		Objective	Questions
_	Alka	ne	
	Which represents an alkane	e	[CPMT 1976]
	(a) $C_5 H_8$	(b) $C_8 H_6$	
	(c) $C_9 H_{10}$	(d) $C_7 H_{16}$	
	The decreasing order of boi	iling points is	[BHU 1999]
	(a) <i>n</i> -Pentane > iso-Pentan	ne > neo-Penta	ane
	(b) iso-Pentane > <i>n</i> -Pentan		
	(c) neo-Pentane > iso-Pen		
	(d) n -Pentane > n eo-Penta		
	To prepare a pure sample of as one reactant, the other r		
	(a) <i>n</i> -propyl bromide		
	(b) Ethyl bromide and <i>n</i> -b	utyl bromide	
	(c) Ethyl chloride and <i>n</i> -b	utyl chloride	
	(d) Methyl bromide and <i>n</i>		
	In the preparation of Grig	nard reagent f	
	the metal (a) Ma	(h) 7 n	[RPET 1999]
	(a) <i>Mg</i> (c) <i>Li</i>	(b) <i>Zn</i> (d) <i>K</i>	
	Sodium acetate can be conv	• •	ie bv
			[Pune CET 1998]
	(a) Heating with $LiAlH_4$		
	(b) Electrolysing its aqueo	us solution	
	(c) Heating with sodalime		
	(d) Heating with calcium a		
•	Which of the following co		
	compositions to prevent th on spark plug, combustion		
	on spark plug, combustion		[KCET 1998]
	(a) Glycerol	(b) Glycol	[
	(c) 1, 2-dibromoethane	(d) Benzene	9
	Which of petroleum corresp	ponds to keros	ene oil
			[DCE 1999]
	(a) $C_{15} - C_{18}$	(b) $C_{10} - C$	12
	(c) $C_5 - C_9$	(d) $C_1 - C_9$	
	In the reaction CH_3 –	-Br + 2Na + Ba	$r - CH_3 \rightarrow$, the
	product called		<u> </u>
	1	9; CPMT 1983	. 86; KCET 1992;
	MP PMT 1994; BHU 1998;		
	(a) Wurtz reaction	(b) Aldol co	ondensation

9.

10.

			H	
	(a) CH_{3}	(b)	$CH_3 - \overset{ }{_{+}} - \overset{ }{_{+}}$	Н
	Н		CH	3
	(c) $CH_3 - CH_3 - CH_3$	(d)	$CH_{3} - C_{+}^{\dagger} - C_{+}^{\dagger}$	CH ₃
12.	The most volatile compound	l is]	DPMT 2000]
	(a) 2, 2-dimethyl propane(c) Isobutane	(b)	2-methyl bu <i>n</i> -pentane	ıtane
13.	In Wurtz reaction, the reage	ent us	sed is FE A	MCET 1008]
-0.	(a) <i>Na</i>		Na/liquidA	
	(c) Na/dry ether		Na/dry alco	
14.	Which of the following has h			
14.	which of the following has i	iigiit		P PMT 2000]
	(a) <i>n</i> -hexane	(b)	<i>n</i> -heptane	
	(c) <i>n</i> -pentane	(d)	2, 2,	4-trimethyl
15	pentane What is from 10			[DDET 1000]
15.	What is freon-12 (a) Pesticide	ഗ	Refrigerant	[RPET 1999]
	(c) Solvent	(d)	Lubricant	
16.	The petrol having octane nu			P PET 2000]
	(a) 20% normal heptane +			
	(b) 80% normal heptane +			
	(c) 20% normal heptane +			
17.	(d) 80% normal heptane + Which of the following react			
1/•	which of the following react	10115	[DPMT 2005]
	(a) $CH_3CH_2CH_2Cl - \frac{Mg/eth}{H_2O}$	er →		
	-			
	(b) $CH_3COCl \xrightarrow{CH_3MgX}_{H_2O}$			
	(c) $CH_3CH = CH_2 \frac{B_2H_6}{CH_3COOH}$	\rightarrow		
	(d) $CH_3CH - CH_3 \xrightarrow{P/HI}$	>		
	ОН			
18.	The shape of methane mole	cule	is [MP PE	Г 1997, 2001]
	(a) Linear	(b)	Trigonal pla	anar
	(c) Square planar	(d)	Tetrahedra	
19.	Which of the following s compound	snow		[CPMT 1996]
	(a) Butene-2	(b)	2, 2-dimeth	
			Butanol-3	
20.	Kerosene is used as fuel bec	ause	it is	[CPMT 1996]
	(a) Less volatile		More volati	
	(c) Cheap		Abundantly	
21.	$CH_3 - CH_2 - CH_2 - CH_3 - $	HBr	\rightarrow Product.	Product in
	above reaction is		[[RPMT 2003]
	(a) $CH_3 - CH - CH_2 - CH$	3		
	Br			

(d) Neopentane

Which of the following has maximum stability[AIIMS 2001]

(b)
$$CH_3 - CH_3 - CH_3$$

 CH_2

(c) Isobutane

(c)
$$CH_2 - CH_2 - CH_2$$

|
 Br CH_3

(d) All of these

22. Which of the following statements is not true for ethane

[AIIMS 1996]

(c) Butene (d) Butane Which of the following is oxidised by $KMnO_4$

(d) Levit reaction

(b) Propane

[AFMC 1997; KCET 1998]

Iodoethane reacts with sodium in the presence of dry

(a) Methane (b) Pentane

(c) Perkin's reaction

ether. The product is

(a) Pentane

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	(a) It can be chlorinated			(d) Saturated hydrocarbor	
	(b) It can be catalytically		34.		nantiomeric pairs that can be
	(c) When oxidised produ	ces CO_2 and H_2O		produced during monochlo	orination of 2-methylbutane is [IIT-JEE 1997]
	(d) It is a homologue of is			(a) 2	(b) 3
23.	Petroleum refining is	[AIIMS 1996; KCET 2004]		(c) 4	(d) 1
	-	um to get different fractions	35.		of[CPMT 1985, 94; KCET 1991]
	(b) Obtaining aromatic compounds present i	compounds from aliphatic			s (b) Aromatic hydrocarbons
		n to get gaseous hydrocarbons		(c) Aliphatic alcohols	(d) None of these
	(d) Purification of petrole		36.	Petroleum ether can be use	
24.		leaded petrol to prevent the		(a) Solvent for fat, oil, vari	nish and rubber
	deposition of lead in the c			(b) As a fuel	
		[Kerala (Med.) 2003]		(c) Both (a) and (b)(d) None of these	
	(a) Iso-octane	(b) Ethylene dibromide	37.	Which of the following are	produced from coaltar
	(c) Tetraethyl lead(e) <i>n</i>-Heptane	(d) Mercaptan	3/•	which of the following are	[MNR 1987; UPSEAT 2002]
25.	-	ines, the type of hydrocarbons		(a) Synthetic dyes	(b) Drugs
23.		is[CBSE PMT 1997; AFMC 1997]		(c) Perfumes	(d) All the three
	(a) Branched hydrocarbo		38.	In alkanes, the bond angle	is [MP PMT 1989; BHU 1996]
	(b) Straight-chain hydro	carbon		(a) 109.5°	(b) 109°
	(c) Linear unsaturated h	ydrocarbon		(c) 120°	(d) 180°
	(d) Toluene		39.	.,	anes; a concentrated aqueous
26.		s not formed by the reaction of		solution of sodium or	potassium salts of saturated
	Cl_2 on CH_4 in sunlight	[AIIMS 1987]			ed to[CPMT 1985; MP PET 1999]
	(a) $CHCl_3$	(b) CH_3Cl		(a) Hydrolysis	(b) Oxidation(d) Electrolysis
	(c) CH_3CH_3	(d) $CH_3CH_2CH_3$	40.	(c) Hydrogenation Halogenation of alkanes is	•
27.	Which of the following ha	s the highest boiling point	40.	fialogenation of alkalies is	[MP PET 1993; KCET 1998]
		[DPMT 1986]		(a) Electrophilic substituti	
	(a) Neopentane	(b) <i>n</i> -butane		(b) Nucleophilic substituti	
	(c) <i>n</i> -heptane	(d) Isobutane		(c) Free-radical substitution	on
28.	Which gives CH_4 when t	reated with water		(d) Oxidation	l
		79; NCERT 1976; IIT-JEE 1990]	41.		d to reduction with hydroiodic tle <i>P</i> , the product formed is
	(a) Silicon carbide	(b) Calcium carbide		F F	[JIPMER 1997]
	(c) Aluminium carbide	(d) Iron carbide		(a) Ethane	(b) Propane
29.	Which of the following do			(c) Butane	(d) None of these
			42.	When ethyl iodide and pro presence of ether, they form	pyl iodide react with <i>Na</i> in the BHU 1997
	(a) CH_3OH	(b) CH_3COOH		(a) One alkane	(b) Two alkanes
	(c) CH_3CHO	(d) $C_2 H_6$		(c) Four alkanes	(d) Three alkanes
30.	-	compounds is insoluble even in	43 .	The alkane that yields	two isomeric monobromo
	hot concentrated H_2SO_4	[IIT-JEE 1983]		derivatives is	
	(a) Ethylene	(b) Benzene		(a) Neopentane	(b) Ethane
	(c) Hexane	(d) Aniline	44.	(c) Methane Kerosene is a mixture of	(d) Propane [CPMT 1979; AFMC 1992]
31.		and ethyl	44•	(a) Alkanes	(b) Aromatic compounds
	alcohol gives [CPMT 1 (a) Methane	(b) Ethane		(c) Alcohols	(d) Aliphatic acids
	(c) Propane	(d) Butane	45.	When petroleum is heated	the vapours contain mainly
32.	· · ·	h can be obtained in single step		<pre>//</pre>	[CPMT 1981]
J	from	i can se ostanica in oingie stop		(a) Kerosene	(b) Petroleum ether
	[CPMT 1974; MP PET 1995	; AFMC 1998, 2000; BHU 2005]		(c) Diesel	(d) Machine oil
	(a) CH_3I	(b) $C_2 H_5 I$	46.	Iso-octane is mixed to the p	
	(c) CH_3OH	(d) C_2H_5OH		(a) To precipitate inorgani(b) To prevent freezing of	
33.	Paraffin wax is	[MP PMT 1986; CPMT 1993]		(c) To increase boiling poi	-
	(a) Ester	/ ////		(d) As an antiknock	int of petion
	(b) Alcohol		47.	• •	[NCERT 1976, 79; DPMT 1984;
	(c) Unsaturated hydroca	rbon	• / *	,	CPMT 1989, 91; BHU 1995]

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	(a) Fire extinguisher(c) Petroleum additive		
48.	Cyclohexane, a hydrocarboi		
•	5 , 5	[NCERT 1976]	
	(a) It is immiscible with water		
	(b) Its density is low as con	-	
	(c) It is non-polar substant		
40	(d) It is immiscible and light Natural gas contains mainly		
49 .		9, 2000, 01, 02; BCECE 2005]	
	(a) Methane	(b) <i>n</i> -butane	
	(c) <i>n</i> -octane	(d) Mixture of octane	
50.	Which compound is not inf	ammable [MP PET 2001]	
	(a) CCl_4	(b) $C_2 H_5 OH$	
	(c) CH_4	(d) $C_6 H_6$	
51.	Propane is obtained from	n propene, by which of the	
	following methods [CBSE PMT 2001; AFMC 2001]	
	(a) Wurtz reaction	(b) Dehydrogenation	
		(d) Catalytic hydrogenation	
52.		used as antiknock agent in 9; CPMT 2000; Pb. CET 2000;	
		MP PET 2001]	
	(a) $(C_2H_5)_4 Pb$	(b) <i>TNT</i>	
	(c) CH_3MgBr	(d) $(C_2H_5)_2Hg$	
53.	In catalytic reduction of h	ydrocarbons which catalyst is	
	mostly used	[DCE 2001]	
	(a) <i>Pt</i> / <i>Ni</i>	(b) <i>Pd</i>	
	(c) SiO_2	(d) Misch Metal	
54 .		ne to form [MP PET 2001]	
	(a) $Br - CH_2 - CH_3$	(b) $CH_3 - CBr_3$	
	(c) $Br - CH_2 - CH_2Br$	(d) $CHBr_3$	
55.	Gasoline is obtained from c		
	(a) Fractional distillation	[MP PMT 1999] (b) Vacuum distillation	
	(c) Steam distillation	(d) Pyrolysis	
56.	Which of the following does		
0	0	[MP PMT 1999]	
	(a) Reaction of CH_3I with	<i>Na</i> in ether	
	(b) Reaction of sodium ace	tate with sodalime	
	-	ated sodium acetate solution	
	(d) Reaction of ethyl chlori		
57.	<i>LPG</i> is a mixture of	[MP PMT 1999; KCET 2005]	
	(a) $C_6 H_{12} + C_6 H_6$	1 10 5 0	
		(d) $C_2H_4 + CH_4$	
58.		ed in making printer's ink, is	
	obtained by decomposition (a) Acetylene	of [MP PET 1993] (b) Benzene	
	(c) Carbon tetrachloride		
59.		ead to petrol [MP PET 1993]	
	(a) Lowers its octane numb		
	(b) Raises its octane numb	er	
		. 1	

- (c) May raise or lower the octane number
- (d) Has no effect on octane number

	60.	Which of the following compound has maximum boiling
		point [IIT-JEE 1982; MP PMT 1986;
		MADT Bihar 1995; Pb. PMT 1999]
		(a) <i>n</i> -hexane (b) <i>n</i> -pentane
		(c) 2, 2-dimethyl propane (d) 2-methyl butane
	61.	Knocking sound occurs in engine when fuel [CPMT 1981]
		(a) Ignites slowly
		(b) Ignites rapidly
_		(c) Contains water
	6-	(d) Is mixed with machine oil
	62.	Petroleum is mainly a mixture of [CPMT 1984; Pb. PMT 1999]
		(a) Alkanes (b) Cyclohexane
		(c) Benzenoid hydrocarbons (d) Alkenes
	63.	Which of the following has maximum boiling point
	03.	[IIT-JEE 1986; MP PMT 1986; CPMT 1989]
•		(a) <i>iso</i> -octane
		(b) <i>n</i> -octane
		(c) 2, 2, 3, 3-tetramethyl butane
		(d) <i>n</i> -butane
l	64.	Aqueous solution of the following compound on
;		electrolysis gives ethane
		[NCERT 1983; MP PET 1985; CPMT 1975, 79]
		(a) Acetic acid (b) Acetamide
		(c) Potassium acetate (d) Ethyl acetate
5	65.	Which of the following does not decolourise bromine
		solution in carbon disulphide [MP PET 1986]
		(a) Acetylene(b) Propene(c) Ethane(d) Propyne
	66.	Anhydrous sodium acetate on heating with sodalime gives
1	00.	[CPMT 1972, 84; Pb. CET 2001, 2003]
•		(a) Acetic acid (b) Methane
		(c) Calcium acetate (d) Ethane
	67.	Water gas is [CPMT 1993, 2004; Pb. PMT 2004]
_		(a) $CO + CO_2$ (b) $CO + N_2$
		(c) $CO + H_2$ (d) $CO + N_2 + H_2$
	68.	A sample of gasoline contains 81% <i>iso</i> -octane and 19% <i>n</i> -
	00.	heptane. Its octane number will be [MP PMT 1995]
1		(a) 19 (b) 81
		(c) 100 (d) 62
	69.	The natural petroleum contains [MP PMT 1995]
		(a) Saturated hydrocarbons
		(b) Cyclic saturated hydrocarbons
		(c) Compounds of sulphur
		(d) All of these
	70.	The preparation of ethane by electrolysis of aqueous
		solution of potassium acetate is called as [MP PMT 1995]
5		(a) Wurtz reaction
I		(b) Sabatier-Senderen's reaction
		(c) Kolbe's synthesis (d) Crignard reaction
		(d) Grignard reaction
I	71.	Action of hydrogen chloride on $CH_3 - C = CH_2$ and on
		CH ₃
		CH = CH will predominantly give the compounds.

 $CH \equiv CH$ will predominantly give the compounds, respectively

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(a)
$$CH_3 - CH = CH_2Cl$$
 and $CH_2Cl - CH_2Cl$
 \downarrow
 CH_3
(b) $CH_3 - CCl = CH_3$ and $CH_3 - CHCl_2$

$$\stackrel{|}{CH_3}$$

(d)
$$CH_3 - CH = CH_3$$
 and $CH_2Cl - CH_2Cl_3$

- 72. As the number of carbon atoms in a chain increases the boiling point of alkanes [AFMC 1989]
 - (a) Increases
 - (b) Decreases
 - (c) Remains same
 - (d) May increase or decrease

73. In the fractional distillation of crude petroleum

[Roorkee 1989]

- (a) Petrol condenses at the bottom of the column
- (b) The gases condense at the top of the column
- (c) High boiling constituents condense at the bottom of the column
- (d) High boiling constituents condense at the top of the column
- Which of the following is not an endothermic reaction 74.

[J & K 2005]

- (a) Dehydrogenation
- (b) Ethane to ethene
- (c) Combustion of propane
- (d) Change of chlorine molecule into chlorine atoms.
- Gasoline is the name of [Roorkee 1989] (a) Crude oil

75.

- (b) The gaseous constituents of petroleum
- (c) The mixture of uncondensed gases produced in the distillation of crude oil
- (d) The mixture of the residue and gas oil obtained in the distillation of crude oil
- In the process of cracking 76. [Roorkee 1080]
 - (a) Organic compounds decompose into their constituent elements
 - (b) Hydrocarbons decompose into carbon and hydrogen
 - compounds (c) High molecular weight organic decompose to give low molecular weight organic compounds
 - (d) Hydrocarbons yield alkyl radicals and hydrogen
- Octane number has o value for 77.

[Roorkee 1989; MP PET 1999, 2002; MP PMT 2001; KCET 2002]

(b) *n*-hexane

(a)	iso-octane	

- (c) *n*-heptane (d) iso-heptane
- Dry distillation of sodium propanoate with sodalime gives 78. [CPMT 1996]

(a) Propane	(b) Propene

- (c) Ethane (d) Ethene
- What is the chief product obtained when *n*-butane is 79. treated with bromine in the presence of light at 130° C

[IIT-JEE 1995]

(a)
$$CH_{3} - CH_{2} - CH - Br$$

 CH_{3}
(b) $CH_{3} - CH - CH_{2} - Br$
 CH_{3}
(c) $CH_{3} - C - Br$
 CH_{3}

(d)
$$CH_3 - CH_2 - CH_2 - CH_2 - Br$$

- 80. A mixture of propene and methane is obtained by the cracking of
 - (b) 2-butene (a) 1-butene (c) *n*-butane (d) Isobutane
- 81. Which of the following fractions of petroleum refining contains kerosene ? (Boiling ranges in °C are given below)
 - (a) 40-80 (b) 80-200
 - (c) 200 300 (d) Above 300
- 82. Which of the following statements is incorrect ? The members of the homologous series of alkanes

[NCERT 1974]

- (a) Are all straight chain compounds
- (b) Have the general formula $C_n H_{2n+2}$
- (c) Have similar chemical properties
- (d) Show a regular gradation of physical properties
- 83. On mixing tetraethyl lead to gasoline available at petrol [CPMT 1981] pumps
 - (a) Calorific value of the fuel increases
 - (b) Odour diminishes
 - (c) Less smoke is obtained on combustion
 - (d) Antiknock property of fuel increases
- 84. A liquid hydrocarbon can be converted to gaseous [CPMT 1980; MP PMT 2001] hydrocarbon by (a) Cracking
 - (b) Hydrolysis
 - (c) Oxidation
 - (d) Distillation under reduced pressure
- 85. The tetrahedral nature of carbon was first given by

[MP PMT 1994]

(b) Le Bell and Van't Hoff

- (a) Kekule
- (c) Pauling (d) Armstrong and Bayer
- Formation of alkane by the action of *Zn* on alkyl halide is 86. called [DPMT 1984; MHCET 2004]
 - (a) Frankland's reaction (b) Wurtz reaction
 - (c) Cannizzaro reaction (d) Kolbe's reaction
 - Which of the following compounds will form a
- 87. hydrocarbon on reaction with Grignard reagent[CPMT 1988, 93] (a) CH_3CH_2OH (b) CH_3CHO

(c)
$$CH_3COCH_3$$

- (d) $CH_3CO_2CH_2$
- 88. Name the hydrocarbon that is a liquid at STP (a) Ethane (b) Propane
 - (c) n-butane (d) n-pentane
- 89. Which statement is not true concerning alkanes

[MP PET 2003]

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- (a) Large number alkanes are soluble in water
- (b) All alkanes have a lower density than water
- (c) At room temperature some alkanes are liquids, some solids and some gases
- (d) All alkanes burn

90. Fischer Tropsch process is used for the manufacture of

- (a) Synthetic petrol [DCE 1999; MP PET 2003] (b) Thermosetting plastics
- (c) Ethanol (d) Benzene
- **91.** Which one of the following compounds cannot be prepared by Wurtz reaction [Kurukshetra CEE 2002; MP PMT 2002; MP PET 2003]
 - (a) CH_4 (b) C_2H_6
 - (c) $C_3 H_8$ (d) $C_4 H_{10}$
- 92. A fuel contains 25 % *n*-heptane and 75 % iso-octane. Its octane number is [MP PMT 1993; MP PET 1994]
 (a) 50 (b) 75
 - (c) 100 (d) 25
- 93. Sodium ethoxide is a specific reagent for [CPMT 1985](a) Dehydration
 - (b) Dehydrogenation
 - (c) Dehydrohalogenation
 - (d) Dehalogenation
- 94. Which of the following has highest percentage of hydrogen

				[CPM1 1975; 79]
(a)	CH_4	(b)	C_2H_4	
(c)	$C_6 H_6$	(d)	C_2H_2	

95. What is the molecular formula of the alkane, the 5.6 *litre* of which weight 11 *g* at STP [MP PMT 2003]

(a) $C_6 H_{14}$ (b) $C_4 H_{10}$

(c) $C_3 H_8$ (d) $C_2 H_6$

- **96.** The reference compound `iso-octane' which is used in determining the octane number of gasoline has the structure
 - (a) $CH_3 CH(CH_3) CH(CH_3) CH(CH_3) CH_3$
 - (b) $CH_3 C(CH_3)_2 CH_2 CH(CH_3) CH_3$
 - (c) $CH_3 C(CH_3)_2 CH(CH_3) CH_2 CH_3$
 - (d) $CH_3 C(CH_3)_2 C(CH_3)_2 CH_3$
- **97.** Sample of 2, 3-dibromo-3-methylpentane is heated with zinc dust. The resulting product is isolated and heated with *HI* in the presence of phosphorus. Indicate which is the structure that represent the final organic product formed in the reaction [CBSE PMT 1991]

(a)
$$CH_3 - CH_2 - CH - CH_2 - CH_3$$

 CH_3
(b) $CH_2 = CH - CH - CH_2 - CH_3$
(c) $CH_3 - CHI - CH - CH_2 - CH_3$
 $CH_3 - CHI - CH - CH_2 - CH_3$
 $CH_3 - CHI - CH - CH_2 - CH_3$

(d)
$$CH_2 = CH - C(I) - CH_2 - CH_3$$

- 98. The order of appearance of the following with rising temperature during the refining of crude oil is [MNR 1993; UPSEAT 2002]
 (a) Kerosene oil, gasoline, diesel
 (b) Diesel, gasoline, kerosene oil
 (c) Gasoline, diesel, kerosene oil
 (d) Gasoline, kerosene oil, diesel
- 99. When sodium propionate is heated with soda lime, the main product is [AMU 2002]
 - (a) Ethane (b) Methane
 - (c) Propane (d) Butane
- **100.** Gasoline is a mixture of alkanes with the number of carbon atoms

 [CPMT 1983, 84; BVP 2003]
 - (a) $C_3 C_5$ (b) $C_5 C_6$
 - (c) $C_6 C_8$ (d) $C_7 C_9$
- **101.** The final product of complete oxidation of hydrocarbons is

[CPMT	1981]
-------	-------

- (a) Acid (b) Aldehyde
- (c) $H_2O + CO_2$ (d) Dihydric alcohol
- 102. Which of the following will have least hindered rotation about carbon-carbon bond[IIT-JEE 1987; CPMT 1989, 94]
 - (a) Ethane(b) Ethylene(c) Acetylene(d) Hexachloroethane
- **103.** Which of the following represents the most oxidized form
- of hydrocarbon [MP PMT/PET 1988]
 - (a) CO_2 (b) RCHO
 - (c) *RCOOH* (d) *RCOOOH*
- **104.** Name the reaction

$$C_{10}H_{22} \xrightarrow{900\,\text{K}} C_4H_8 + C_6H_{14}$$

[MP PET 1995; MP PMT 1997]

- (a) Alkylation (b) Cracking
- (c) Pyrolysis (d) Fractionation
- **105.** How many types of carbon atoms are present in 2, 2, 3-trimethylpentane
 - (a) One (b) Two
 - (c) Three (d) Four
- 106. Which one gives only one monosubstitution product on chlorination [AIEEE 2003]
 (a) *n*-pentane (b) Neopentane

(d) *n*-butane

- (c) Isopentane
- **107.** CH_4 is formed when
 - (a) Sodium acetate is heated with sodalime
 - (b) Iodomethane is reduced
 - (c) Aluminium carbide reacts with water
 - (d) All of these
- 108. A mixture of methane, ethylene and acetylene gases is passed through a Wolf's bottle containing ammoniacal cuprous chloride. The gas coming out is [NCERT 1976](a) Methane



[AFMC 1987]

- (b) Acetvlene
- (c) A mixture of methane and ethylene
- (d) The original mixture
- 109. At room temperature solid paraffin is [RPET/PMT 1999]
 - (a) $C_3 H_8$ (b) $C_8 H_{18}$

(c)
$$C_4 H_{10}$$
 (d) $C_{20} H_{42}$

- 110. Which one of the following compounds does not give addition reactions [MADT Bihar 1981]
 - (a) Aldehydes (b) Alkanes
 - (c) Alkenes (d) Alkynes
 - (f) All of these (e) Ketones
- The most important method of preparation of 111. hydrocarbons of lower carbon number is[CBSE PMT 1989]
 - (a) Pyrolysis of higher carbon number hydrocarbons
 - (b) Electrolysis of salts of fatty acids
 - (c) Sabatier and Senderen's reaction
 - (d) Direct synthesis
- 112. The inorganic origin of petroleum is indicated by the fact that [Roorkee 1990]
 - (a) Its constituents can be separated by fractional distillation
 - (b) Carbon and hydrocarbon can combine by absorption of solar energy to give hydrocarbons
 - (c) Petroleum contains traces of chlorophyll
 - (d) Oil fields are located with the help of seismograph
- 113. Which of the following is a gemdihalide [CPMT 1976, 88]

[BHU 2005]

[MP PMT 1986]

- (a) $CH_3.CHBr.CHBr.CH_3$ (b) $CH_2Br.CH_2Br$
- (c) CHBr = CHBr(d) CH_3CHBr_2
- **114.** Which one of the following contain isopropyl group
 - (a) 2,2,3,3-tetramethylpentane
 - (b) 2-methylpentane
 - (c) 2,2,3-trimethylpentane
 - (d) 3,3-dimethylpentane
- 115. Natural gas is a mixture of
 - (a) $CO + CO_2$
 - (d) $CH_4 + C_2H_6 + C_3H_8$ (c) $CO + H_2 + CH_4$

(b) $CO + N_2$

- 116. By Wurtz reaction, a mixture of methyliodide and ethyliodide gives [BHU 2003]
 - (a) Butane
 - (b) Ethane
 - (c) Propane
 - (d) A mixture of the above three
- 117. Product obtained by nitration of propane is [RPMT 2003]
 - (a) Nitropropane (b) Nitromethane
 - (c) Nitroethane (d) All of these
- 118. Isomerism in saturated hydrocarbons is due to
 - (a) Change in the valence of carbon
 - (b) Change in the ratio of elements in compounds
 - (c) Formation of branches in the chain of C atoms
 - (d) Formation of double bond

- **119.** Photochemical chlorination of alkane is initiated by a process of [DPMT 1985; NCERT 1978]
 - (a) Pyrolysis (b) Substitution
 - (c) Homolysis (d) Peroxidation
- **120.** Which of the following is not linked with methane
 - (a) Marsh gas (b) Natural gas
 - (c) Producer gas (d) Coal gas
- **121.** Which of the following has highest octane number
 - [MP PET 1996]

- (a) *n*-hexane
- (b) *n*-heptane
- (c) Iso-octane
- (d) n-heptane and iso-octane mixed in ratio 50 : 50
- **122.** A mixture of ethyl iodide and *n*-propyl iodide is subjected to Wurtz reaction. The hydrocarbon that will not be formed is
 - [IIT-JEE (Screening) 1990]

(b) *n*-propane

- (a) *n*-butane
- (d) *n*-hexane (c) *n*-pentane
- **123.** Most of the hydrocarbons from petroleum are obtained by [CPMT 1974, 80]
- (a) Fractional distillation (b) Fractional crystallization
 - (c) Vaporization (d) Polymerization
- **124.** Which is the best antiknock compound or Which one of the following substances is used as an antiknock compound

[CPMT 1974, 81, 99, 2000; RPMT 2002; CBSE PMT 1996; KCET (Med.) 2000 MP PET 1985, 87, 97, 2001;

- MP PMT 1994, 96; AIIMS 2000]
- (a) Lead tetrachloride (b) Lead acetate
- (c) Zinc ethyl (d) Tetraethyl lead (TEL)
- 125. In the dichlorination reaction of propane, mixture of products are obtained. How many isomers, the mixture contains [Orissa JEE 2003]
 - (a) 2 (b) 3
 - (c) 4 (d) 5
- 126. Which of the following cycloalkane gives open chain compound, when reacts with bromine [Orissa JEE 2003]
 - (a) Cyclopropane (b) Cyclopentane
 - (c) Cyclohexane (d) Cyclo-octane
- Grignard reagent is not prepared in aqueous medium but 127. prepared; in ether medium because the reagent
 - [KCET 2002]
 - (a) Reacts with water (b) Is insoluble in water
 - (c) Is highly reactive in ether
 - (d) Becomes inactive in water
- 128. A sample of petrol is a mixture of 30% n-heptane and 70% iso-octane. The sample has octane number

[MP PET 1985]

- (a) 30 (b) 70 (c) 15
 - (d) 35
- 129. For the reduction of ketones to hydrocarbon, the appropriate agent is [DPMT 2002] (a) *HI* (b) Zn - Hg/HCl





	(c) Red phosphorous	(d) $H_2 SO_4$		(c) Gasoline	(d) Heavy oil
130.		$\lim_{n \to \infty} \sup_{x \to 0} \sup_{x \to 0} x$	141.	The marsh gas detecto	r used by miners works on the
Ū		rms sulphonic acid, is called		principle of	[AMU 1984]
		[MH CET 1999]		(a) Difference in the rat(b) Avogadro's hypothes	-
	(a) Nitration(c) Sulphonation	(b) Halogenation		(c) Gay-Lussac's law of	
191	Propane is obtained from p	(d) Oxidation		(d) Berzelius hypothesis	0
1.31.		[CPMT 1997; CBSE PMT 2001;	142.	Methane can be prepare	
		AFMC 2001; MH CET 2001]		(a) Wurtz's reaction	(b) Decarboxylation
	(a) Catalyst hydrogenation	(b) Wurtz reaction		(c) Hydrogenation reac	
	(c) Dehydrogenation	(d) Frankland reaction	143.	The most strained cycloa	
132.	B.P. of branched chain alk chain alkanes are	anes as compared to straight		(a) Cyclopropane	(b) Cyclobutane
	(a) Lower	[MP PMT 1987; AIIMS 1999]	144	(c) Cyclopentane	(d) Cyclohexane th chlorine in dark [Pb. PMT 2000]
	(b) Equal		144.	(a) C_2H_4	(b) $C_2 H_2$
	(c) Higher				
	(d) Independent of the cha	in		(c) CH_4	(d) CH_3CHO
133.	Daily use candles (paraffin	wax) contain [CPMT 1996]	145.	Main constituent of mar	-
	(a) Higher saturated hydro	carbon			1980; MP PMT 1994; AFMC 1997]
	(b) Lower saturated hydrod			(a) $C_2 H_2$	(b) CH_4
	(c) Higher unsaturated hyd			(c) $H_2 S$	(d) <i>CO</i>
	(d) Lower unsaturated hyd		146.		g method can be used for the
34.	The reaction $CH_4 + Cl_2 -$	$\xrightarrow{\text{uv light}} CH_3Cl + HCl \text{ is an}$		preparation of methane (a) Wurtz reaction	(b) Kolbe's reaction
	example of	[CBSE PMT 1999, 2002]		(c) Reduction of alkyl h	
	(a) Addition reactions	(b) Substitution reaction	147.		
	(c) Elimination reaction	(d) Rearrangement reaction			[MP PET 2000, 03]
35.	Normal butane convert into	isobutane by [RPMT 2002]		(a) Methane	(b) Ethane
	(a) $LiAlH_4$	(b) $AlCl_3$		(c) Propane	(d) Butane
	(c) $NaBH_4$	(d) Zn/HCl	148.	<i>C-H</i> bond length is great	
06	Alcoholic solution of KOH is				EE 1989; MNR 1990; AMU 2002]
30.		CPMT 1982, 86; IIT-JEE 1990]		(a) $C_2 H_2$	(b) $C_2 H_4$
	(a) Dehydration	(b) Dehydrogenation		(c) $C_2 H_6$	(d) $C_2H_2Br_2$
	(c) Dehydrohalogenation		149.		ing compounds does not form an
37.	Aluminium carbide on reac	-		ozonide	[EAMCET 1997]
		[NCERT 1981; MP PET 1985]		(a) Ethene(c) Propene	(b) Propyne(d) Propane
	(a) Methane	(b) Ethane	150.	Which type of hybridisat	-
	(c) Ethene	(d) Ethyne	1.301		; Bihar MEE 1996; JIPMER 1997]
1 38.	Maximum carbon-carbon b			(a) <i>sp</i>	(b) sp^2
	(a) Ethyne	[T-JEE 1981; Bihar MEE 1995] (b) Ethene		(c) sp^{3}	(d) sp^3d
	(c) Ethane	(d) Benzene	151.	Silver acetylide when he	ated with <i>HCl</i> gives
30.		tion is expected to readily give	-	(a) $C_2 H_2$	(b) H_2
0,7		bod yields [CBSE PMT 1997]		(c) $C_2 H_4$	(d) None of these
	(a) RCOOK	\xrightarrow{dys}	152.		with ethyl iodide, which of the
	(b) $RCOOAg \xrightarrow{l_2}$			following hydrocarbons	-
	-			(a) Methane	[NCERT 1984; BHU 1982] (b) Ethane
	(c) $CH_3 - CH_3 \xrightarrow{Cl_2}_{hv}$			(c) Butane	(d) Ethene
	(d) $(CH_3)_2 CCl - \frac{C_2H_5OH}{C_2H_5OH}$	>	153.	Solid methane is	[DPMT 1983; CBSE PMT 1989]
10	5 2	tions of petroleum, the one		(a) Molecular solid	(b) Ionic solid (d) Net peggible
+0.	having the lowest boiling	g point is or Which of the	154	(c) Covalent solid The shape of ethane is	(d) Not possible [Bihar CEE 1995]
	following is obtained at low	vest temperature by fractional	-04.	(a) Triangular	(b) Tetrahedral
	-	[MP PMT 1993; MP PET 1996]		(c) Linear	(d) None of these
	(a) Kerosene	(b) Diesel oil			

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alkene

155.	$CH_3 MgI$ will give methane with	[Roorkee 1995]
		$CH_3 - CH_2 - NH_2$
	(c) $CH_3 - CO - CH_3$ (d)	All of these
156.	Propane-1-ol can be prepared	
	reaction with (a) CH_3COOH (b)	[MP PMT 2003] <i>H</i> ₃ <i>BO</i> ₃
	(c) $B_2H_6 / NaOH, H_2O_2$ (d)	
157.		
-071	down into lower hydrocarbons	
	called	[MP PMT 2002]
		Cracking
	(c) Oxidation (d) Successive alkanes differ by	Reduction
150.		[MP PMT 2002]
	-	C_2H_4
159.	General formula of alkane is	- 2 4
	[EAMCET]	1979; Manipal MEE 1995]
		$C_n H_{2n-1}$
		$C_n H_{2n+1}$
160.	Methane and ethane both can b which of the following compound	
		CH ₃ O
	(c) CH_3Br (d)	CH_3CH_2OH
161.		alkane is initiated by a
	process of	[Kerala PMT 2004]
		Substitution Peroxidation
	(e) Homolysis	1 of officiation
162.	A petroleum fraction having bot containing 6-10 carbon atoms pe	
	containing 0-10 carbon atoms pe	[UPSEAT 2004]
	e	Gas oil
162	(c) Gasoline (d) Producer gas is a mixture of	Kerosene
103.	-	ET 2002; UPSEAT 2004]
	(a) CO and N_2 (b)	CO_2 and H_2
		CH_4 and N_2
164.	The highest boiling point is expe	cted for [DEC. 2003]
	(a) <i>n</i> – butane(b) iso-octane	
	(c) n – octane	
	(d) 2,2,3,3-tetramethyl butane	
165.	Which of the following is a go electricity	[Pb. CET 2003]
	(a) Diamond (b)	Graphite
		Charcoal
166.	Which one of the following has point	as the minimum boiling
	-	[AIEEE 2004]
		1-Butyne Isobutane
167.	(c) n-Butane (d) Octane number can be changed l	
- / -	(a) Isomerisation (b)	Alkylation
160	-	All of these
108.	Gasoline has composition (a) $C_8 - C_{12}$ (b)	[AFMC 2004] $C_2 - C_5$
	$(u) c_8 c_{12}$ (b)	c_2 c_5

(c) $C_6 - C_{11}$	(d) None of these
--------------------	-------------------

- **169.** The complete combustion of CH_4 gives [BHU 2004]
 - (a) $CO + H_2$ (b) $CO + N_2$
 - (c) $CO_2 + H_2O$ (d) $CO + N_2O$

170. Which of the following has highest knocking [UPSEAT 2004]

- (a) Olefins
 - (b) Branched chain olefins
 - (c) Straight chain olefins
 - (d) Aromatic hydrocarbons
- **171.** Which one of the following compounds gives methane on treatment with water [Kerala PMT 2004; MH CET 2004]
 - (b) CaC_2 (a) Al_4C_3 (c) VC (d) *SiC*
 - (e) $B_4 C$
- 172. Pick out the alkane which differs from the other members of the group. [KCET 2004]
 - (a) 2,2-dimethyl propane
 - (b) Pentane
 - (c) 2-methyl butane
 - (d) 2,2-dimethyl butane
- 173. 2-Methylbutane on reacting with bromine in the presence of sunlight gives mainly [AIEEE 2005] (a) 1-bromo-2-methylbutane
 - (b) 2-bromo-2-methylbutane
 - (c) 2-bromo-3-methylbutane
 - (d) 1-bromo-3-methylbutane

174. Of the five isomeric hexanes, the isomer which can give two monochlorinated compounds is [AIEEE 2005] (a) *n*-hexane

- (b) 2, 3-dimethylbutane (c) 2, 2-dimethylbutane
- (d) 2-methylpentane
- **175.** The product obtained on reaction of C_2H_5Cl with hydrogen over palladium carbon is [AFMC 2005] (a) $C_3 H_8$ (b) $C_4 H_{10}$ (c) $C_2 H_6$ (d) $C_2 H_4$
 - - Alkene
- Addition of bromine to 1, 3-butadiene gives 1.
 - [CPMT 1987, 93]
 - (a) 1, 2 addition product only
 - (b) 1, 4 addition product only
 - (c) Both 1, 2 and 1, 4 addition products
 - (d) No reaction
- 2. When ethylene bromide is treated with *Zn*, we get

[RPMT 1997]

- (a) Alkane (b) Alkene (c) Alkyne (d) All
- Ethene when treated with Br_2 in the presence of CCl_4
- which compound is formed

[RPMT 1997; DCE 2001; KCET (Med.) 1999]

- (a) 1, 2-dibromoethane
- (b) 1-bromo-2-chloroethane
- (c) Both (a) and (b)

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3.



- (d) 1, 1, 1-tribromoethane
- 4. In a reaction

$$CH_{2} = CH_{2} \xrightarrow{\text{Hypochloro us}} M \xrightarrow{R} |$$

$$CH_{2} = OH_{2} \xrightarrow{\text{Hypochloro us}} M \xrightarrow{R} |$$

$$CH_{2} = OH_{2} \xrightarrow{R} |$$

Where M = molecule; R = reagent M and R are

[CBSE PMT 1997; CPMT 2001]

- (a) CH_3CH_2Cl and NaOH
- (b) $CH_2Cl CH_2OH$ and aq. $NaHCO_3$
- (c) CH_3CH_2OH and HCl
- (d) $CH_2 = CH_2$ and heat

(a) Ethane

5. Alkenes usually show which type of reaction

(a) Addition (b) Substitution

- (c) Elimination (d) Superposition
- The propene reacts with *HBr* to form
 - [AIIMS 1999; RPET 1999]
 - (b) Hexane
- (c) 1-bromo-propane (d) 2-bromo propane

7. Ethylene may be obtained by dehydration of which of the following with concentrated H_2SO_4 at $160 - 170^{\circ}C$

			[RPET 1999]
(a)	C_2H_5OH	(b)	CH ₃ OH
(c)	$CH_{2}CH_{2}CH_{2}OH$	(d)	$(CH_{2})_{2}CHCH_{2}OH$

8.

6.

$$H_{3}C \xrightarrow{CH_{3}} CH_{3} \xrightarrow{X} CH_{3} \xrightarrow{CH_{3}} CH_{3} \xrightarrow{CH_{3}} CH_{3} \xrightarrow{CH_{3}} CH_{3}$$

X in the above reaction is[CPMT 1985, 93](a) HNO_3 (b) O_2

(c) O_3 (d) $KMnO_4$

9. The disappearance of the characteristic purple colour of *KMnO*₄ in its reaction with an alkene is the test for unsaturation. It is known as

[CPMT 1989, 94; CBSE PMT 1990]

- (a) Markownikoff's test (b) Baeyer's test
- (c) Wurtz's test (d) Grignard test
- **10.** A gas formed by the action of alcoholic *KOH* on ethyl iodide, decolourises alkaline *KMnO*₄. The gas is

[KCET 2003]

(a) $C_2 H_6$ (b) CH_4

(c)
$$C_2 H_2$$
 (d) $C_2 H_4$

11. $CH_3 - CH_2 - Cl \xrightarrow{alc.KOH} A$, the product is

[CPMT 2003] (a) *CH*₃*CH*₂*OK* (b) *CH*₃*CHO*

- (c) $CH_3CH_2OCH_2CH_3$ (d) $CH_2 = CH_2$
- 12. The final product formed when ethyl bromide is treated with excess of alcoholic *KOH* is [MP PET 1999]
 (a) Ethylene (b) Ethane

- (c) Ethyne (d) Vinyl bromide
- **13.** Which of the following hydrocarbons cannot be obtained by Sabatier and Senderen's reaction
 - (a) CH_4 (b) C_2H_6
 - (c) $C_3 H_8$ (d) All
- 14. When 3, 3-dimethyl-2-butanol is heated with H_2SO_4 the
major product obtained is [CBSE PMT 1995]
 - (a) *cis* and *trans* isomers of 2, 3-dimethyl-2-butene
 - (b) 3, 3-dimethyl-1-butene
 - (c) 2, 3-dimethyl-2-butene
 - (d) 2, 3-dimethyl-1-butene
- **15.** The intermediate during the addition of *HCl* to propene in the presence of peroxide is [IIT-JEE 1997]

(a)
$$CH_3 CHCH_2 Cl$$
 (b) $CH_3 CHCH_3$

(c)
$$CH_3CH_2CH_2$$
 (d) $CH_3CH_2CH_2$

16. $CH_2 = CH_2 \xrightarrow{KMnO_4} X$. Product 'X' in above reaction is

[RPMT 2003]

(a)	Ethylene glycol	(b)	Glucose
(c)	Ethanol	(d)	All of these

17. Which of the following compounds represents acrylonitrile

[JIPMER 1997]

- (a) Vinyl cyanide (b) Cyanoethene
- (c) Prop-2-ene nitrile (d) All of them
- **18.** When acetylene reacts with arsenic trichloride in the presence of anhydrous aluminium chloride, it produces

[AFMC 1999]

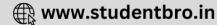
- (a) Lewisite
- (b) β -chlorovinyl dichloroarisine
- (c) Nitrobenzene
- (d) Both (a) and (b)
- **19.** Ozonolysis of which one of the following will give two molecules of acetaldehyde

[Bihar MEE 1997; MP PET 2000]

- (a) 1-butene (b) 2-butene
- (c) 1-pentene (d) 2-pentene
- (e) None of these
- **20.** In which of the following, addition of HBr does not take place against Markownikoff's rule **or** Anti-Markownikoff addition of HBr is not observed for
 - [IIT-JEE 1985; CBSE PMT 1994; MADT Bihar 1995;
 - **MP PMT 1999; AMU 2002]** (b) But-1-ene
 - (a) Propene(b) But-1-ene(c) But-2-ene(d) Pent-2-ene
 - (c) but-2-ene (d) Pent-2-ene
- 21. Which one of the following characteristics apply to both ethene and ethyne [NCERT 1990]
 - (a) Explode when mixed with chlorine
 - (b) Decolourise Baeyer's reagent giving brown precipitate
 - (c) Rapidly absorbed by cold conc. H_2SO_4
 - (d) Form white precipitate with silver nitrate solution
- **22.** Which of the following has highest knocking property (a) Aromatic hydrocarbons
 - (b) Olefins

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(c) Branched chain paraffins



- (d) Straight chain paraffins
- **23.** Dilute aqueous $KMnO_4$, at room temperature reacts with R CH = CH R to give **[Roorkee 1992]**
 - (a) R CHO (b) R COOH

(c) RCHOH - CHOHR (d) $CO_2 + H_2O$

- 24. Aqueous sulphuric acid reacts with 2-methyl-1-butene to give predominantly [Roorkee 1992] (a) Isobutyl hydrogen sulphate
 - (b) 2-methyl-2-butanol
 - (c) 2-methyl-1-butanol
 - (d) Secondary butyl hydrogen sulphate
- 25. How can ethene be produced from ethanol [BHU 1996](a) By dehydrohalogenation
 - (b) By dehydrogenation
 - (c) By dehydration with conc. H_2SO_4 at $170^{\circ}C$
 - (d) By reduction with hydrogen iodide
 - Baever's reagent is used in the laboratory for

[CBSE PMT 1991, 92; AIIMS 1998; AFMC 1999]

- (a) Detection of double bonds
- (b) Detection of glucose
- (c) Reduction
- (d) Oxidation

26.

27. Isopropyl alcohol is obtained by reacting which of the following alkenes with conc. H_2SO_4 and H_2O

[MP PMT 1999]

- (a) Ethylene (b) Propylene
- (c) 2-methyl propene (d) Isoprene
- **28.** Which of the following compound is produced when $CH_2 = CH (CH_2)_2 COOH$ reacts with *HBr* in presence of peroxides [AIIMS 2000]
 - (a) $CH_3CH(CH_2)_5COOH$
 - (b) $BrCH_2CH_2(CH_2)_5COOH$
 - (c) $CH_3CH_2CH_2(CH_2)_5COOH$
 - (d) $CH_3CH_2BrCH_2CH_2COOH$
- **29.** One mole of each of the following alkenes is catalytically hydrogenated. The quantity of heat evolved will be the lowest in the case of **[Roorkee 2000]**
 - (a) 1-butene (b) Trans-2-butene
 - (c) Cis-2-butene (d) 1, 3-butadiene
- **30.** Which of the following is not used to distinguish ethene from ethane

[KCET (Med.) 2001; UPSEAT 2002; CBSE PMT 2002]

- (a) Iodine in CCl_4 (b) Bromine in CCl_4
- (c) Alkaline $KMnO_4$ (d) Ammonical Cu_2Cl_2
- **31.** A hydrocarbon *X* adds on one mole of hydrogen to give another hydrocarbon and decolourised bromine water. *X* reacts with $KMnO_4$ in presence of acid to give two moles of the same carboxylic acid. The structure of *X* is

[JIPMER 2001]

- (a) $CH_2 = CH CH_2CH_2CH_3$
- (b) $CH_3CH_2CH_2 CH = CHCH_3$
- (c) $CH_3CH_2CH = CHCH_2CH_3$
- (d) $CH_3CH = CHCH_2CH_2CH_3$
- **32.** When 2-bromobutane reacts with alcoholic *KOH*, the reaction is called [KCET (Med.) 2001]
 - (a) Halogenation (b) Hydrogenation

- (c) Chlorination (d) Dehydro-halogenation
- **33.** 1, 3-butadiene reacts with ethylene to form **[BHU 2001]**
 - (a) Benzene (b) Cyclohexane
- (c) Cyclohexene (d) 2, 3 dimethyl butane
- **34.** Ethylene reacts with ozone gas to form the compound
 - (a) HCHO (b) C_2H_5OH

(c)
$$O \begin{pmatrix} CH_2 - O \\ H_2 - O \end{pmatrix}$$
 (d) CH_3CHO
 $CH_2 - O$

- **35.** Oils are converted into fats by[Kerala (Med.) 2002](a) Hydration(b) Decarboxylation
 - (c) Hydrogentation (d) Dehydrogenation
 - (e) Hydrogenolysis
- **36.** Which process converts olefins into parafins
 - [MP PET 2002]
 - (a) Halogenation (b) Dehydration (c) Hydrogenation (d) Hydrolysis
- **37.** Of the following the formula which represents a saturated cyclic compound is **[AMU 1983]**
 - (a) $C_3 H_6$ (b) $C_3 H_8$
 - (c) $C_8 H_{10}$ (d) $C_8 H_{12}$
- **38.** In a reaction, if half of the double bond is broken and two new bonds are formed, this is a case of
- [AMU 1983; NCERT 1978; CPMT 1983](a) Elimination(b) Addition(c) Displacement(d) Rearrangement39. Which of the following are formed on addition reaction of DCI with 3-methyl-1-butene[Roorkee 2000](a) $CH_2DCHCICH(CH_3)_2$ (b) $CH_2DCH_2CCl(CH_3)_2$ (c) $CH_3CDClCH(CH_3)_2$ (d) $ClCH_2CHDCH(CH_3)_2$ 40. Major product of the following reaction is
 - Br $CH_{3} C CH_{2} CH_{3} + alco. KOH \rightarrow [MP PMT 1986]$ H
 - (a) Butene-1 (b) Butene-2
 - (c) Butane (d) Butyne-1
- **41.** Cyclopentene on treatment with alkaline *KMnO*₄ gives [CPMT 1987]
 - (a) Cyclopentanol

42.

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- (b) trans 1, 2-cyclopentanediol
- (c) cis 1, 2-cyclopentanediol
- (d) 1:1 mixture of *cis* and *trans* 1, 2-cyclopentanediol
- Which of the following is the most stable alkene

[AIIMS 1998; KCET (Med.) 2000; CPMT 2003]

- (a) $R_2C = CR_2$ (b) RCH = CHR
- (c) $RCH_2 = CH_2R$ (d) $CH_2 = CH_2$
- **43.** Ethene gives with acidic $KMnO_4$ solution [MP PMT 1997]
 - (a) Ethylene glycol
 - col (b) Ethylene oxide le (d) Acetaldehyde

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- (c) Formaldehyde (d) Acetaldehy
- **44.** In paraffins, with the increasing molecular weight, it is found that
 - (a) Freezing point decreases
 - (b) Boiling point decreases
 - (c) Boiling point increases
 - (d) Vapour pressure decreases

- **45.** When alcoholic solution of ethylene dibromide is heated with granulated zinc, the compound formed is**[CPMT 1990]**
 - (a) Ethylene (b) Ethyne
 - (c) Cyclobutane (d) Butane
- **46.** A gas formed by the action of alcoholic *KOH* on ethyl iodide, decolorises alkaline $KMnO_4$ solution. The gas is

[CPMT 1974, 91; MP PET 1985; IIT-JEE 1982]

(a) CH_4	(b)	C_2H_6
------------	-----	----------

	(c)	C_2H_4	(d)	C_2H_2
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47. Markownikoff's rule provides guidance of addition of *HBr* on

[MNR 1994] (a) $CH_2 = CH_2$ (b) $CH_3 - CH_2 - CH_3$

- (c) $CH_3CH = CHCH_3$ (d) $CH_2 = CHBr$
- **48.** Ethyl bromide gives ethylene when reacted with
 - [CPMT 1982, 93; RPET 2000; Pb. PMT 2001] (a) Ethyl alcohol (b) Dilute *H*₂*SO*₄
 - (c) Aqueous *KOH* (d) Alcoholic *KOH*
 - Ethylene is prepared by the dehydration of

[CPMT 1974, 79; DPMT 1985; BHU 1989]

- (a) Ethyl alcohol (b) Methyl alcohol
- (c) Acetic acid (d) Oxalic acid

50. Which reactions are most common in alkenes

49.

[Pb. CET 1989]

- (a) Electrophilic substitution reactions(b) Nucleophilic substitution reactions
- (c) Electrophilic addition reactions
- (d) Nucleophilic addition reactions

(a) Ethyl alcohol

- **51.** A mixture of 1-chloropropane and 2-chloropropane when treated with alcoholic *KOH* gives **[NCERT 1990]**
 - (a) 1-propene (b) 2-propene
 - (c) Isopropylene (d) All the three
- **52.** The compound formed by passing ethylene gas into cold alkaline solution of $KMnO_4$ is

[NCERT 1974, 81; CPMT 1979, 86, 88; MP PET 1985, 95; AFMC 1998]

- (b) Acetaldehyde
- (c) Acetic acid (d) Ethylene glycol
- **53.** A gas decolourised $KMnO_4$ solution but gives no precipitate with ammoniacal cuprous chloride is **or** Which of the following gases does not give a precipitate with ammoniacal solution of silver nitrate but decolourizes $KMnO_4$ (neutral or slightly alkaline)

[NCERT 1974, 77; CPMT 1974, 77, 78; MP PMT 1996; MP PET 1996, 99]

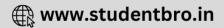
(a) Ethane	(b)	Methane
(c) Ethene	(d)	Acetylene
A hydrocarbon reacts with	hyp	ochlorous a

54. A hydrocarbon reacts with hypochlorous acid to give 1-chloro-2-hydroxyethane. The hydrocarbon is

[CBSE PMT 1989]

- (a) Ethylene(b) Methane(c) Ethane(d) Acetylene
- **55.** When ethene is heated at $400^{\circ}C$ under high pressure, the product is/are

- (a) Carbon and H_2 (b) Polyethylene
- (c) Acetylene and H_2 (d) None of these
- **56.** Which decolorize aqueous bromine and gives white fumes of HCl on reaction with PCl_5 [Pb. PMT 1999]
 - (a) $CH_3COCH_2CH = CH_2$
 - (b) $CH_3CH_2CH_2CH_2CH_3$
 - (c) $CH_3CH = CHCH_2CH_2OH$
- (d) $CH_3OCH_2CH_2CH_2CH_2OH$ During debromination of meso-dibromobutane, the major 57. compound formed is [IIT-JEE 1997] (a) *n*-butane (b) 1-butane (c) *cis*-2-butene (d) trans-2-butene 58. What product is formed when 1-chlorobutane react with alcoholic KOH [RPMT 2002] (a) 1-butene (b) 2-butene (c) 1-butanol (d) 2-butanol The olefin which on ozonolysis gives CH_3CH_2CHO and 59. CH₃CHO is [Roorkee 1992] (b) 2-butene (a) 1-butene (c) 1-pentene (d) 2-pentene Bond length between carbon-carbon in ethylene molecule 60. is [MP PET 1997] (a) 1.54 Å (b) 1.35 Å (c) 1.19 Å (d) 2.4 Å The compound having both sp and sp^2 hybridised carbon 61. atom is [IIT-JEE 1981] (a) Propene (b) Propyne (c) Propadiene (d) None of these 62. The halogen which is most reactive in the halogenation of alkenes under sunlight is [IIT-JEE 1981] (a) Chlorine (b) Bromine (c) Iodine (d) All equal When ethene reacts with bromine, it forms 63. [AFMC 2000; KCET 2001] (a) Chloroethane (b) Ethylene dibromide (c) 1 bromopropane (d) 1,2-dichloroethene Paraffins are soluble in 64. [NCERT 1978] (a) Distilled water (b) Benzene (c) Methanol (d) Sea water 65. Addition of *HCl* to propene in presence of peroxides gives [BHU 1981, 98] (a) 1-Chloropropane (b) 2-Chloropropane (c) 3-Chloropropane (d) Propene dichloride 66. The name of the product obtained by the addition of HI to propene in presence of peroxide catalyst is [KCET 2000] (a) Isopropyl iodide (b) 2-Iodopropene (c) 2-Iodopropane (d) 1-Iodopropane In the reaction $C_2H_5CH = CH_2 + H - X \rightarrow$ Product. 67. What is the product [BHU 2002] (a) $C_2H_5 - CH_3$
 - (b) $C_2H_5CH_2 CH_2X$



- (c) $C_2H_5 CHX CH_3$
- (d) $CH_3 CH_2X CH = CH_2$
- 68. Alkene can be prepared from alkyl halide by the following reagent $R - X + Nu^- \rightarrow \text{Alkene} + NuH$ [RPET 2000] (a) Alc. KOH + heat (b) Aq. KOH + cold water
- (c) NaOH (d) LiOH 2-chlorobutane is heated with alcoholic NaOH, the product 69.
 - formed in larger amount is [RPET 1999; AMU 2000] (a) 1-Butene (b) 1-Butyne
 - (c) 2-Butene (d) All of these
- Ethylene has high b.p. and high vapour pressure at 70. $100^{\circ} C$ and does not dissolve in water. Hence ethylene is separated by this method [UPSEAT 1999] (b) Vacuum distillation
 - (a) Simple distillation
 - (c) Vapour distillation (d) Alkali treatment
- Addition of bromine to 1, 3-butadiene gives [AMU 1999] 71. (a) 1, 4-addition product only
 - (b) 1, 2-addition product only
 - (c) Both 1, 2-and 1, 4 addition product
 - (d) None of these
- In the presence of peroxide, hydrogen chloride and 72. hydrogen iodide do not give anti-Markovnikoff's addition to alkenes because [IIT-JEE Screening 2001]
 - (a) Both are highly ionic
 - (b) One is oxidising and the other is reducing
 - (c) One of the steps is endothermic in both the cases
 - (d) All the steps are exothermic in both the cases
- The compound most likely to decolourize a solution of 73. potassium permanganate is [NCERT 1978]
 - (a) CH_3CH_3

- (c) $CH_3CH = CHCH_2CH_3$ CH_3
- (d) $CH_3 C CH_3$ $\dot{C}H_{3}$
- Ethylene is converted to X on passing through a mixture 74. of an acidified aqueous solution of palladium chloride and cupric chloride. Which of the following reagents readily take part in addition reaction with X[UPSEAT 2003] (a) B_{r} (b) HBr

$$(a) B_{12} (b) HDI$$

- (c) HCl (d) *HCN* Addition of HCl does not obey antimarkownikoff's rule
- 75. because

[UPSEAT 2003]

- (a) It is a strong acid (b) It is a gas
- (c) Its bond energy is high (d) Its bond energy is less
- Correct statement about1, 3-dibutene [UPSEAT 2003] 76. (a) Conjugated double bonds are present
 - (b) Reacts with HBr
 - (c) Forms polymer
 - (d) All of these
- At low temperatures, the slow addition of molecular 77. bromine to $CH_2 = CH - CH_2 - C \equiv CH$ gives

[Roorkee Qualifying 1998]

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- (a) $CH_2 = CH CH_2 CBr = CHBr$
- (b) $BrCH_2 CHBr CH_2 C \equiv CH$
- (c) $CH_2 = CH CH_2 CH_2 CBr_3$
- (d) $CH_3 CBr_2 CH_2 C \equiv CH$
- 78. *PCl*₅ reacts with propanone, to give [Pb. PMT 2001] (a) vic-dichloride (b) Propanal
 - (c) propane-chloride (d) gem-dichloride
- The compounds that will give an isomer of 2; 2-dimethyl 79. propane on catalytic hydrogenation are [AMU 1999] (1) $CH_3CH = C - CH_3$ (2) $CH_3CH = CHCH_3$

(3)
$$CH_{3}C = CHCH_{2}CH_{3}(4)$$
 $CH_{3}C = C - CH_{3}$
 $CH_{3}CH_{3}CH_{3}$

- (c) 1 and 3 (d) 1 and 2 **80.** Alkene $R - C - H = CH_2$ reacts readily with B_2H_6 and
 - the product on oxidation with alkaline hydrogen peroxides produces [CBSE PMT 1995] (a) $R - CH_2 - CHO$ (b) $R - CH_2 - CH_2 - OH$ (c) $R - C - CH_3$ (d) $R - CH - CH_3$

- Bayer's reagent is used for detection of 81. [RPMT 2002] (a) Amines (b) Glucose
 - (c) Unsaturated bond (d) Alcohol
- Which of the following is(are) example(s) of nucleophilic 82. addition reaction in case of acetylene
 - (b) Addition of HCN (a) Addition of water
 - (c) Addition of $AsCl_3$ (d) All
- Structural formula for lewisite is 83.

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$$CHCl CHCl_2$$
(a) || (b) |

$$CHAsCl_3 CHAsCl_3$$

$$CHCl$$
(c) || (d) None of these

$$CHAsCl_2$$

Propene when heated with chlorine at about $500^{\circ}C$ 84. forms

[MP PET 1997]

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(a) $CH_2Cl.CH = CH_2$ (b) $CH_3.CHCl.CH_2Cl$

(c)
$$CH_2Cl.CHCl.CH_2Cl$$
 (d) All the three

- PVC is obtained from vinyl chloride by a reaction called 85. (a) Addition (b) Isomerization (c) Polymerization (d) Substitution
- 86. Reaction of Br_2 on ethylene in presence of NaCl gives
 - (a) $BrCH_2 CH_2Br$ (b) $ClCH_2 - CH_2Br$
 - (c) Both (a) and (b) (d) None of these
- 87. $CH_3 - CH = CH_2 + HBr \longrightarrow \dots$ the product formed is [AIIMS 1983; CPMT 1997; RPMT 1999, 2003]

	(a) $CH_3 - CH_2 - CH_2 - Br$ (b) $CH_3 - CHBr - CH_3$
	(c) $BrCH_2 - CH = CH_2$ (d) $CH_2 = C = CH_2$
88.	The product of reaction between propene and <i>HBr</i> in the presence of a peroxide is
	(a) $CH_3 - CH_2 - CH_2Br$ (b) $CH_3 - CHBr - CH_3$
	(c) $CH_3 - CH_2Br$ (d) $CH_3 - CH = CHBr$
89.	
-	(a) Only aldehyde
	(b) Only ketone
	(c) Both aldehyde and ketone
	(d) None of these
90.	The final product formed by the ozonolysis of compound $RCH = CR_2$ is [NCERT 1978]
	(a) $RCHO$ (b) R_2CO
	(c) Both (a) and (b) (d) None of these
91.	Which one is an unsaturated compound [BIT 1990]
	(a) $C_6 H_{14}$ (b) $C_4 H_8$
	(c) C_3H_7OH (d) CH_3OH
92.	Ethyl alcohol on heating with conc. H_2SO_4 gives
	[EAMCET 1979; MP PMT 1996]
	(a) $CH_3COOC_2H_5$ (b) C_2H_6
	(c) C_2H_4 (d) C_2H_2
93.	Monohalides on reacting with alcoholic KOH give
20	[MP PET 1982, 86; DPMT 1981; CPMT 1979, 83]
	(a) Alkanes (b) Alkenes
	(c) Alkynes (d) Aromatic hydrocarbons
94.	Ethylene is a member of series [BHU 1979]
	(a) Alkyne (b) Olefin
05	(c) Paraffin(d) AmineIn a double bond between two carbon atoms of ethene,
95.	there are [NCERT 1981]
	(a) Two sigma bonds perpendicular to each other
	(b) One sigma and one pi bond
	(c) Two pi bonds perpendicular to each other
	(d) Two pi bonds at an angle of 60°
96.	The formation of alkene from alkyl halide is an example of
	[CPMT 1983; AMU 1982; Pb. CET 1986] (a) Addition (b) Elimination
	(c) Substitution (d) (a) and (c)
97.	In the following reaction
27	$CH_3 - CH_2 - CH_2 - CH_3 \xrightarrow{H_2SO_4}$ [AIIMS 1983]
	(a) $CH_3CH = CHCH_3$ predominates
	(b) $CH_2 = CHCH_2CH_3$ predominates
	(c) Both are formed in equal amounts
	(d) The amount of production depends on the nature of catalyst
98.	The compound <i>B</i> formed in the following sequences of

98. The compound *B* formed in the following sequences of reactions is

$$CH_3CH_2CH_2OH \xrightarrow{PCl_3} A \xrightarrow{Alco.KOH} B$$

[NCERT 1981]

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	(a) Propyne	(b)	Propene
			Propane
99.	<i>n</i> -propyl bromide on treatm	ent	with ethanolic potassium
	hydroxide produces [IIT-	JEE 1987; MP PMT 1997]
	(a) Propane	(b)	Propene
	(c) Propyne	(d)	Propanol
100.	The dehydrohalogenation of	of	neopentyl bromide with
	alcoholic <i>KOH</i> mainly gives		
			ing) 1990; MP PET 1993]
	(a) 2-methyl-1-butene		
	(c) 2, 2-dimethyl-1-butene		
101.	Which is the most reactive hy	yarc	-
		(-)	[JIPMER 2002]
			Ethyne
		• •	Methane
102.	Shape of ethylene molecule is		[MP PET 1993]
			Pyramidal
			Linear
103.	Electrophilic addition on a involves the intermediate f		
	carbocation. This statement i		
	(a) Saytzeff's rule		
	(c) Markownikoff's rule		
104.	$CH_2 = CHCl$ reacts with HC	• •	
104.	-		
	(a) $CH_2Cl - CH_2Cl$		
	(c) $CH_2 = CHCl.HCl$	(d)	None of these
105.	Deviation from Markowniko	ff's ı	rule occurs in presence of
	(a) Zinc	(b)	Peroxides
	(c) $Hg - Zn / HCl$	(d)	All of these
106.	Presence of peroxides affects	the	addition of [BHU 1987]
	(a) HBr	(b)	HCl
	(c) <i>HI</i>	(d)	All of these
107.	Catalyst used in dimerisati	ion	of acetylene to prepare
	chloroprene is		[BHU 1984]
	(a) $HgSO_4 + H_2SO_4$	(b)	Cu_2Cl_2
	(c) $Cu_2Cl_2 + NH_4Cl$	(d)	$Cu_2Cl_2 + NH_4OH$
108.	Chloroprene is		
	(a) 2-chloro-1, 3-butadiene		
	(b) 3-chloro-2, 3-butadiene		
	(c) 2, 3-dichlorobutadiene		
	(d) None of these		
109.	Chloroprene is used in makir	ıg	[MP PET 1985]
	(a) Synthetic rubber	(b)	Plastic
	(c) Petrol	(d)	All of these
110.	When isobutyl magnesium b		
	with absolute ethyl alcohol, t	he p	
			[IIT-JEE 1995]
	(a) $CH_3 - CH - CH_2OH$ an	.iu (ln ₃ cn ₂ mgdr
	CH ₃		

(b)
$$CH_3 - CH - CH_2 - CH_2 - CH_3$$
 and $Mg(OH)Br$

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- (c) $CH_3 CH CH_3$ and $CH_3 CH_2OM_gBr$ $\downarrow CH_3$
- (d) $CH_3 CH CH_3, CH_2 = CH_2$ and Mg(OH)Br CH_3
- **111.** The predominant product formed, when 3-methyl-2-pentene reacts with *HOCl*, is
 [IIT-JEE 1995]

(a)
$$CH_{3} - CH_{2} - CH_{3} - CH_{3}$$

$$L_{CH_3}$$

112. Which of the following occurs easily in ethylene

[MNR 1987; NCERT 1979](a) Addition(b) Substitution

- (c) Elimination (d) Rearrangement
- **113.** How many gm of bromine will react with 21 $gm C_3H_6$

		[MP PET 1985]
(a) 80	(b) 160	
(c) 240	(d) 320	

- **114.** Conjugate double bond is present in[MP PMT 1987](a) Propylene(b) Butadiene(c) Isobutylene(d) Butylene
- **115.** On passing vapours of an organic liquid over finely divided Cu at 573K the product was an alkene. This reaction is

(a) Catalytic oxidation of primary alcohol

- (b) Catalytic dehydrogenation of secondary alcohol
- (c) Catalytic dehydrogenation of tertiary alcohol
- (d) Catalytic dehydration of tertiary alcohol
- **116.** The total number of sigma σ and $pi(\pi)$ bonds in an ethylene molecule are

(a) $4\sigma, 2\pi$ (b)	$4\sigma, l\pi$
-------------------------	-----------------

- (c) $5\sigma, 2\pi$ (d) $5\sigma, 1\pi$
- **117.** Cyclic hydrocarbon molecule A has all the carbon and hydrogens in a single plane. All the carbon-carbon bonds are of same length and less that 1.54 Å but more than 1.34 Å. C C C bond angle will be [CBSE PMT 1989]

(a) 120° (b) 180°

(c) 100° (d) $109^{\circ}28'$

118. General formula of alkenes is

[CPMT 1975, MNR 1987; NCERT 1987; MP PMT 1994] (a) $C_n H_{2n}$ (b) $C_n H_{2n-2}$

(c)
$$C_n H_{2n+2}$$
 (d) $C_n H_{2n-1}$

119. The product of following reaction is

$$CH_{3} - CH_{3} = CH_{2} - CH_{2} = CH_{2} - CH_{3} + CH_{3} + CH_{3}$$

$$CH_{3} - CH_{3} = CH_{2} - CH_{3} + C$$

CЦ

[MP PMT 1986; MP PET 1997]

(a)
$$CH_{3} - C - CH - CH_{2}$$

 $CH_{3} OH$
 $CH_{3} OH$
(b) $CH_{3} - C - CH_{2} - CH_{2}OH$
 CH_{3}
(c) $CH_{3} - C - CH_{2} - CH_{2}OH$
 CH_{3}
(c) $CH_{3} - C - CH - CH_{3}$
 CH_{3}
(d) $HOCH_{2} - C - CH_{2} - CH_{2}$
 CH_{3}

- **120.** Which one of the following organic compounds decolourizes an alkaline *KMnO*₄ solution[**CPMT 1987, 93**]
 - (a) CS_2 (b) C_3H_6
 - (c) $C_3 H_8$ (d) $CH_3 OH$

121. Decolourization of alkaline $KMnO_4$ is used as a test for

- (a) Aromatic hydrocarbons
- (b) Olefinic hydrocarbons
- (c) Acetylenic hydrocarbons
- (d) Cycloalkanes **122.** The reaction

$$CH_2 = CH_2 + H_2 \xrightarrow{Ni}_{250-300^\circ C} CH_3 - CH_3$$
 is called

[MP PMT 1996; CBSE PMT 2001; MH CET 2001; BHU 2002]

D

- (a) Wurtz's reaction
- (b) Kolbe's reaction
- (c) Sabatier and Senderen's reaction
- (d) Carbylamine reaction

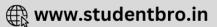
123. The alkene which on ozonolysis yields acetone is

(a)
$$CH_2 = CH_2$$

(b)
$$CH_3 - CH = CH_2$$

(c)
$$(CH_3)_2 C = C(CH_3)_2$$

- (d) $CH_3 CH = CH CH_3$
- **124.** $CH_3CH = CHCHO$ is oxidized to $CH_3CH = CHCOOH$ using [NCERT 1978]
 - (a) Alkaline potassium permanganate
 - (b) Acidified potassium permanganate
 - (c) Selenium dioxide
 - (d) Osmium tetroxide



- **125.** The order of increasing reactivity towards *HCl* of the following compounds will be
 - (1) $CH_2 = CH_2$
 - (2) $(CH_3)_2 C = CH_2$
 - (3) $CH_3CH = CHCH_3$ [MP PET 1994]
 - (a) 1 < 2 < 3 (b) 1 < 3 < 2
 - (c) 3 < 2 < 1 (d) 2 < 1 < 3
- 126. The reagent which is used to distinguish between propene and propyne is [MP PET 1994; IIT-JEE (Screening) 2000; AIIMS 2000; Pb. PMT 2002; BHU 2003]

(a) Bromine (b) Alkaline $KMnO_4$

- (c) Ammoniacal $A_g NO_3$ (d) Ozone
- **127.** Which one of the following reactions would be the best for the formation of 2-bromobutane [MP PET 1994]
 - (1) $CH_{3}CH = CHCH_{2}CH_{3} \xrightarrow{HBr}$ (2) $CH_{3}CH_{2}CH = CH_{2} \xrightarrow{HBr}$ (3) $CH_{3}CH = CHCH_{3} \xrightarrow{Br_{2}}$ (4) $CH_{3}CH_{2}CH = CH_{2} \xrightarrow{HBr}$ Peroxide (a) 1 (b) 2 (c) 3 (d) 4

128. If *HCl* is added over $CH_2 = C$

then what is
[CPMT 1996]

 CH_3

134.

formed
(a)
$$CH_2 = CH$$

 Cl
 Cl
 CH_3
(b) $CH_2 - CH$
 CH_3
 CH_3
 CH_3
(c) $CH_2 = C$
 $CH_2 CH_3$
 CH_3
 C

- **129.** Position of double bond in an organic compound is determined by

 [DCE 2001; RPMT 2002]
 - (a) Ozonolysis(b) Oxidation(c) Reduction(d) Hydrogenation
- **130.** A gas decolourises Bayer's reagent but does not react with Tollen's reagent, this gas is
 [MP PMT 2001]
 - (a) Ethene (b) Ethyne
 - (c) Ethane (d) Methane
- **131.** Formation of 2-butene from 2-bromobutane is according to
 - (a) Markowikoff's (b) Bayer
 - (c) Saytzeff (d) Wurtz
- **132.** An alkene on ozonolysis gave acetaldehyde the alkene is
 - (a) Ethylene (b) Propene
 - (c) 1-butene (d) 2-butene

133. Indicate the organic structure for the product expected when 2-methyl propene is heated with acetyl chloride in presence of anhydrous zinc chloride [CBSE PMT 1989] CH_2

(a)
$$CH_{3} - C - CH_{2} - CO - CH_{3}$$

 CI
(b) $CH_{3} - C - CH_{2} - CO - CH_{3}$
 CH_{3}
(c) $CH_{3} - C - CH_{2} - CO - CH_{3}$
 CH_{3}
(d) $CH_{3} - C - C = CH_{2}$
The reaction
 CH_{3}
 CH_{3}

$$CH_{3} \xrightarrow{(H_{3})} CH_{3} \xrightarrow{(H_{2}SO_{4})} CH_{3} \xrightarrow{(H_{2}SO_{4})} CH_{3} \xrightarrow{(H_{2}SO_{4})} CH_{3} \xrightarrow{(H_{2}SO_{4})} CH_{2}$$

(c) Kaney W and
$$H_2$$
 (d) Education solution of

136. Electrolysis of cold concentrated aqueous solution of potassium succinate yields **[CPMT 1985; MP PMT 1986]**

- (a) Ethane (b) Ethyne
- (c) Ethene (d) Ethane-1, 2-diol
- 137. A hydrocarbon containing 2 carbon atoms gives Sabatier and Senderen's reaction but does not give precipitate with ammoniacal silver nitrate solution. The hydrocarbon in the question is [MADT Bihar 1983]
 - (a) Ethane (b) Acetylene
 - (c) Ethylene (d) None of these
- 138. The reaction

 $CH_2 = CH - CH_3 + HBr \rightarrow CH_3 CHBr - CH_3$ is

[CBSE PMT 1996]

[AMU 1983]

- (a) Nucleophilic addition (b) Electrophilic addition
- (c) Electrophilic substitution (d) Free radical addition
- **139.** What is the product of the reaction of 1, 3-butadiene with Br_2 [Orissa JEE 2003]
 - (a) 1,4 –dibromobutene (b) 1,2 -dibromobutene
 - (c) 3,4-dibromobutene (d) 2,3-dibromo-2-butene
- 140. An alkene given two moles of *HCHO*, one mole of *CO*₂ and one mole of *CH*₃*COCHO* on ozonolysis. What is its structure [Orissa JEE 2003]

(a)
$$CH_2 = C = CH - CH_2 - CH_3$$

(b)
$$CH_2 = CH - CH = CH_2$$

CU

(c)
$$CH_2 = C = C - CH_3$$

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$$\begin{array}{c} CH_{3} \\ \text{(d)} \quad CH_{2} = C = \overset{|}{C} - CH = CH_{2} \end{array}$$

$$CH_{3}CH = CH_{2} + H_{2}O + [O] \xrightarrow{KMnO_{4}}_{Acid}$$

$$CH_{3} - CH - CH_{2} \xrightarrow{[O]} X + HCOOH$$

$$OH OH$$

$$X \text{ is } [MP PMT 2002]$$
(a) $CH_{3}CH_{2}COOH$ (b) $CH_{3}COOH$

(c) CH_3CH_2CHO (d) CH_3CH_2OH

142. Which of the following alkenes gives only acetic acid and on oxidation with potassium permanganate solution[MP PET 2003]

(a) Ethylene	(b) 1-Butene
(c) Propene	(d) 2-Butene

143. Butene-1 may be converted to butane by reaction with [AIEEE 2003]

(a) Zn-HCl	(b) <i>Sn-HCl</i>
(c) <i>Zn-Ha</i>	(d) Pd/H_2

- **144.** The major product formed when propene reacts with *HBr* in presence of peroxides is**[NCERT 1980; CBSE PMT 1989]**
 - (a) *n*-propyl bromide (b) Isopropyl bromide
 - (c) *n*-propyl alcohol (d) 1, 3-dibromopropane
- **145.** Ethyl hydrogen sulphate is obtained by the reaction of
 H_2SO_4 on [CPMT 1985]
 - (a) Ethylene (b) Ethane
 - (c) Ethyl chloride (d) Ethanol
- **146.** Ethylene reacts with ozone to give[DPMT 1981]
 - (a) Formaldehyde(b) Ethyl alcohol(c) Ozonide(d) Acetaldehyde
- **147.** Which of the following aliphatic compounds will discharge red colour of bromine

(a) $C_2 H_4$ (b) $C_3 H_6$

- (c) $C_4 H_8$ (d) All of these
- $\textbf{148.} \ \ \textbf{Chlorination} \ \textbf{can be done on}$

(a)
$$CH_3 - CH = CH_2$$
 (b) $CH_2 = CH_2$

(c) CH = CH (d) None of these

149. Addition of *HI* on the double bond of propene yields isopropyl iodide and not *n*-propyl iodide as the major product. This is because the addition proceeds through

[CPMT 1988]

(a) A more stable carbonium ion

(b) A more stable carbanion

(c) A more stable free radical

- (d) None of the above being a concerted reaction
- **150.** When butene-1 is mixed with excess of bromine, the expected reaction product is **[CPMT 1974; BHU 1980]**
 - (a) 1, 2-dibromobutane (b) 1, 1-dibromobutane
 - (c) 2, 2-dibromobutane (d) Perbromobutane
- **151.** A compound 'X' on ozonolysis forms two molecules of *HCHO*. Compound 'X' is [AIIMS 1987; CPMT 1993] (a) C_2H_4 (b) C_2H_2

(c)
$$C_2 H_6$$

152. For the reaction

 $CH_3 - CH = CH_2 + HOCl \rightarrow A$ the product A is

(d) $C_6 H_6$

[Orissa JEE 2002]

(a)
$$CH_{3} - CHCl - CH_{2}OH$$

(b) $CH_{3} - CH - CH_{2} - Cl_{2} - Cl_{2} - CH_{3} - CH_{3} - CH_{2} - CH_{2} - COCl_{3}$
(c) $CH_{3} - CH_{2} - CH_{2} - COCl_{3} - CH_{3} - CH_{3$

153. $(CH_3)_2 C = CH \xrightarrow[H_2]{Catalyst} Optical isomers [BHU 2003]$ CH_2

- (a) 2 (b) 4 (c) Zero (d) 3
- **154.** Isobutene +*HBr* → product is [BHU 2003]
 (a) Tertiary butyl bromide (b) Isobutyl bromide
 - (c) Tertiary butyl alcohol (d) Isobutyl alcohol
- **155.** Which of the following represents the given mode of hybridisation $sp^2 sp^2 sp$ from left to right

(a)
$$H_2C = CH - C \equiv CH$$
 (b) $HC \equiv C - C \equiv CH$

(c)
$$H_2C = C = C = CH_2$$
 (d) CH_2

- 156. "The negative part of addenda adds on to the carbon atom linked with least number of hydrogen atoms". This statement is called[DPMT 1982; AIIMS 1988; AFMC 2004]
 (a) Thiele's principle
 (b) Bayer's strain theory
 - (c) Markownikoff's rule (d) Peroxide effect
 - (c) Markownikon's rule (d) Peroxide effect
- **157.** The product obtained, heating ethanol with conc. H_2SO_4 at $165^\circ 170^\circ$, is [MP PMT 2003]
 - (a) $(C_2H_5)_2SO_4$ (b) $CH_2 = CH_2$

(c)
$$CH_3COOH$$
 (d) $C_2H_5HSO_4$

158. Which of the following is the most stable

- (a) 1-butene (b) 2-butene
 - (c) 1-pentene (d) 2-pentene

159. Which doesn't follow Markownikoff's rule

- [JEE Orissa 2004; MP PMT 2004; BCECE 2005] (a) *CH*₃ - *CH* = *CH*₂
 - (b) $CH_3CH = CHCH_3$

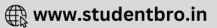
(c)
$$CH_3 - CH - CH = CH_2$$

 $| CH_3$

(d)
$$CH_3 - CH_2 - CH = CH_2$$

- 160. The product of acid catalyzed hydration of 2-phenyl
propene is[IIT JEE (Screening) 2004](a) 3-phenyl-2-propanol(b) 1-phenyl-2-propanol
 - (c) 2-phenyl-2-propanol (d) 2-phenyl-1-propanol
- **161.** A reagent used to test for unsaturation of allkene is

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		[BHU 2004]
	(a) conc. H_2SO_4	(b) Ammonical Cu_2Cl_2
	(c) Ammonical AgNO ₃	(d) Solution of Br_2 in CCl_4
162.	Propylene on hydrolysis with	sulphuric acid forms
		[MH CET-2003]
		(b) Isopropyl alcohol
		(d) Butyl alcohol
163.	An alkene, on ozonolysis acetaldehyde. The alkene is :	gives formaldenyde and
		(b) Propene
		(d) Butene-2
		cold alkaline
164.	In the reaction, $H_2C = CH_2$.	(A):
	Product A is :	[Pb. CET 2000]
	(a) Ethylene glycol	
		(d) Butyric acid
105.	Using anhydrous $AlCl_3$ as	
	following reaction produces e	[CBSE PMT 2004]
	(a) $H_2C = CH_2 + C_6H_6$	[000111112004]
	(b) $H_3C - CH_3 + C_6H_6$	
	(c) $H_3C - CH_2OH + C_6H_6$	
	(d) $CH_3 - CH = CH_2 + C_6H$	6
166.	Which of these does not follo	0
		[Orissa JEE 2005]
		(b) 1-butene (d) 2-hexene
167.	-	
	gives	[CBSE PMT 2004]
	(a) Allyl bromide(c) Isopropyl bromide	
168.	Which of the following reac	
	react with $AgNO_3$?	[BCECE 2005]
	(a) $C_2 H_6$	(b) <i>CH</i> ₄
	(c) $C_2 H_4$	(d) $C_2 H_2$
169.	3-Phenylpropene on reaction	with HBr gives (as a major
	product)	[AIIMS 2005]
	(a) $C_6H_5CH_2CH(Br)CH_3$	
	(b) $C_6H_5CH(Br)CH_2CH_3$	
	(c) $C_6H_5CH_2CH_2CH_2Br$	
	(d) $C_6H_5CH(Br)CH = CH_2$	
170.		<i>HBr</i> with one molecule of
		predominantly [AIEEE 2005] r kinetically controlled
	conditions	·
	(b) 1-bromo-2-butene un controlled conditions	nder thermodyanamically
		nermodynamically controlled
	(d) 1-bromo-2-butene und conditions	ler kinetically controlled
171.	The only alcohol that can hydration of alkene is	be prepared by the indirect [AFMC 2005]

- (a) Ethyl alcohol
- (b) Propyl alcohol
- (c) Isobutyl alcohol (d) Methyl alcohol

CH₃

172. The reaction of *HBr* with $CH_3 - C = CH_2$ in the presence of peroxide will give [BHU 2005] (a) CH_3CBrCH_3 (b) $CH_3CH_2CH_2CH_2Br$ $\dot{C}H_3$ CH_3 CH_3 (c) CH_3CHCH_2Br (d) $CH_3CH_2CHCH_3$ 173 BVP 2004 decolourised by KMnO4 solution but gives no precipitate with ammoniacal cuprous chloride is [KCET 2005] (a) Ethane (b) Methane (c) Ethene (d) Acetylene

174. Cyclohexene on reaction with OsO₄ followed by reaction with NaHSO₃ gives [Orissa JEE 2005]
(a) cis-diol
(b) trans-diol

(c) epoxy (d) alcohol

Alkyne

1. Which of the following gases is used for welding

(a) Methane	(b) Ethane
(c) Acetylene	(d) Ethene

2. A metallic carbide on treatment with water gives a colourless gas which burns readily in air and which gives a precipitate with ammoniacal silver nitrate solution. Gas evolved is

[NCERT 1975; CPMT 1977; MP PET 2002]

(a)	Methane	(b)	Ethane
(c)	Acetylene	(d)	Ethylene

3. 1-butyne reacts with cold alkaline $KMnO_4$ to produce

[AIIMS 1997]

[CPMT 1996]

- (a) CH_3CH_2COOH
- (b) $CH_3CH_2CH_2COOH$
- (c) $CH_3CH_2COOH + CO_2$
- (d) $CH_3CH_2COOH + HCOOH$

4. Identify the product *D* in the following series of reaction

$$CH_{3}COOH \xrightarrow{LiAlH_{4}} A \xrightarrow{H^{+}} B \xrightarrow{Br_{2}} C \xrightarrow{alc.} KOH \xrightarrow{KOH} D$$

[CBSE PMT 1998]

(a) Methane	(b) Alcohol
(c) Acetylene	(d) Benzaldehyde

5. The correct order towards bond length is

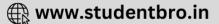
[RPMT 1997]

(a) $C - C < C = C < C \equiv C$ (b) $C \equiv C < C = C < C - C$

- (c) $C = C < C \equiv C < C C$ (d) $C = C < C C < C \equiv C$
- 6. In the molecule $CH \equiv C CH = CH_2$, the hybridisation of C - C bond is [Orissa JEE 2005]

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- (a) $sp^2 sp$ (b) $sp^3 - sp^3$
- (c) $sp^2 sp^2$ (d) $sp^3 - sp$
- The product formed when acetylene is passed through red 7. hot tube is [BHU 1989; RPMT 2003]
 - (a) Benzene (b) Cyclohexane
 - (d) Ethane (c) Neoprene
- Acetylenic hydrogens are acidic because 8.

[CBSE PMT 1989; Pb. PMT 1999]

- (a) Sigma electron density of C-H bond in acetylene is nearer to carbon, which has 50% s-character
- (b) Acetylene has only one hydrogen on each carbon
- (c) Acetylene contains least number of hydrogens among the possible hydrocarbons having two carbons
- (d) Acetylene belongs to the class of alkynes with molecular formula $C_n H_{2n-2}$
- 9. Which is the most suitable reagent among the following to distinguish compound (iii) from rest of the compounds

(i)
$$CH_3 - C \equiv C - CH_3$$

- (ii) $CH_3 CH_2 CH_2 CH_3$
- (iii) $CH_3 CH_2 C \equiv CH$

(iv)
$$CH_3 - CH = CH_2$$

- (a) Bromine in carbon tetrachloride
- (b) Bromine in acetic acid
- (c) Alkaline $KMnO_4$
- (d) Ammoniacal silver nitrate reagent
- A hydrocarbon of formula C_6H_{10} absorbs only one 10. molecule of H_2 upon catalytic hydrogenation. Upon ozonolysis, the hydrocarbon yields

 $O = C - CH_2 - CH_2 - CH_2 - CH_2 - CH_2 - CH_2 = O$

The hydrocarbon is

[MP PMT 1986]

[CBSE PMT 1989]

- (a) Cyclohexane (b) Benzene
- (c) Cyclohexene (d) Cyclobutane
- Poisonous gas 'Lewissite' is obtained by the reaction of 11. [MP PMT 2003]
 - (a) CH = CH and $AsCl_3$
 - (b) $CH_2 = CH_2$ and $AsCl_3$

(c)
$$CH = CH$$
 and S_2Cl_2

- (d) $CH_2 = CH_2$ and NOCl
- Products of 12. the following reaction (1) O_3 $CH_3C \equiv C CH_2 CH_3 \xrightarrow{(2) Hydrolysis} \dots$ are

[CBSE PMT 2005]

- (a) $CH_3CHO + CH_3CH_2CHO$ (b) $CH_3COOH + CH_3CH_2CHO$
- (c) $CH_3COOH + HOOCCH_2CH_3$

- (d) $CH_3COOH + CO_2$
- By coaltar distillation, which is not obtained 13.
 - [SCRA 1990; MP PMT 1986] (a) Light oil (b) Middle oil
 - (c) Heavy oil (d) Mobil oil
- Hydrocarbon containing following bond is most reactive 14. [AIIMS 1987]
 - (a) $C \equiv C$ (b) C = C
 - (c) C-C(d) All of these
- The shapes of methane, ethene and ethyne molecules are, 15. respectively
 - (a) Tetrahedral, planar and linear
 - (b) Tetrahedral, linear and planar
 - (c) Pyramidal, planar and linear
 - (d) Tetrahedral, pyramidal and planar
 - To synthesize the unsymmetrical alkyne
 - $CH_3 C \equiv C CH_2 CH_3$ the reagents needed would be
 - (a) Ethene, iodoethane, iodomethane and potassium hydroxide
 - (b) Acetaldehyde, 1-bromopropane and conc. H_2SO_4
 - (c) 1, 2-dichloroethane, 1-propanol and alcoholic potassium hydroxide
 - (d) Ethyne, iodomethane, iodoethane and sodamide
- When propyne is treated with dilute H_2SO_4 and $HgSO_4$, 17. the major product is [Kurukshetra CEE 2002]
 - (a) Propanal

16.

- (b) Propanol
- (c) Propyl hydrogen sulphate
- (d) Propanone
- 18. Which of the following will be the final product when C_2H_2 reacts with *HCl*

[DPMT 1984; AFMC 1982; Bihar MEE 1982]

(a)	CH CHCl	(b) $ CH_3 \\ CHCl_2$
(c)	CHCl CHCl	(d) None of these

19. What is the end product of the following sequences of operations $CaC_2 \xrightarrow{H_2O} A \xrightarrow{\text{dil}.H_2SO_4} B \xrightarrow{Ni}_{H_2} C$

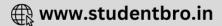
[CPMT 1978; MP PMT 1996]

- (a) Methyl alcohol (b) Acetaldehyde (c) C_2H_5OH (d) $C_2 H_4$
- $R CH_2 CCl_2 R \xrightarrow{\text{Reagent}} R C \equiv C R$ 20. The reagent is [CBSE PMT 1989; MP PET 1995]
 - (a) Na (b) HCl and H_2O
 - (c) $KOH \text{ in } C_2H_5OH$ (d) *Zn*

Acetylene can be prepared from 21. [CPMT 1988] (a) Potassium fumarate (b) Calcium carbide (c) Ethylene bromide (d) All of these

- Acetylene is obtained by the electrolysis of 22. [BHU 1986]
 - (a) Sodium succinate (b) Potassium fumarate (c) Both (a) and (b)
 - (d) None of these

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- **23.** The compound C_3H_4 has a triple bond, which is indicated by its reaction with **[MP PMT 1999]**
 - (a) Bromine water (b) Bayer's reagent
 - (c) Fehling solution (d) Ammonical silver nitrate

24.
$$CH \equiv CH \xrightarrow{H_2O/H_g^{2+}} X \xrightarrow{LiA/H_4} Y \xrightarrow{P_4/B_{P_2}} Z$$
 Here Z is

[JIPMER 2002]

- (a) Ethylene bromide (b) Ethanol
- (c) Ethyl bromide (d) Ethylidene bromide

25. $CH \equiv CH \xrightarrow{Ni(CN)_2} X$. Here X in the reaction

[JIPMER 2002]

- (a) Benzene (b) Ethane
- (c) Cycloctatetraene (d) Cyclohexane
- **26.** A salt producing hydrocarbon among these compounds is **[KCET (Engg.) 2002]**
 - (a) Ethane (b) Methane
 - (c) Ethene (d) Ethyne
- **27.** An unknown compound *A* has a molecular formula C_4H_6 . When *A* is treated with an excess of Br_2 a new substance *B* with formula $C_4H_6Br_4$ is formed. *A* forms a white precipitate with ammoniacal silver nitrate solution. A may be

·	[MP PET/PMT 1998]
(a) Butyne-1	(b) Butyne-2
(c) Butene-1	(d) Butene-2

28. Which of the following reacts with sodium with the elimination of hydrogen [BHU 1983]

(a) CH_4 (b) C_2H_6 (c) C_2H_4 (d) C_2H_2

- (d) $C_2 H_2$ [CPMT 1985]
- (a) White precipitate with A_gNO_3 and red precipitate with Cu_2Cl_2
 - (b) White precipitate with Cu₂Cl₂ and red precipitate with AgNO₃
 - (c) White precipitate with both the reagents
 - (d) Red precipitate with both the reagents
- **30.** The bond length between sp^3 hybridised carbon atom and other carbon atom is minimum in

. . _

(a) Propane(c) Propene

Acetylene gives

20.

[CBSE PMT 1996; Pb. PMT 1999] (b) Butane (d) Propyne

- 31. The *C H* bond length is minimum in the bond formed by(a) *sp s* overlapping (as in alkynes)
 - (b) $sp^2 s$ overlapping (as in alkenes)
 - (c) $sp^3 s$ overlapping (as in alkanes)
 - (d) None of these
- **32.** Which of the *C C* bond is strongest
 - (a) Formed by $sp^3 sp^3$ hybridised carbon atoms (as in alkanes)
 - (b) Formed by $sp^2 sp^2$ hybridised carbon atoms (as in alkenes)

- (c) Formed by sp sp hybridised carbon atoms (as in alkynes)
- (d) All are equal
- 33. Which of the following pairs has the same bond angle(a) Ethane and ethylene(b) Ethylene and acetylene(c) Ethylene and benzene(d) Acetylene and benzene

34. The product(s) obtained via oxymercuration $(H_gSO_4 + H_2SO_4)$ of 1-butyne would be **[IIT-JEE 1999]**

(a)
$$CH_3 - CH_2 - C - CH_3$$

(b) $CH_2 - CH_3 - CH_3$

(b)
$$CH_3 - CH_2 - CH_2 - CH_2$$

(c)
$$CH_3 - CH_2 - CHO + HCHO$$

- (d) $CH_3CH_2COOH + HCOOH$
- **35.** A compound is treated with *NaNH*₂ to give sodium salt. Identify the compound [AFMC 1998]
 - (a) $C_2 H_2$ (b) $C_6 H_6$
 - (c) $C_2 H_6$ (d) $C_2 H_4$
- 36. A gas decolourises bromine in CCl₄ and forms a precipitate with ammoniacal silver nitrate. The gas is[EAMCET 19(a) C₂H₂
 (b) C₂H₄

(c)
$$C_2 H_6$$
 (d) CH_4

- **37.** Among the following compounds which have more than one type of hybridisation for carbon atom
 - (i) $CH_3CH_2CH_2CH_3$
 - (ii) $CH_3 CH = CH CH_3$
 - (iii) $CH_2 = CH C \equiv CH$
- (iv) $H C \equiv C H$ [EAMCET 1998]
 - (a) (ii) and (iii) (b) (ii) (c) (iii) and (iv) (d) (iv)
- **38.** The homologue of ethyne is **[EAMCET 1998]**
 - (a) $C_2 H_4$ (b) $C_2 H_6$
 - (c) $C_3 H_8$ (d) $C_3 H_4$
- **39.** When acetylene reacts with HCl in the presence of H_gCl_2 , the product is [MNR 1985; MP PET 1996; UPSEAT 2000]
 - (a) Methyl chloride (b) Dichloroethane
 - (c) Vinyl chloride (d) Ethylidine chloride
- **40.** When propyne reacts with aqueous H_2SO_4 in the presence of H_gSO_4 , the major product is

[IIT-JEE 1983; AFMC 1991; KCET 1993]

(a) sulphate	Propanal	(b) Propyl	hydrogen
- (a)	Asstance	(d) Dramanal	

- (c) Acetone (d) Propanol
- **41.** Propyne on polymerisation gives **[CPMT 1999, 2002]**
 - (a) Mesitylene (b) Benzene

(a) $C_2 H_6$

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- (c) Ethyl benzene (d) Propyl benzene
- **42.** When treated with ammoniacal cuprous chloride, which one among the following forms copper derivative
 - [**CBSE PMT 1989; MP PMT 1993**] (b) *C*₂*H*₄
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	(c) $C_2 H_2$ (d) $C_6 H_6$
43 •	Which of the following catalyst is used in the polymerisation of $CH = CH$ to C_6H_6 [CPMT 1999]
	(a) $AlCl_3$ (b) $HgSO_4$
	(c) $NbCl_3$ (d) HCl
44.	$KMnO_4$ will oxidise acetylene to [CPMT 1999]
••	(a) Ethylene glycol (b) Ethyl alcohol
	(c) Oxalic acid (d) Acetic acid
45 .	Ethyne on reaction with dil. H_2SO_4 and Hg (II) gives
	(a) Ethanol
	(b) Ethanal
	(c) Methoxymethane
46.	(d) Ethyl hydrogen sulphate Which of the following is used to distinguish ethylene and
40.	acetylene [MP PET 2000; KCET 2000; JIPMER 2000;
	CPMT 1977; NCERT 1973]
	(a) Alkaline $KMnO_4$
	(b) Bromine water
	(c) Ammoniacal cuprous chloride
	(d) Conc. H_2SO_4
47•	The distinguishing test for triple bond containing acidic hydrogen is [JIPMER 2000]
	(a) $Ag(NH_3)_2^+$ (b) Br_2 in CCl_4
	(c) Alkaline $KMnO_4$ (d) $AlCl_3$
48.	If acetylene is passed through an electric arc in the atmosphere of nitrogen, the compound formed is
	[RPMT 1999]
	(a) <i>HCN</i> (b) Pyrrole
	(c) Pyrazole (d) Pyridine
49.	Ozonolysis of acetylene gives [RPMT 1999]
	(a) Glycol(b) Glyoxal,formic acid(c) Formaldehyde(d) None
50.	The bond length between the hybridised carbon atom and
J 01	other carbon atom is minimum in [Pb. PMT 2000]
	(a) Butane (b) Propyne
	(c) Propene (d) Propane
51.	The reaction of propene with HOCl proceeds via the addition of[IIT-JEE (Screening) 2001]
	(a) H^+ in the first step
	(b) Cl^+ in the first step
	(c) OH^- in the first step
	(d) Cl^+ and OH^- in a single step
52.	Acetylene reacts with ammonical A_{gNO_3} forming
	[MH CET 1999; CPMT 1984, 86; MP PMT 1997]
	(a) Silver acetylene (b) Silver acetate

(d) $C_6 H_6$

(c) C_2H_2

- (a) Silver acetylene (b) Silver acetate (c) Metal silver (d) Silver mirror
- Ethylidine dichloride can be prepared by the reaction of **53**. HCl and

- (a) $C_2 H_4$ (b) $C_2 H_2$
- (d) All of these (c) $C_2 H_5$
- Which of the following order of reagent is chosen to 54. prepare 1, 3-butadiene from C_2H_2 [RPET 2000]
 - (a) $CuCl/NH_4Cl$ and $H_2/Pd(BaSO_4)$
 - (b) $NH_4Cl/CuCl$ and $H_2/Pd(BaSO_4)$
 - (c) $H_2 / Pd(BaSO_4)$ and $CuCl / NH_4Cl$
 - (d) $H_2/Pd(BaSO_4)$ and $NH_4Cl/CuCl$
- Benzene is the polymer of [RPET 1999; Bihar MEE 1999] 55.
 - (a) Methane (b) Ethane (c) Ethylene (d) Ethyne

 ${}^{CH}_{{}_{|||}}$ reacts with a cetic acid in presence of $Hg^{_{2+}}$ to give ${}^{CH}_{CH}$ 56.

[CPMT 1985]

(a)	CH_3 $CH(CH_3COO)_2$	(b)	$CH(CH_3COO)_2$ $CH(CH_3COO)_2$
(c)	CH_3 $H_2(CH_3COO)$	(d)	None of these

Acetylene is prepared industrially by passing electric 57. discharge through graphite electrodes in the atmosphere of

(a) Air (b) N_2 (d) CO_2 (c) H_{2}

When acetylene is passed into dilute sulphuric acid 58. s that - ----

containing Hg^{2+} ions	, the product formed is
[DPMT 1996; Ro	orkee 1995; BHU 1998; KCET 1999;
MP PET 1985	, 86; DCE 1999; DPMT 1999, 2002;
СРМТ	1975, 82, 83, 90; MP PMT 1994, 97;
CBSE PMT 1	999; AIIMS 2002; CBSE PMT 1999;
	KCET (Med.) 1999, JIPMER 1999]
(a) Acetone	(b) Acetic acid
(c) Acetaldehyde	(d) Formaldehyde
Which of the following	; has acidic hydrogen
[IIT-JEE 198;	5, 89; CPMT 1986; Bihar MEE 1997;
	RPET 1999; AFMC 1999]
(a) Ethyne	(b) Ethene

- (c) Ethane (d) Benzene
- **60.** Xylenes on oxidation with acidic *KMnO*₄ gives

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[JIPMER 2000]
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- (a) Terphthalic acid (b) Phthalic acid (c) Isophthalic acid (d) All of these
- The structure of the product(Z) in the reactions given
- 61. below $HC = CH \xrightarrow{NaNH_2, CH_3COCH_3} X \xrightarrow{Hg^{2+}, H_3O^+} Z$ is H_2O H^+ [Roorkee 2000]

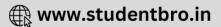
(a)
$$CH_3 - CH_2 - CH_2 - CH_2 - CH_2OH$$

[MH CET 1999]

59.

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62. Carbon-carbon bond length is minimum in [CBSE PMT 1988, 91; MNR 1984; CPMT 1989; RPMT 1997; Pb. PMT 2001]

(a) Ethane

- (c) Ethyne (d) Benzene
- (e) Ethanol
- **63.** Triple bond of ethyne is made of **or** Cylindrical shape of an alkyne is due to

[EAMCET 1978; NCERT 1979; CBSE PMT 1997; Manipal MEE 1995; Bihar MEE 1996]

(b) Ethene

- (a) Three σ bonds
- (b) Three π bonds
- (c) Two σ and one π bond
- (d) Two π and one σ bond
- 64. An organic compound has a triple bond and not double bond. It can be tested by [MP PMT 2000, 03]
 - (a) Bromine water
 - (b) Bayer's reagent
 - (c) Fehling solution
 - (d) Ammonical silver nitrate
- **65.** Which of these will not react with acetylene

		[AIEEE 2002; DCE 2002]
(a)	NaOH	(b) Ammonical $AgNO_3$
(c)	Na	(d) HCl

66. What is the product when acetylene reacts with hypochlorous acid [RPMT 2002; AIEEE 2002]

(a)
$$CH_3COCl$$
 (b) $ClCH_2CHO$

(c)
$$Cl_2CHCHO$$
 (d) $ClCHCOOH$

- **67.** The alkene C_6H_{10} producing $OHC (CH_2)_4 CHO$ on ozonolysis is **[Roorkee 1999]** (a) Hexene-1 (b) Hexene-3
 - (c) Cyclohexene (d) 1-methylcyclohexene-1
- 68. The number of moles of proton which can be easily given by butyne-1(1 mole) is [MP PMT 2000]
 (a) 1 (b) 2
 - (c) 3 (d) 6

69. Which will undergo reaction with ammoniacal $AgNO_3$

(a)
$$\begin{array}{c} CH_3 \\ CH_3 \end{array} > CH - CH_2 - CH = CH - CH_3$$

(b) $CH_3 - CH = CH - C \equiv CH$

- (c) $CH_3 CH_2 CH = CH CH_2 CH_3$
- (d) $CH_2 = CH CH_2 CH_3$
- (e) None
- **70.** Acetylene gas when passed through the 20% H_2SO_4 at 80° C gives acetaldehyde. The catalyst required for this conversion is
 - (a) Anhydrous $AlCl_3$ (b) $HgSO_4$

- 71. Which of the following reactions will yield 2, 2dibromopropane [MNR 1993; UPSEAT 2001]
 (a) UC CU: 2UD
 - (a) $HC \equiv CH + 2HBr \rightarrow$
 - (b) $CH_3C \equiv CH + 2HBr \rightarrow$
 - (c) $CH_3CH = CH_2 + HBr \rightarrow$
 - (d) $CH_3CH = CHBr + HBr \rightarrow$
- **72.** Which of the following does not give white precipitate with ammoniacal A_{gNO_3}

(a)
$$CH \equiv CH$$
 (b) $CH_3 - C \equiv CH$

(c)
$$CH_3 - C \equiv C - CH_3$$
 (d) $CH_2 - C \equiv CH$

73.
$$\begin{array}{c} CH & \xrightarrow{O_3 / NaOH} X \xrightarrow{Z_1 / CH_3 COOH} Y & Y \text{ is [AIIMS 1988]} \\ CH & \end{array}$$

(a)
$$|$$
 (b) CH_3CH_2OH
 CH_2OH

- (c) CH_3COOH (d) CH_3OH
- 74. Which is represented by the formula $C_n H_{2n-2}$

[CPMT 1975, 76; EAMCET 1979; MP PET 2003

(a) Alkane(b) Alkyne(c) Alkene(d) None of these

75. What is the major product of the following reaction $CH_3C \equiv C - CH_2 - CH_3 \xrightarrow{1 \text{ mole of } Cl_2}$

(a)
$$CI > C = C < CI CH_3 > C = C < CI CH_2CH_3$$

(b) $CH_3 - CH_2 - CH_2 - CH_2CH_3$
(c) $CI = CH_2CH_3$

(c)
$$Cl > C = C < CH_2CH_3$$

 $Cl = Cl = C < Cl = CL_3$

(d)
$$CH_3 - \overset{i}{C} - \overset{i}{C} - CH_2CH_3$$

 $Cl \quad Cl$

76. A compound C_5H_8 which give white ppt. with ammonical A_gNO_3 . A give $(CH_3)_2$ *CHCOOH* with hot alcoholic *KOH* then compound is **[RPMT 2002]** (a) $CH_3CH_2 - CH_2 - CH = CH_2$



	(b) $CH_3 - CH_2 - C \equiv CH$	
	(c) $(CH_3)_2 CH - C \equiv CH$	
	(d) $CH_2 = CH - CH_2 - CH = 0$	CH_2
77.	1, 2-dibromoethane when hea	ted with alcoholic potash
	gives	[Kerala PMT 2004]
) Acetylene
	•) Methane
~	(e) None of these	
7 8.	Which of the following is not series	a member of homologous [RPMT 2002]
	(a) Ethene (b) 1-butene
) 2-butyne
79.	The compound formed as	
	permanganate oxidation of eth	
		[MP PET/PMT 1998]
) Benzyl alcohol
•	-) Acetophenone
80.	What is the product when 2-by NH_3 in presence of lithium	Ityne is treated with liquid [Orissa JEE 2003]
) <i>cis</i> -2-butene
) 1-butene
81.	Distinction in pentene-1 and pe	
01.	Distinction in pentene-1 and pe	[CPMT 1996]
	(a) $[Ag(NH_3)_2]^+$ (b)) Conc. H_2SO_4
	(c) <i>HCl</i> (d) Br ₂
82.	A mixture of ethane, ethene an	
	ammoniacal $AgNO_3$ solution	
	unreacted are	[CPMT 1990]
	(a) Ethane and ethene (b	•
_	-) Ethane only
83.	In its reaction with silver nitrat	
		[MP PET 1999]
	(a) Oxidising property (b	
. .) Acidic property
84.	1 7 1	
	(a) <i>CH</i> (b)) CH ₂
	(c) $C_2 H_2$ (d)) $C_2 H_4$
85.	Which of the following bonds is	s most acidic
-) $-C - H$
) All are equally acidic
86.	The hybridisation in metha	
	respectively is	[CPMT 2003]
	(a) sp^3 , sp^2 and sp (b)) $sp^{3,}sp, sp^{2}$
	(c) sp^2 , sp^3 and sp (d)) sp^{3}, sp^{2}, sp
87.	Number of acidic hydrogen ato	ms in butyne-1 are
		[MP PET 1986]
) 3
) 4
88.	Which of the following shows li	
) Ethene
	(c) Acetylene (d) <i>CCl</i> ₄

J & K 2005]

	(a) Methane (b) Ethane
	(c) Ethene (d) Acetylene
90.	
	catalyst gives [AFMC 1991]
	(a) 1, 1-dicyano ethane(b) Ethyl cyanide(c) Vinyl cyanide(d) Divinyl cyanide
91.	Which compound will react with an aqueous solution of
) =.	$Ag(NH_3)^+_2OH^-$ [DPMT 2000]
	(a) $CH_2 = CH_2$ (b) $CH_3 - CH_3$
	(c) $CH_3CH_2C \equiv CH$ (d) $CH_3 - C \equiv C - CH_3$
92.	Which of the following give H_2 gas with <i>Na</i> [RPMT 2002]
92.	
	(a) CH_4 (b) C_2H_6
	(c) $C_2 H_4$ (d) $C_2 H_2$
93.	$CH_3 - C \equiv CH \xrightarrow{O_3}_{Zn/H_2O_2}$ Product Product in above reaction
	is [RPMT 2003]
	(a) <i>CH</i> ₃ <i>COOH</i> (b) <i>HCOOH</i>
	(c) Both (a) and (b) (d) $CH_3CHO + HCHO$
94.	The number of π – bonds in the product formed by
	passing acetylene through dilute sulphuric acid containing mercuric sulphate is [EAMCET 1997]
	(a) Zero (b) One
	(c) Two (d) Three
95.	Which of the following is weakly acidic
	(a) $CH_2 = CH_2$ (b) C_6H_6
	(c) $CH_3 - C \equiv CH$ (d) $CH_3 - C \equiv C - CH_3$
96.	Which of the following reactions is shown by alkynes
	[AMU 1984; RPMT 2000]
	(a) Addition (b) Substitution
	(c) Polymerization (d) All of these
97.	Shortest C–C bond length is present in [BVP 2004]
	(a) $CH_3 - CH_2 - CH_3$ (b) $CH_3CH_2CH_2CH_3$
	(c) $CH_2 = CH - CH = CH_2$ (d) $CH \equiv C - C \equiv CH$
98.	Acetylene can be obtained by the reaction [MH CET 2004]
	(a) $HCOOK \xrightarrow{\text{electrolyss}}$
	(b) $CHI_3 + 6Ag + CHI_3 \xrightarrow{\Delta}$
	(c) $CH_3CH_2OH \xrightarrow{\text{Conc. } H_2SO_4}{443^{\circ}C}$
	(d) $Be_2C + H_2O \rightarrow$
99.	Which of the following used for the conversion of 2- hexyne into trans-2-hexane [IIT JEE (Screening) 2004]
	(a) $H_2/Pd/BaSO_4$ (b) H_2,PtO_2
	(c) $NaBH_4$ (d) $Li - NH_3/C_2H_5OH$
100	
100.	In which of the following, the bond length between

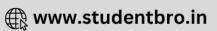
100. In which of the following, the bond length between hybridized carbon atom and other carbon atom is minimum

[MH CET 2003] (b) Propene

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(a) Propyne



	(c)	Butane	(d)	Propane
101.				of acetylene an hydrogen
	is p	assed over heated Lindla	ar's ca	atalyst
		[K	erala	PMT 2004; AIIMS 1987]
	(a)	Ethane and water are for	orme	1
	(b)	Ethylene is formed		
	(c)	Acetylene and ethane a	re for	rmed
	(d)	None of these		
102.	-	acetylene molecule, the	two o	carbon atoms are linked
	by			
				[KCET 2004]
		One sigma bond and tw	-	
		Two sigma bonds and o	one pi	bond
		Three sigma bonds		
	(d)	Three pi bonds		
103.	Wh	ich reacts with ammonia	acal A	AgNO ₃
				[Orissa JEE 2005]
	(a)	Propyne	(b)	2-butyne
	(c)	1,3-butadiene	(d)	Pentene
104.	СН	$T \equiv CH \xrightarrow{H_gSO_4} \xrightarrow{CH_3M_4} H_2SO_4$	$gBr \rightarrow$	$\xrightarrow{P/Br_2}$
-		H_2SO_4 H_2O_4)	
				[DPMT 2005]
	(a)	$CH_3CH(Br)CH_3$	(b)	$CH_3CH_2CH_2Br$
	(c)	$CH_2 = CH - Br$	(d)	$BrCH = CH - CH_3$
105.	Car	bide, which react with w	ater t	to give propyne is
				[Kerala CET 2005]
		CaC_2	(b)	SiC
	(c)	Mg_2C_3	(d)	Al_4C_3

(e) Be_2C

Aromatic hydrocarbon

1. The function of anhydrous *AlCl*₃ in the Friedel-Craft's reaction is to

[MNR 1986, 1995; Roorkee 1999; BHU 2001; CPMT 2002; MPPET 2001]

(b) Addition

- (a) Absorb water (b) Absorb *HCl*
- (c) To produce electrophile (d) To produce nucleophile

Benzene reacts with CH₃COCl in the presence of AlCl₃ to give [DPMT 1983; CBSE PMT 1991]

- (a) C_6H_5Cl (b) C_6H_5COCl (c) $C_6H_5CH_3$ (d) $C_6H_5COCH_3$
- **3.** Acylation process is preferred than direct alkylation because (by the Friedel-Craft's reaction)
 - (a) In alkylation, a poisonous gas is evolved
 - (b) In alkylation, large amount of heat is evolved
 - (c) In alkylation, polyalkylated product is formed
 - (d) Alkylation is very costly
- 4. Benzene cannot undergo(a) Substitution

Coaltar is main source of [DPMT 1984] 5. (a) Aromatic compounds (b) Aliphatic compounds (c) Cycloalkanes (d) Heterocyclic compounds 6. Which of the following is not formed by the ozonolysis of o-xylene (a) Glyoxal (b) Ethyl glyoxal (c) Dimethyl glyoxal (d) Methyl glyoxal The number of σ and π bonds in a molecule of benzene 7. is [MP PMT/PET 1988; BHU 1995; CPMT 1997] (a) 6σ and 9π (b) 9σ and 3π (c) 12σ and 3π (d) 6σ and 6π 8. The ratio of σ and π bonds in benzene is [CPMT 1991; BHU 1995] (a) 2 (b) 4 (d) 8 (c) 6Carbon atoms in benzene molecule is inclined at an angle 9. of [BHU 1985] (a) 120° (b) 180° (c) $109^{\circ}28'$ (d) 60° 10. When benzene is treated with excess of Cl_2 in the presence of I_2 , the end product is (a) Monochlorobenzene (b) Trichlorobenzene (c) Hexachlorobenzene (d) Benzene hexachloride 11. Chemical name of the insecticide gammexene is [CPMT 1981; MP PET 1995; MP PMT 1996; CBSE PMT 1999; MP PET 1999] (a) DDT (b) Benzene hexachloride (c) Chloral (d) Hexachloroethane Gammexane is obtained from benzene when it reacts with 12. (a) Br_2 in bright sunlight (in the absence of a catalyst) (b) Cl_2 in bright sunlight (in the absence of a catalyst) (c) CH_3Cl in the presence of anhydrous $AlCl_3$ (d) $COCl_2$ in the presence of anhydrous $AlCl_3$ Point out the wrong statement in relation to the structure 13. of benzene (a) It forms only one monosubstitution product (b) The C - C bond distance in benzene is uniformly 1.397 Å (c) It is a resonance hybrid of a number of canonical forms (d) It has three delocalised π - molecular orbitals Which equation represents an example of Friedel-Craft's 14. [MNR 1993; CPMT 1996] reaction (a) $C_6H_6 + C_2H_5Cl \xrightarrow{AlCl_3} C_6H_5C_2H_5 + HCl$

(d) Oxidation

(c) Elimination

(b) $C_2H_5OH + HCl \xrightarrow{ZnCl_2} C_2H_5Cl + H_2O$

(c)
$$C_6H_5Cl + CH_3COCl \xrightarrow{AlCl_3} C_6H_5COCH_3 + Cl_2$$

- (d) $C_2H_5Br + Mg \xrightarrow{Ether} C_2H_5Mgr$
- **15.** The most stable carbonium ion among the following is **[JIPMER 2002; AFMC 2002]**
 - (a) $C_6H_5CHC_6H_5$ (b) $C_6H_5CH_2$

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(c)
$$CH_3CH_2$$
 (d) $C_6H_5CH_2CH_2$

- The reaction of toluene with chlorine in presence of ferric 16. chloride gives predominantly [IIT-JEE 1986; DCE 2000] (a) Benzoyl chloride (b) *m*-chlorotoluene
 - (c) Benzyl chloride
- (d) o- and p-chlorotoluenes The product formed when toluene is heated in light with 17. Cl_2 and in absence of halogen carrier is
 - (a) Benzotrichloride (b) Gammexene
 - (c) Chlorobenzene (d) None of these
- Attacking or reactive or electrophilic species in nitration 18. of benzene is or In the nitration of benzene with concentrated HNO_3 and H_2SO_4 the attack on ring is made by
 - [CBSE PMT 1994; MP PET 1996, 2000; Pb. PMT 1998; BHU 2001; BVP 2004; DCE 2003]
 - (a) NO_2^- (b) NO_{2}^{+}
 - (c) NO_3^- (d) NO_2
- Which of the following reactions takes place when a 19. mixture of concentrated HNO_3 and H_2SO_4 reacts on benzene at 350K [CPMT 1985] (a) Sulphonation (b) Nitration
 - (c) Hydrogenation (d) Dehydration
- Nitration of benzene by nitric acid and sulphuric acid is 20. [MNR 1989; CPMT 1990; BCECE 2005] (a) Electrophilic substitution (b)Electrophilic addition
 - (c) Nucleophilic substitution (d)Free radical substitution
- Necessary conditions for halogenation are [CPMT 1976] 21.
 - (a) Cold and dark
 - (b) Presence of halogen carrier
 - (c) Both (a) and (b)
 - (d) None

22.
$$C_6H_6 + CH_3Cl \xrightarrow{\text{anhydrous}} C_6H_5CH_3 + HCl$$

- is an example of [NCERT 1979; CPMT 1974, 85, 90; Bihar CEE 1995; BHU 1979, 2001; MP PET 1995; MP PMT 1995; KCET 1993; EAMCET 1998; AIIMS 1998; CBSE PMT 2000; AFMC 2000; JIPMER 2000]
 - (a) Friedel-Craft's reaction (b) Kolbe's synthesis
- (c) Wurtz reaction (d) Grignard reaction
- The reaction of benzene with chlorine in the presence of 23. iron gives [MP PET 1993]
 - (a) Benzene hexachloride (b) Chlorobenzene
 - (c) Benzyl chloride (d) Benzoyl chloride
- Benzene was discovered by [NCERT 1981] 24. (a) Ramsay (b) Dalton
 - (c) Faraday (d) Priestley
- The correct structure of benzene was proposed by 25.
 - [CPMT 1972] (a) Faraday (b) Davy
 - (c) Kekule (d) Wohler

The centric structure of benzene was proposed by 26.

- [CPMT 1982, 83, 89] (a) Dewar (b) Ladenberg
- (c) Kekule (d) Armstrong and Baeyer
- The bond order of individual carbon-carbon bonds in 27. benzene is [IIT-JEE 1981; MP PET 2000] (b) Two
 - (a) One
 - (c) Between one and two (d) One and two, alternately
- 28. Six carbon atoms of benzene are of

- (a) One type (b) Two types
- (c) Three types (d) Six types
- On heating a mixture of sodium benzoate and sodalime, 29. the following is obtained
 - [CPMT 1990; AIIMS 1996; MP PET 1999; AFMC 1999]
 - (a) Toluene (b) Phenol
 - (c) Benzene (d) Benzoic acid
- 30.
- Benzene on treatment with a mixture of conc. HNO₃ and conc. H_2SO_4 at $100^{\circ}C$ gives (a) Nitrobenzene (b) *m*-dinitrobenzene (c) *p*-dinitrobenzene (d) *o*-dinitrobenzene What is the end product which is obtained on the 31. [MP PMT/PET 1988] nitration of toluene (a) *o*-nitrotoluene (b) *p*-nitrotoluene (c) 2, 4-dinitrotoluene (d) 2, 4, 6-trinitrotoluene Which of the following processes is reversible 32. (a) Halogenation (b) Sulphonation (c) Nitration (d) None 33. The attacking (electrophilic) species in sulphonation of [RPMT 1997; CPMT 1999, 2002] benzene is (a) SO_2 (b) SO_3 (c) SO_4^{2-} (d) HSO_3^- Which xylene is most easily sulphonated 34. (a) Ortho (b) Para (c) Meta (d) All at the same rate Toluene on oxidation with dilute HNO3 and alkaline 35. $KMnO_4$ gives [DPMT 1981] (a) Benzaldehyde (b) Phenol (c) Nitrotoluene (d) Benzoic acid 36. Benzene vapour mixed with air when passed over V_2O_5 catalyst at 775K gives [AFMC 1991; CPMT 2001; MP PMT 2003] (a) Glvoxal (b) Oxalic acid (d) Fumaric acid (c) Maleic anhydride Most common reactions of benzene 37. (aromatic hydrocarbon) and its derivatives are [DPMT 1984; MP PMT 1989; AFMC 1997; BHU 1996, 98] (a) Electrophilic addition reactions (b) Electrophilic substitution reactions (c) Nucleophilic addition reactions (d) Nucleophilic substitution reactions
- 38. Which is most readily nitrated
 - [Roorkee 1992] (b) Phenol
 - (a) Benzene (c) Aniline (d) Nitrobenzene
 - o, p-directing groups are mostly
- 39. (a) Activating groups (b) Deactivating groups (c) Neutral groups
 - (d) None of these
- Which among the following is the strongest *o*, *p*-directing 40. [CBSE PMT 1989] group (a) OH (b) Cl
 - (c) $C_6 H_5$
- The compound that is most reactive towards electrophilic 41. nitration is

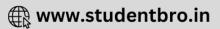
[IIT-JEE 1985; AIIMS 1998; MP PET/PMT 1998]

(d) *Br*

- (a) Toluene (b) Benzene
- (c) Benzoic acid (d) Nitrobenzene

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- Amongst the following, the compound that can be most 42. readily sulphonated is
 - [IIT-JEE 1982; MADT Bihar 1995; KCET 2005]
 - (a) Benzene (b) Nitrobenzene
 - (c) Toluene (d) Chlorobenzene
- Which of the following would be least reactive towards 43. [NCERT 1981] bromine
 - (a) Nitrobenzene (b) Phenol
 - (c) Anisole (d) Chlorobenzene
- Amongst the following, the compound that is nitrated 44. with difficulty is
 - (a) Benzene (b) Nitrobenzene
 - (c) Toluene (d) Phenol
- Select the true statement about benzene from amongst 45. the following [CBSE PMT 1992]
 - (a) Because of unsaturation benzene easily undergoes addition reactions
 - (b) There are two types of *C C* bonds in benzene molecule
 - (c) There is a cyclic delocalisation of π electrons in benzene
 - (d) Monosubstitution of benzene group gives three isomeric substances
- Anhydrous AlCl₃ is used in the Friedel-Craft's reaction 46. because it is [CBSE PMT 1991]
 - (a) Electron rich
 - (b) Soluble in ether
 - (c) Insoluble to chloride and aluminium ions
 - (d) Electron deficient
- (i) Chlorobenzene and (ii) benzene hexachloride are 47. obtained from benzene by the reaction of chlorine, in the presence of
 - (a) (i) Direct sunlight and (ii) anhydrous AlCl₃
 - (b) (i) Sodium hydroxide and (ii) sulphuric acid
 - (c) (i) Ultraviolet light and (ii) anhydrous FeCl₃
 - (d) (i) Anhydrous AlCl₃ and (ii) direct sunlight
- In Friedel Craft's alkylation, besides AlCl₃ the other **48**. [AFMC 1997; CBSE PMT 1999] reactants are
 - (a) $C_6H_6 + CH_3Cl$ (b) $C_6 H_6 + C H_4$
 - (c) $C_6H_6 + NH_3$ (d) $C_6H_6 + CH_3COCl$

[RPMT 1999]

[RPMT 1999]

- Nitration of benzene is a 49.
 - (a) Electrophilic displacement
 - (b) Electrophilic addition
 - (c) Nucleophilic addition
 - (d) Nucleophilic displacement
- Benzene shows 50.
 - (b) Addition (a) Substitution (c) Oxidation (d) All of these
- 51. Benzene can be obtained in the reaction
 - [RPET 2000; Bihar MEE 1997]
 - (a) Ethene + 1, 3-butadiene
 - (b) Trimerisation of ethyne
 - (c) Reduction of PhCHO
 - (d) All of these
- 52. Thiophene and benzene are separated by [RPET 2000]
 - (a) Sulphonation of thiophene (b) Sulphonation of benzene

- (c) Nitration of thiophene
- (d) Nitration of benzene
- Which of the following is a hydrocarbon [AFMC 1992] 53. (b) Benzene (a) Urea
 - (c) Ammonium cyanate (d) Phenol
- Aromatic compounds burn with sooty flame because 54.
 - [BIT 1001]
 - (a) They have a ring structure of carbon atoms
 - (b) They have a relatively high percentage of hydrogen
 - (c) They have a relatively high percentage of carbon
 - (d) They resist reaction with oxygen of air
- Among the following compound which one is planar in 55. shape [MP PMT 2000]
 - (a) Methane (b) Acetylene
 - (c) Benzene (d) Isobutane
- Among the following statements on the nitration of 56. aromatic compounds, the false one is [IIT-JEE 1997]
 - (a) The rate of nitration of benzene is almost the same as that of hexadeuterobenzene
 - The rate of nitration of toluene is greater than that of (b) benzene
 - The rate of nitration of benzene is greater than that of (c) hexadeuterobenzene
 - (d) Nitration is an electrophilic substitution reaction
- Methyl group attached to benzene can be oxidised to 57. carboxyl group by reacting with [KCET 1993]

(a)
$$Fe_2O_3$$
 (b) $AgNO_3$

(c)
$$KMnO_4$$
 (d) Cr_2O_3

CH₃

- [MP PET 2002] is widely used 58. How is NO,
 - (a) Insecticide (b) Drug
 - (c) Explosive (d) Dye
- The compound 'A' when treated with HNO₃ (in presence 59. of H_2SO_4) gives compound 'B' which is then reduced with *Sn* and *HCl* to aniline. The compound 'A' is [MP PET 2002]
 - (a) Toulene (b) Benzene
 - (c) Ethane (d) Acetamide
- Which is formed when benzene is heated with chlorine in 60. the presence of sunlight
 - [CPMT 2000: KCET (Med.) 2000: MP PMT 1993: MP PET 2002 AIIMS 1999]
 - (a) $C_6H_5CCl_3$ (b) $C_6H_5CHCl_2$
 - (c) $C_6H_5CH_2Cl_2$ (d) $C_6 H_6 C l_6$
- The compound used as an explosive is 61. [Kerala (Engg.) 2002; MP PET 2002; MP PMT 1993]
 - (a) 2,4, 6-tribromoaniline (b) 1,3, 5-trinitrobenzene
 - (c) 2,4, 6-trichlorotoluene (d) 1,3, 5-trichlorobenzene
 - (e) 2,4, 6-trinitrotoluene
- Adding of Cl_2 to benzene in the presence of $AlCl_3$ is an 62.
 - example of

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(b) Halogenation

[Bihar MEE 1996]

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- (a) Addition (c) Substitution (d) Elimination

	(e) None of these	
63.		hthalene balls are put inside
0	kerosene	[Kerala (Med.) 2002]
	(a) Precipitates	
	(c) Dissolves easily	
	(e) None of these	(a) 2000 not appoint
64.		are found in
04.	Three fused belizene fings	
	(a) Naphthalana	[Kerala (Engg.) 2002]
	(a) Naphthalene	(d) Trink and moth and
-	(c) Phenanthroline	
65.	Product obtained after nitr	
	()	[RPMT 1997]
	(a) TNT	(b) 1, 3-dinitrobenzene
	(c) Picric acid	
66.		e (not hydrolysis), the product
	is	
		[RPMT 1997; CPMT 1997]
	(a) Benzene triozonide	
	(c) Ethanediol	(d) All of them
67.	Which acid will not form h	ydrocarbon [CPMT 1997]
	(a) Cinnamic acid	(b) Isothallic acid
	(c) Salicylic acid	(d) Picric acid
68.		of <i>n</i> -haptane in presence of
		res [Roorkee 1999]
	2 3 2 3	
	(a) iso-heptane(c) toluene	(b) 1-heptene
69.	$C_6H_6 \xrightarrow{HNO_3} X \xrightarrow{Cl_2} X$	<i>Y</i> . In the above sequence <i>Y</i> is
	H_2SO_4 $FeCl_3$	
	(a) 1 nitrochloro honzono	[AIIMS 1999]
		(b) 3-nitrochlorobenzene
		(d) 1,2-nitrochlorobenzene
70.	Which of the following has	
	(a) Olefins	(b) Straight chain paraffins
	(c) Aromatic hydrocarbon	s (d) Branched chain
paraf		
71.		he bond length between carbon
	and carbon atom is equal	[CPMT 1997]
	(a) 2-butene	(b) Benzene
	(c) 1-butene	(d) 1-propyne
72.		poratory from which one of the
	following compounds	[MP PMT 1996]
	(a) $C_6 N_5 N_2 Cl$	(b) C_6H_5OH
	(c) C_6H_5COONa	(d) $C_6H_5SO_3H$
7 3 •		is not used in Friedel-crafts
	reaction	
	(a) Dhanyi aaataniida	[KCET 2000]
	(a) Phenyl acetanilide	
	(c) Benzene	(d) Chlorobenzene
74.	In chlorination of benzene,	-
		[MP PET 2000]
	(a) Cl^+	(b) Cl^{-}
	(c) Cl_2	(d) Cl_2^{-}
	2	
7 5 .	Which of following having	
	(a) Ponzono	[BCECE 2005]
	(a) Benzene	(b) Cyclohexane
-1	(c) CH_4	(d) C_2H_6
76.		[MP PET 2001; Pb. PMT 2004]
	(a) Tetrahedral	(b) Planar
	(c) Pyramidal	(d) Trigonal
	Pyridine is less basic than t	riethylamine because

77. Pyridine is less basic than triethylamine because

(b) Nitrogen in pyridine is sp^2 hybridized (c) Pyridine is a cyclic system (d) In pyridine, lone pair of nitrogen is delocalized Electrophile in the case of chlorination of benzene in the 78. presence of $FeCl_3$ is [CBSE PMT 1996] (a) Cl^+ (b) *Cl*⁻ (c) *Cl* (d) $FeCl_3$ Which one of the following will undergo meta substitution 79. on monochlorination [AIIMS 1991] (a) Ethoxy ethane (b) Chlorobenzene (c) Ethyl benzoate (d) Phenol 80. Nitration of toluene takes place at [NCERT 1990] (a) *o*-position (b) *m*-position (c) *p*-position (d) Both *o*- and *p*-positions 81. Which of the following is not o, p-directing group (a) $-NH_2$ (b) –*OH* (d) -*CHO* (c) -X (halogens) 82. Benzene can react with [UPSEAT 2003] (a) Br_2 water (b) HNO_3 (d) CH_3OH (c) H_2O The compound 'A' having formula C_8H_{10} (aromatic) 83. which gives 1 mononitro substitute and 3 nitrosubstitute compound is [DPMT 2002] (b) p-Xylene (a) *m*-Xylene (c) o-Xylene (d) Ethyl benzene 84. Catalytic hydrogenation of benzene gives [AIIMS 1996] (b) Cyclohexane (a) Xylene (c) Benzoic acid (d) Toluene Benzene is obtained from 85. [CPMT 1996] (a) Coaltar (b) Plant (c) Animal (d) Charcoal The 'middle oil' fraction of coaltar distillation contains 86. [MP PET 2001] (a) Benzene (b) Anthracene (c) Naphthalene (d) Xylene Lindane can be obtained by reaction of benzene with 87. [DCE 2000] (a) CH_3Cl /anhy. $AlCl_3$ (b) Cl₂/sunlight (c) C_2H_5I /anhy. AlCl₃ (d) $CH_3COCl / AlCl_3$ 88. Which of the following oil is obtained from benzene after fractional distillation of coal tar [BHU 2004] (a) Light oil (b) Heavy oil (c) Middle oil (d) Anthracene oil 89. Hydrocarbon C_6H_6 decolourise Br_2 water and gives ppt. with ammonical AgNO3 Hydrocarbon can be [MP PET 2004] (a) 1, 3, 5 Cyclohexatriene (b) 1, 5 Hexadiyne (c) 2, 4 Hexadiyne (d) None Decreasing order of C-C bond length is [JEE Orissa 2004] 90.

(a) Pyridine has aromatic character

[AIIMS 2005]

 (a) C_2H_4 (b) C_2H_2

 (c) C_6H_6 (d) C_2H_6

 (a) IV > III > I > II (b) I > II > IV > III

 (c) II > I > IV > III (d) IV > I > III > II > II

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91.	Benzene can be obtained by heating either benzoic acid with <i>X</i> or phenol with <i>Y</i> . <i>X</i> and <i>Y</i> are respectively
	[KCET 2004]
	(a) Zinc dust and soda lime
	(b) Soda lime and zinc dust
	(c) Zinc dust and sodium hydroxide
	(d) Soda lime and copper
92.	Order of reactivity of C_2H_6, C_2H_4 and C_2H_2 is
	[MH CET 2004]
	(a) $C_2H_6 > C_2H_4 > C_2H_2$ (b) $C_2H_2 > C_2H_6 > C_2H_4$
	(c) $C_2H_2 > C_2H_4 > C_2H_6$ (d) All are equally reactive
93.	
	(a) Kolbe's reaction (b) Williamson's synthesis
	(c) Wurtz reaction (d) Sandmeyer reaction
94.	Aromatisation of <i>n</i> -heptane by passing over
•	$(Al_2O_3 + Cr_2O_3)$ catalyst at 773 K gives [DCE 2004]
	(a) Benzene (b) Toluene
	(c) Mixture of both (d) Heptylene
95.	0 U
	[AIEEE 2005]
	(a) Benzylamine (b) Aniline
	(c) Acetanilide (d) <i>p</i> -nitroaniline
96.	
	[AFMC 2005]
	(a) Benzene (b) Chlorobenzene
	(c) Benzaldehyde (d) Benzoic acid
97.	In presence of light & heat toluene chlorinated & react with aqueous <i>NaOH</i> to give
	[Kerala CET 2005]
	(a) <i>o</i> -Cresol
	(b) <i>p</i> -Cresol
	(c) Mixture of <i>o</i> - Cresol & <i>p</i> -Cresol
	(d) Benzoic acid
	(e) 1, 3, 5 trihydroxy toluene
	G Critical Thinking
	Objective Questions

- In the case homologous series of alkanes, which one of the following statements is incorrect
 [JIPMER 2000]
 - (a) The members of the series are isomers of each other
 - (b) The members of the series have similar chemical properties
 - (c) The members of the series have the general formula $C_n H_{2n+2}$, where *n* is an integer
 - (d) The difference between any two successive members of the series corresponds to 14 unit of relative atomic mass
- **2.** How many primary, secondary, tertiary and quaternary carbons are present in the following hydrocarbon

$$CH_{3} - CH(CH_{3}) - C(CH_{3})_{2} - CH_{2} - CH(CH_{3}) - CH_{2} - CH_{3}$$

	Primary	Secondary	Tertiary	Quaternary
(a)	6	2	2	1
(b	2	6	3	0
)				
(c)	2	4	3	2
(d	2	2	4	3
)				

3. The octane number of a sample of petrol is 40. It means that its knocking property is equal to the mixture of **[MP PMT 2003]**

- (a) 40% *n*-heptane + 60% *iso*-octane
- (b) 40% petrol + 60% *iso*-octane
- (c) 60% *n*-heptane + 40% *iso*-octane
- (d) 60% petrol + 40% *iso*-octane
- 4. Formation of 2-butene as major product by dehydration of 2-butanol is according to [MP PMT 1995]
 (a) Markownikoff rule
 (b) Saytzeff rule
 (c) Peroxide effect
 (d) Anti-Markownikoff rule

5.
$$CH_3C \equiv CCH_3 \xrightarrow{(i)X} CH_3 - C - C - CH_3$$

X in the above reaction is [CPMT 1985; MP PET 1997; Roorkee Qualifying 1998; DPMT 2001]

(a)
$$HNO_3$$
 (b) O_2
(c) O_3 (d) $KMnO_4$

6. Which of the following is Friedel-Craft's reaction

- [MP PET 1994]
- (a) $C_6H_6 + FeCl_3 + Cl_2 \to C_6H_5Cl$

(b)
$$C_6H_5CHO + CH_3CHO + KOH \rightarrow C_6H_5CH = CH - CHO$$

- (c) $C_6H_6 + CH_3COCl + AlCl_3 \rightarrow C_6H_5 C CH_3$
- (d) $C_6H_5OH + CHCl_3 + KOH \longrightarrow$ Salicylaldehyde
- 7. Condition for maximum yield of C_2H_5Cl is
 - [IIT-JEE 1986]
 - (a) C_2H_6 (excess) + $Cl_2 \xrightarrow{UV \text{ Light}}$

(b)
$$C_2H_6 + Cl_2 \xrightarrow{\text{Boom temp.}}$$

- (c) $C_2H_6 + Cl_2 \text{ (excess)} \xrightarrow{UV \text{ Light}}$
- (d) $C_2H_6 + Cl_2 \xrightarrow{UV \text{ Light}} \rightarrow$
- **8.** When ethyl alcohol is heated with red phosphorus and *HI*, then which of the following is formed

(a)
$$C_2H_6$$
 (b) CH_4

- (c) $C_3 H_8$ (d) $C_2 H_4$
- 9. In the Fischer-Tropsch synthesis of petrol..... and are used as the raw materials [KCET 1998]
 (a) H₂;CO
 (b) CH₄;H₂
 - (c) $CH_4; CH_3OH$ (d) $CH_3OH; CO$
- 10. Which one of the following reactions is most suitable for the preparation of *n*-propyl benzene [MP PET/PMT 1998]
 (a) Friedel-Craft's reaction
 (b) Wurtz reaction
 (c) Wurtz-Fittig reaction
 (d) Grignard reaction

11. Propane cannot be prepared from which reaction

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$$[DCE 2003]$$
(a) $CH_3 - CH = CH_2 \xrightarrow{B_2H_6}_{OH^-}$
(b) $CH_3CH_2CH_2I \xrightarrow{H_1}_{P}$
(c) $CH_3CH_2CH_2CI \xrightarrow{Na}_{P}$
(d) None of these
12. The reaction
$$CH_3CH = CH_2 \xrightarrow{(CO+H_2)}_{H^+} CH_3 - CH - CH_3 \text{ is known} \xrightarrow{COOH}$$
as
$$[MP PMT 2002]$$
(a) Wurtz reaction
(b) Koch reaction
(c) Clemmensen reduction
(d) Kolbe's reaction
$$CH_3$$
13. The compound $CH_3 - C = CH - CH_3$ on reaction with
 $NalO_4$ in the presence of $KMnO_4$ gives [CBSE PMT 2003]
(a) CH_3COCH_3
(c) $CH_3COCH_3 + CH_3COOH$
(d) Ag_2C
(c) AgC
(d) Ag_2C
(e) AgC
(d) $AgOH$
15. Naphthalene is a/an
[AFMC 2004]
(a) Ionic solid
(c) Metallic solid
(c) Nich of the following is not aromatic
[Pb. CET 2000]
(a) Benzene
(b) Naphthalene
(c) Pyridine
(c) Pyridine
(c) IUP SEAT 2004]
(a) 1, 1-dicyanoethane
(b) 1, 2-dicyanoethane
(c) Vinyl cyanide
(c) Maccutar solid
(c) Metallic solid
(c) None of these
18. Write the products of the addition reaction
 $C = C_{+} \times XY \rightarrow [Kertal (Med.) 2002]$
(a) $\sum C = C_{-}$
(b) $X - C = C_{-} X$
 X
(c) $\stackrel{i}{C} = C_{-}$
(d) $X - \stackrel{i}{C} - C_{-} X$
 X
(e) $\stackrel{i}{C} = C_{-}$
(f) X
(f) $\stackrel{i}{C} = C_{-}$
(g) X
(g) $\stackrel{i}{C} = C_{-}$
(g) $X - \stackrel{i}{C} = C_{-}$
(g) $X - \stackrel{i}{C} = C_{-}$
(g) X
(g) $\stackrel{i}{C} = C_{-}$
(g) $X - \stackrel{i}{C} = C_{-}$
(g) X
(g) $\stackrel{i}{C} = C_{-}$
(g) $\stackrel{i}{C} = C_{-}$
(g) $\stackrel{i}{C} = C_{-$

 $CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$ $C_2H_2 + H_2 \rightarrow C_2H_4$

$$n(C_2H_4) \rightarrow (-CH_2 - CH_2 -)_n$$

is

The amount of polyethylene obtained from 64.1 $kg\ CaC_2$

[AIIMS 1997]

	(c) $21 kg$	(d) $28 kg$
20.		red from benzene by using a
		and conc. H_2SO_4 . In the
	nitrating mixture, HNO ₃ ac	ts as a [IIT-JEE 1997]
	(a) Base	(b) Acid
	(c) Reducing agent	(d) Catalyst
21.	A group which deactivate	s the benzene ring towards
		it which directs the incoming
	group principally to the <i>o</i> - a	nd <i>p</i> -positions is [Pb. PMT 1998]
	(a) $-NH_2$	(b) $-Cl$
	(c) $-NO_2$	
	2	(d) $-C_2H_5$
22.	monobromination of the fol	ne decreasing reactivity to ring
	$C_6H_5CH_3$, C_6H_5COOH	
	I II	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
	(a) $I > II > III > IV$	
	(c) $II > III > IV > I$ Benzene is obtained by	
23.	(a) Substitution of three ac	[DPMT 2002] etvlene molecules
	(b) Addition of three C_2H_2	•
	(c) Polymerisation of three	
	(d) Condensation of three	
24.	(a) $KMNO_4$	penzoic acid by [AIIMS 1999] (b) $K_2Cr_2O_7$
		2 2 ,
	(c) $H_2 SO_4$	(d) Both (a) and (b)
25.	$CaC_2 + H_2O \rightarrow A - \frac{H_2SO_4/H}{2}$	$a^{gSO_4} \rightarrow B$. Identify A and B in
	the given reaction (a) C_2H_2 and CH_3CHO	[CFM1 2000; BVF 2004]
		(d) C_2H_2 and CH_3COOH
26.		ction with $HgSO_4 + H_2SO_4$
		gives acetic acid. <i>X</i> is[MP PMT 1999]
	(a) $C_2 H_2$	(b) $C_2 H_4$
	(c) $C_3 H_4$	(d) $C_4 H_6$
27.		ium carbide react with heavy
	water	[CPMT 1999]
	(a) $C_2 D_2$	(b) CaD_2
. 0	(c) CaD_2O	(d) CD_2
28.	The addition of <i>HBr</i> is easie	
	(a) $ClCH_2 = CHCl$	(b) $ClCH = CHCl$
	(c) $CH_3 - CH = CH_2$	
29.	Identify the species <i>X</i> in the	
	Propene + $O(\text{conc. acidic } KN)$	
	(a) Acetone	(b) Acetaldehyde
	(c) Isopropanol	(d) Acetic acid
30.	In benzene 1, 3 position is ca	
	(a) Meta	(b) Para

(b) 14 *kg*

(a) 7 *kg*

- (c) Ortho (d) Odd position
- **31.** Which of the following is formed as a result of biological oxidation of benzene in the body of the dog

[Manipal MEE 1995]

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	(a) Acrylic acid(c) Maleic acid	(b) Cinnamic acid						
32.	When acetylene is reacted	(d) Gluconic acid with <i>HBr</i> , we get						
0		[CPMT 1979; JIPMER 2002]						
	(a) Methyl bromide	(b) Ethyl bromide						
		(d) Ethylidene bromide						
33.	The only o, p-directing g nature is	group which is deactivating in						
	(a) $-NH_2$	(b) <i>–OH</i>						
	(c) $-X$ (halogens)	(d) $-R$ (alkyl groups)						
34 .	Which kind of isomerism v							
	(a) Geometrical	(b) Optical						
	(c) Position	(d) None of these						
35.	in presence of light tolu gives	ene on reaction with chlorine						
	Siveo	[RPET 1999]						
	-	(b) Ortho chlorotoluene						
	(c) Para chloro toluene	-						
36.	If ethylene, carbon monox temperature, which of the	tide and water is heated at high following is formed						
	1 /	[AIIMS 2000]						
	(a) $C_4 H_8 O_2$	(b) C_2H_5COOH						
	(c) CH_3COOH	(d) $CH_2 = CH - COOH$						
37.	Compound $C_6 H_{12}$ is an	[AMU 1983]						
	(a) Aliphatic saturated compound							
	(b) Alicyclic compound							
	(c) Aromatic compound							
.	(d) Heterocyclic compour							
38.	, 0							
	$CH_2 = CH_2 \xrightarrow{HBr} X \xrightarrow{HBr}$							
		[AIIMS 1983; RPMT 1999]						
	(a) $C_2 H_5 I$	(b) C_2H_5OH						
	(c) CHI_3	(d) CH_3CHO						
39.	<i>n</i> -pentane and iso pentane	a can be distinguished by						
	· · · · · · · · · · · · · · · · · · ·							
		[BVP 2004]						
	(a) <i>Br</i> ₂	[BVP 2004] (b) <i>O</i> ₃						
40	(a) Br_2 (c) conc. H_2SO_4	[BVP 2004] (b) <i>O</i> ₃ (d) <i>KMnO</i> ₄						
40.	(a) Br_2 (c) conc. H_2SO_4 $CH \equiv CH + HBr \rightarrow X$, pro	[BVP 2004] (b) O_3 (c) $KMnO_4$ bduct X is [Pb. CET 2003]						
40.	(a) Br_2 (c) conc. H_2SO_4 $CH \equiv CH + HBr \rightarrow X$, pro (a) Ethylene bromide	[BVP 2004] (b) O_3 (c) $KMnO_4$ (c) Vinyl bromide						
40.	(a) Br_2 (c) conc. H_2SO_4 $CH \equiv CH + HBr \rightarrow X$, pro	[BVP 2004] (b) O_3 (c) $KMnO_4$ bduct X is [Pb. CET 2003]						
40.	(a) Br_2 (c) conc. H_2SO_4 $CH \equiv CH + HBr \rightarrow X$, pro (a) Ethylene bromide	[BVP 2004] (b) O_3 (c) $KMnO_4$ (d) $KMnO_4$ (b) Vinyl bromide						
40.	(a) Br_2 (c) conc. H_2SO_4 $CH \equiv CH + HBr \rightarrow X$, pro (a) Ethylene bromide (c) Bromo ethane	$[BVP 2004]$ (b) O_3 (d) $KMnO_4$ duct X is [Pb. CET 2003] (b) Vinyl bromide (d) Ethyledine bromide						
40.	(a) Br_2 (c) conc. H_2SO_4 $CH \equiv CH + HBr \rightarrow X$, pro (a) Ethylene bromide (c) Bromo ethane	$[BVP 2004]$ (b) O_3 (d) $KMnO_4$ duct X is [Pb. CET 2003] (b) Vinyl bromide (d) Ethyledine bromide						
40.	(a) Br_2 (c) conc. H_2SO_4 $CH \equiv CH + HBr \rightarrow X$, pro (a) Ethylene bromide (c) Bromo ethane	[BVP 2004] (b) O_3 (d) $KMnO_4$ duct X is [Pb. CET 2003] (b) Vinyl bromide (d) Ethyledine bromide N & Reason						
40.	(a) Br_2 (c) conc. H_2SO_4 $CH \equiv CH + HBr \rightarrow X$, pro (a) Ethylene bromide (c) Bromo ethane	$[BVP 2004]$ (b) O_3 (d) $KMnO_4$ duct X is [Pb. CET 2003] (b) Vinyl bromide (d) Ethyledine bromide						
40.	(a) Br_2 (c) conc. H_2SO_4 $CH = CH + HBr \rightarrow X$, pro (a) Ethylene bromide (c) Bromo ethane R Assertion Assertion : 1-Butene presence	[BVP 2004] (b) O_3 (d) $KMnO_4$ bduct X is [Pb. CET 2003] (b) Vinyl bromide (d) Ethyledine bromide N & Reason For AIIMS Aspirants on reaction with HBr in the of a peroxide produces 1-						
	(a) Br_2 (c) conc. H_2SO_4 $CH = CH + HBr \rightarrow X$, pro (a) Ethylene bromide (c) Bromo ethane Restriction Assertion : 1-Butene presence bromo-bu	[BVP 2004] (b) O_3 (d) $KMnO_4$ bduct X is [Pb. CET 2003] (b) Vinyl bromide (d) Ethyledine bromide N & Reason For AIIMS Aspirants on reaction with HBr in the of a peroxide produces 1-						

	(c) Position	(d) None of these	
35∙	In presence gives	of light toluene on reaction with chlorine	
	81.00	[RPET 1999]	

1.	Assertion	:	1-Butene on reaction with <i>HBr</i> in the presence of a peroxide produces 1-bromo-butane.
	Reason	:	It involves the free radical mechanism. [IIT-JEE (Screening) 2000]
2.	Assertion	:	Addition of Br_2 to 1-butene gives two optical isomers.

	Reason	:	The product contains one asymmetric
3.	Assertion	:	carbon.[IIT 1998]Cyclobutaneislessstablethan
	Reason	:	cyclopentane Presence of bent bonds causes "loss of
4.	Assertion	:	orbital overlap". [AIIMS 1996] Pyrrole is an aromatic heterocyclic
	Reason	:	compound. It has a cyclic, delocalised 6π electrons.
_	Assertion	:	[AIIMS 1995] CH_4 does not react with Cl_2 in dark.
5.			7 2
	Reason	:	Chlorination of CH_4 takes place in sunlight. [AIIMS 2001]
6.	Assertion	:	sunlight.[AIIMS 2001]Alkyl benzene is not prepared by Friedel-
0.	165011011	•	Crafts alkylation of benzene.
	Reason	:	Alkyl halides are less reactive than acyl halides. [AIIMS 2003]
7.	Assertion	:	2-Bromobutane on reaction with sodium
			ethoxide in ethanol gives 1-butene as a major product. [AIIMS 2004]
	Reason	:	1-Butene is more stable than 2-butene.
8.	Assertion	:	Styrene on reaction with <i>HBr</i> gives 2-
	D		bromo-2- phenyl-ethane.
	Reason	:	Benzyl radical is more stable than alkyl radical. [AIIMS 2004]
9.	Assertion	:	Melting point of <i>n</i> -butane is higher than
	_		propane.
	Reason	:	It is called oscillation effect.
10.	Assertion Reason	:	Iodination of alkanes is reversible. Iodination is carried out in presence of
	Reason	•	iodic acid.
11.	Assertion	:	Isobutane on oxidation with $KMnO_4$
	_		gives tert-butyl alcohol.
	Reason	:	Oxidising agents have no effect on alkanes.
12.	Assertion	:	Halogenation of alkanes is catalysed by tetraethyl lead.
	Reason	:	Halogenation proceeds through free radical mechanism.
13.	Assertion	:	Neopentane forms only one monosubstituted compound.
	Reason	:	Neopentane has high bond energy.
14.	Assertion	:	Freezing point of neopentane is more than <i>n</i> -pentane.
	Reason	:	Increase in Van der Waals forces increases freezing point.
15.	Assertion	:	Knocking lowers the efficiency of the engine.
	Reason	:	Fuel with minimum knocking property is preferred.
16.	Assertion	:	The presence of Ag^+ enhances the solubility of alkenes in water.
	Reason	:	Alkenes are weakly polar in nature.
17.	Assertion	:	2-Butanol on heating with H_2SO_4 gives
			1-butene and 2-butene.
	Reason	:	Dehydration of 2-butanol follows saytzeff rule.

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18.	Assertion	:	Ethene on treating with Br_2 in presence
			of $NaCl$ forms CH_2ClCH_2Br and
			$CH_2Br - CH_2 - Br$.
	Reason	:	This addition involves the formation of free radicals.
19.	Assertion	:	Straight chain alkanes have very low octane number.
	Reason	:	Quality of gasoline is measured in terms of octane number.
20.	Assertion	:	Corey-House reaction can be used to prepare both symmetrical and unsymmetrical alkanes.
	Reason	:	The reaction involves the interaction between lithium dialkyl copper with an alkyl halide both of which may contain even or odd number of carbon atoms.
21.	Assertion	:	All the hydrogen atoms in $CH_2 = C = CH_2$ lie in one plane.
	Reason	:	All the carbon atoms in it are sp^2 hybridized.
22.	Assertion	:	Propene reacts with <i>HBr</i> in presence of benzoyl peroxide to yield 2-bromopropane.
	Reason	:	In presence of peroxide, the addition of <i>HBr</i> to propene follows ionic mechanism.
23.	Assertion	:	Acetylene reacts with so damide to evolve H_2 gas.
	Reason	:	Acetylene is a weaker acid than ammonia.
24.	Assertion	:	Aryl halides are less reactive towards substitution of halogen atom.
	Reason	:	Halogens are o, p – directing in nature.
25.	Assertion	:	Benzene is a solvent for the Friedel Craft's alkylation of bromobenzene.
	Reason	:	Friedel Craft's reaction is used to introduced on alkyl or acyl group in benzene nucleus.
26.	Assertion	:	Benzene removes a butter stain from a table cloth.
	Reason	:	Butter has an affinity towards benzene.
27.	Assertion	:	Nitration of toluene is easier than benzene.
	Reason	:	The methyl group in toluene is electron- releasing.
28.	Assertion	:	Benzene forms benzene sulphonic acid with fuming H_2SO_4 at high temperature.
	Reason	:	The attacking species is SO_3 .
29.	Assertion	:	Activating groups are electron donors.
	Reason	:	Nitroso group is activating group.
30.	Assertion	:	Benzene reacts with CH_3COCl to give chlorobenzene.
	Reason	:	Chlorination is an electrophilic substitution reaction.
31.	Assertion	:	Conjugated polyenes containing odd number of carbon atoms is known as annulenes.
	Reason	:	General formula of annulenes is $(CH = CH)_n$ where $n = 2,3,4$ etc.

32.	Assertion	:	Tropylium	n cation i	s aromatic	in	nature

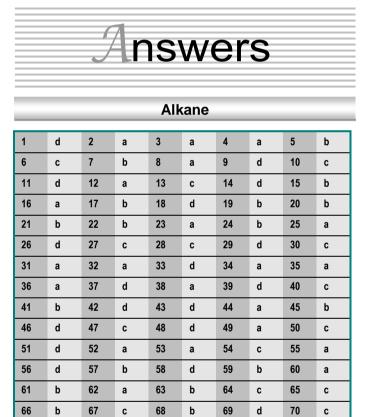
34.

35.

Reason

Reason : The only property that determines its aromatic behaviour is its planar structure.

- **33.** Assertion : [10] Annulene is not aromatic though it contains Huckel number of π -electrons.
 - Reason : Steric interaction between internal hydrogens makes it non-planar.
 - Assertion : Rates of nitration of benzene and hexadeuterobenzene are different.
 - : C H bond is stronger than C D bond
 - Assertion : Cyclolpentadienyl anion is much more stable than allyl anion.
 - Reason : Cyclopentadienyl anion is aromatic in character.



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94

99

104

109

114

119

С

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а

а

а

b

d

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С

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103

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d

а

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d

3,4 etc.	10	116	d	117	d	118	C

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115

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d

b

d

C

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7	C	122	b	123	a	124	d	125	C
3	а	127	а	128	b	129	b	130	C
	а	132	a	133	a	134	b	135	b
	c	137	a	138	c	139	a	140	C
1	a	142	b	143	a	144	c	145	b
46	C	147	d	148	c	149	d	150	b
51	a	152	c	153	a	154	b	155	ab
56	C	157	b	158	а	159	а	160	C
61	е	162	c	163	a	164	c	165	b
6	d	167	d	168	C	169	C	170	c
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	_		_		kene	_	_	_	_
	C	2	b	3	а	4	b	5	а
	d	7	a	8	d	9	b	10	d
	d	12	a	13	a	14	C	15	b
	a	17	d	18	d	19	b	20	c
6 1	b	22	d	23	c	24	b	25	c
		27	a b	23	c d	24	b b	25 30	c d
6	a				-			_	-
1	C	32	d	33	c	34	а	35	C
6	C	37	a	38	b	39	ac	40	b
1	C	42	a	43	C	44	C	45	а
16	C	47	d	48	d	49	a	50	c
i1	а	52	d	53	C	54	а	55	b
6	c	57	d	58	а	59	d	60	b
1	C	62	а	63	b	64	b	65	b
6	d	67	с	68	a	69	c	70	C
1	c	72	c	73	с	74	d	75	c
6	d	77	a	78	d	79	c	80	b
1	c	82	d	83	с	84	a	85	с
6	c	87	b	88	a	89	с	90	с
	b	92	С	93	b	94	b	95	b
3	b	97	а	98	b	99	b	100	b
01	b	102	c	103	c	104	b	105	b
06	a	107	c	108	a	109	a	110	c
111	c	112	a	113	a	114	b	115	d
16	d	117	a	118	a	119	a	120	b
121	b	117	a C	123		124	a b	120	
	_	122		123	C b		-		c
126	c		b		b	129	a	130	a
31	C	132	b,d	133	a	134	b	135	C
36	C	137	C	138	b	139	а	140	d
41	b	142	C	143	d	144	а	145	d
46	a	147	d	148	abc	149	а	150	а



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66	а	67	d	68	с	69	b	70	с
71	b	72	С	73	а	74	а	75	а
76	b	77	d	78	а	79	С	80	d
81	d	82	b	83	b	84	b	85	а
86	С	87	b	88	а	89	d	90	а
91	b	92	с	93	а	94	b	95	a
96	d	97	d						

Critical Thinking Questions

1	a	2	a	3	с	4	b	5	С
6	С	7	a	8	a	9	a	10	c
11	a	12	b	13	d	14	b	15	d
16	d	17	С	18	а	19	d	20	a
21	b	22	b	23	С	24	b	25	a
26	a	27	a	28	d	29	d	30	a
31	b	32	d	33	C	34	а	35	d
36	b	37	b	38	C	39	d	40	b

Assertion and Reason

1	a	2	a	3	C	4	а	5	b
6	b	7	d	8	b	9	b	10	b
11	b	12	е	13	C	14	b	15	b
16	b	17	a	18	C	19	b	20	a
21	d	22	d	23	c	24	b	25	е
26	b	27	a	28	е	29	C	30	е
31	е	32	C	33	a	34	b	35	a

Answers and Solutions

Alkane

- **1.** (d) $C_7 H_{16} (C_n H_{2n+2})$
- 3. (a) According to wurtz reaction. $2CH_3CH_2CH_2Br + 2Na \xrightarrow{\text{ether}} \rightarrow$

 $CH_3(CH_2)_4 CH_3 + 2NaBr$

5. (b)
$$2CH_3COONa + 2H_2O \xrightarrow{\text{Electolysis}}$$

Sodium acetate

$$CH_3 - CH_3 + 2CO_2 + 2NaOH + H_2$$

6. (c)
$$Pb(C_2H_5)_4 \xrightarrow{\text{heat}} Pb + 4CH_3CH_2$$

Ethylradical

$$CH_2 - CH_2 + Pb \longrightarrow CH_2 = CH_2 + PbBr_2$$

| | Ethene Lead bromide
Br Br

As leaded gasoline burns, lead metal gets deposited in the engine which is removed by adding ethylene dibromide. The lead bromide is volatile and is carried off with the exhaust gases from the engine

9. (d)
$$C_2H_5I + 2Na + IC_2H_5 \xrightarrow{\text{Dry}} C_2H_5 - C_2H_5 + 2NaI$$

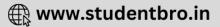
Ether Butane

10. (c)
$$(CH_3)_3 CH \xrightarrow{KMnO_4} (CH_3)_3 C - OH$$

tertiary butylalcohol

13. (c) $RCl + 2Na + RCl \xrightarrow{Dry} 2NaCl + R - R$ Ether Alkane

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- 14. (d) *iso*-octane *i.e.* 2,2,4-trimethyl pentane has highest octane number.
- 17. (b) With calculated amount of Grignard reagent, acetyl chloride forms ketones.

$$CH_{3}COCl + XM_{g}CH_{3} \rightarrow CH_{3}COCH_{3} + M_{g} < Cl_{X}$$

18. (d) CH_4 is tetrahedral

$$H$$

 sp^{3} hybridization
(tetrahedra 1)

- **22.** (b) Ethane is a saturated compound it can not be catalytically hydrogenated.
- (a) Branched hydrocarbons are more desirable because they are more volatile.

26. (d)
$$CH_4 \xrightarrow{Cl_2} CH_3Cl \xrightarrow{Cl_2} CH_2Cl_2 \xrightarrow{Cl_2}$$

 $CHCl_3 \xrightarrow{Cl_2} CCl_4$. Since this reaction takes place by free radical mechanism. Hence, there is a possibility of formation of ethane.

$$\begin{array}{c} CH_3 + CH_3 \rightarrow CH_3 - CH_3 \\ \text{Methyl free radicals} \qquad \text{Ethane} \end{array}$$

28. (c) $Al_4C_3 + 6H_2O \rightarrow 3CH_4 + 2Al_2O_3$ Aluminium Methane Aluminium

31. (a)
$$C_2H_5OH + CH_3 + Mg - Br \rightarrow CH_4 + Mg$$

32. (a)
$$CH_3I + 2H \xrightarrow{Zn/HCl} CH_4 + HI$$

 $CH_3I + 2Na + ICH_3 \xrightarrow{Dry} CH_3 - CH_3 + 2NaI$
Ether

36. (a) Solvent for fat, oil, varnish and rubber

4

- **37.** (d) Synthetic dyes, drugs, perfumes all are made from coal tar.
- **38.** (a) In alkanes, hybridization is sp^3 . Hence bond angle is $109^o.5'$.

39. (d)
$$2CH_3COONa + 2H_2O \xrightarrow{\text{Electrolysis}} CH_3 - CH_3 + 2CO_2 + 2NaOH + H_2$$

41. (b)
$$CH_3 - CH_2 - COOH + 6HI \xrightarrow{\text{Red }P}$$

Propanoic acid
 $CH_3 - CH_2 - CH_3 + 2H_2O + 3I_2$

2. (d)
$$C_2H_5I + 2Na + C_3H_7I \xrightarrow{\text{Dry}} C_2H_5 - C_3H_7 + 2NaI$$

Ether Pentane

$$C_2H_5I + 2Na + C_2H_5I \xrightarrow{\text{Dry}} C_2H_5 - C_2H_5 + 2NaI$$

Ether Butane

Propane

$$C_{3}H_{7}I + 2Na + C_{3}H_{7}I \xrightarrow{Dry} C_{3}H_{7} - C_{3}H_{7} + 2NaI$$
Hexane

- 48. (d) Cyclohexane, is immiscible and lighter than water. Hence, floats on the surface of water.
- $\label{eq:49.49} \textbf{(a)} \quad \text{Methane is the main component of natural gas.}$
- **53.** (a) *Pt./Ni* is used in catalytic reduction of hydrocarbon.

55. (a) Fractional distillation is used because the difference between the boiling point of different component is less.

. (d)
$$CH_3 - CH_2 - Cl + KOH \rightarrow CH_2 = CH_2 + KCl + H_2O$$

(alc.) Ethene

In presence of alc. *KOH* dehydrohalogenation occur and alkene is formed.

57. (b) Liquefied petroleum gas is a mixture of ethane, propane and butane. The main component is butane.

58. (d)
$$CH_4 + O_2 \xrightarrow{\Delta} C + 2H_2O$$

Limited
supply
of air

It contains 98-99% carbon. It is used in making black ink, paints and shoe polishes.

- (b) Tetraethyl lead is anti-knocking agent it increases the octane no. of the fuel.
- **60.** (a) *n*-hexane because it is linear therefore strong Vander Waal force.
 - (b) Knocking Sudden and irregular burning of the fuel mixture causing jerks against the piston and gives rise to violent sound. This is known as knocking.
- **63.** (b) *n*–octane

56

59.

61.

64

79

- Boiling point depends on molecular mass. Greater the molecular mass higher will be the boiling point.
- Boiling point also depends on the structure. If two compounds have same molecular mass then straight chain or linear compound has higher boiling point.

4. (c)
$$2CH_3COOK + 2H_2O \xrightarrow{\text{Electrolysis}}$$

Potassium acetate $CH_2 - CH_2 + 2CO_2 + 2K_1$

 $_{3} + 2CO_{2} + 2KOH + H_{2}$ Anode Cathode

65. (c) Ethane does not decolourise bromine solution because it is a saturated compound.

66. (b)
$$CH_3COONa + NaOH \xrightarrow{CaO} CH_4 + Na_2CO_3$$

Sodium acetate Methane

68. (b) Octane number is related to the percentage of *iso*-octane since *iso*-octane is 81% hence octane number is 81%.

70. (c)
$$2CH_3COOK + 2H_2O$$
 Electrolysis

$$2\underbrace{CO_2 + CH_3 - CH_3}_{\text{Anode}} + \underbrace{2KOH}_{\text{Cathode}} + H_2$$

7. (b)
$$CH_3 - C = CH_2 + HCl \rightarrow CH_3 - C = CH_3$$

$$CH \equiv CH + HCl \rightarrow CH_2 = CH - Cl \xrightarrow{HCl} CH_3 - CHCl_2$$

- (a) Boiling point of alkanes increases with the number of carbon atoms because surface area increases which increases the Vander Waal forces.
- **74.** (c) The enthalpy of combustion *i.e.*, ΔH is always negative. It means combustion is an exothermic reaction.

78. (c)
$$CH_3CH_2COONa + NaOH \xrightarrow{CaO} C_2H_6 + Na_2CO_3$$

$$\textbf{a} \quad (\textbf{a}) \quad CH_3 - CH_2 - CH_2 - CH_3 + Br_2 \xrightarrow{\text{Light}}_{130^{\circ} C}$$

$$CH_{3} - CH - CH_{2} - CH_{3} + CH_{3} - CH_{2} - CH_{2} - CH_{2} - Br$$

$$| I-Bromo butane$$

$$Br$$

$$(Minor)$$
2-Bromo butane
$$(Main product)$$

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2-Bromobutane is the main product because

 2^o carbonium ion is more stable than 1^o .



80. (c)
$$CH_3CH_2CH_2CH_3 \xrightarrow{\text{Cracking}} n$$
-Butane

$$CH_4 + CH_3 - CH = CH_2$$

83. (d) Anti-knocking properties of fuel increases.

84. (a)
$$C_6H_{14} \xrightarrow{\Delta} C_4H_{10} + C_2H_2$$

Hexane Butane Ethene Liquid Gas

Compounds having active hydrogen $(ROH, H_2O, R - NH_2)$ 87. (a) can form alkane when treated with Grignard's reagent

$$CH_3CH_2OH + CH_3MgBr \rightarrow CH_4 + Mg < OCH_2CH_3$$

- 91. (a) It is not possible to prepare CH_4 by wurtz reaction.
- 92. (b) Octane number is the percentage by volume of iso-octane in the mixture of iso-octane and *n*-heptane which has the same antiknocking properties as the fuel under examination. Given fuel (25% n-heptane +75% iso-octane) Hence, octane number = 75 (because iso octane is 75%)

93. (c)
$$CH_3 - CH_2 - CH_2 - Br \xrightarrow{C_2H_5ONa}$$

Dehydro halogenation
 $CH_3 - CH = CH_2 + HBr$

 $\frac{Mass of hydrogen}{Mass of compound} \times 100$ % of hydrogen = 94. (a)

$$CH_4 = \frac{4}{16} \times 100 = 25\%$$
.

Molecular mass can be obtained by the victor mayer process 95. (c)

Molecular mass
$$=\frac{\text{Weight}}{Vml.} \times 22400$$

$$= \frac{11}{5600} \times 22400 = 44$$

$$CH_{3}$$
7. (a) $CH_{3} - CH - \frac{1}{C} - CH_{2} - CH_{3} + Zn = \frac{1}{2}$

$$Br = Br$$

2,3-dibromo-3-methyl pentane

$$CH_{3}$$

$$CH_{3} - CH = C - CH_{2} - CH_{3} + ZnBr_{2}$$

$$HI + \bigvee_{Red P (Reduction)}^{I} CH_{3} - CH_{2} - CH - CH_{2} - CH_{3}$$

$$CH_{3}$$

$$CH_{3} - CH_{2} - CH - CH_{2} - CH_{3}$$

$$CH_{3}$$

$$CH_{3} - Methyl pentane$$

011

98. (d) Gasoline, kerosene oil, diesel

q

99. (a)
$$CH_3 - CH_2 - COONa \xrightarrow{\text{Soda lime}} CH_3 - CH_3$$

100. (d)Gasoline or petrol composition $C_7 - C_{12}$.

101. (c)
$$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$$

Methane
 $C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$
Ethene
All bydrocarbons saturated or unsaturated on comp

All hydrocarbons saturated or unsaturated on complete combustion always produce CO_2 and H_2O .

Free rotation around carbon-carbon bond takes place easily in 102. (a) alkanes. Now ethane and hexachloroethane both are alkanes. But in hexachloroethane bulky chlorine atom hinders the rotation. Therefore least hindered rotation takes place in ethane.

(a) Hydrocarbons on complete oxidation produce CO_2 and water 103.

$$CH_3 - CH_3 + 3\frac{1}{2}O_2 \rightarrow 2CO_2 + 3H_2O$$
(b) $C_{10}H_{22} \xrightarrow{900K} C_4H_8 + C_6H_{14}$

104. (b)
$$C_{10}H_{22} \xrightarrow{900 \text{ K}} C_4H_8 + C_6H_{14}$$

Decane CH_3
106. (b) $CH_3 = C - CH_3$

106. (b)
$$CH_3 - C - CH_3$$

ю

Replaceable hydrogen atoms are present only on 4 primary carbon atoms. Hence, it gives only are monochloro Substituted product. 0.0

107. (d)
$$CH_3COONa + NaOH \xrightarrow{CaO} CH_4 + Na_2CO_3$$

Sod.acetate $CH_4 + 2H_4 \rightarrow CH_4 + HI_4$

Iodomethane

$$Al_4C_3 + 6H_2O \rightarrow 3CH_4 + 2Al_2O_3$$

Aluminiumcarbide

108. (c) Acetylene reacts with ammonical cuprous chloride to form red ppt. of copper acetylide while methane and ethylene do not react (since they do not have acidic hydrogen) They come out from the bottle

$$CH = CH + 2[Cu(NH_3)_2]OH \rightarrow$$

$$Cu - C \equiv C - Cu + 4NH_3 + 2H_2O$$

$$CH = A \text{ preprint} Cu - C \equiv C - Cu + 4NH_3 + 2H_2O$$

$$CH_4$$
 + Ammonical $Cu_2Cl_2 \rightarrow No$ reaction

$$C_2H_4$$
 + Ammonical $Cu_2Cl_2 \rightarrow$ No reaction

Alkanes do not give addition reactions because multiple bond is 110. (b) absent.

III. (a)
$$C_6H_{14} \xrightarrow{Pyrolysis} C_2H_4 + C_4H_{10}$$

Hexane Δ Ethene Butane

In gemdihalide both the halogen atoms are present on the 113. (d) same carbon atom while in vicdihalide both the halogen atoms are present on adjacent carbon atoms. C HCHR CH_{2}

b. (b)
$$H_3C - H_2C - C - C - CH_3$$

 CH_3CH_3
 $2,3,3,3$ -tetramethylpentane
 CH_3

$$H_{3}C - H_{2}C - H_{2}C - HC - CH_{3}$$

isopropyl group 2-methylpentane
$$CH_{3}CH_{3} \qquad CH_{3}$$
$$H_{3}C - H_{2}C - HC - C - CH_{3} \qquad H_{3}C - H_{2}C - C - CH_{2} - CH_{3}$$
$$H_{3}C - H_{2}C - HC - C - CH_{3} \qquad H_{3}C - H_{2}C - C - CH_{2} - CH_{3}$$

All-butane, Ethane and Propane are possible in this reaction. (d)

116. 118. (c) Formation of branches in the chain of C atoms

$$\begin{array}{c} C - C - C - C \\ \text{straight chain} \end{array} \qquad \begin{array}{c} C - C - C \\ | \\ C \\ \end{array}$$

- Branched chain Chlorination of alkane in photochomical reaction which takes
- 119. (c) place by free radical mechanism. Free radicals are formed by homolytic bond fission or homolysis.

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114



120. (c) Marsh gas, Natural gas and coal gas contains CH_4 but producer gas is a mixture of CO and N_2

$$\begin{array}{c} 2C \\ Coke \\ Red hot \\ Air \end{array} \rightarrow \underbrace{2CO + 4N_2}_{Producer gas}$$

- 123. (a) Fractional distillation is based on the difference in the boiling point of different components.
- 124. (d) Tetraethyl lead (TEL) is an anti-knocking compounds when mixed with petrol tend to improve the octane no. and therefore, decreases the knocking in the cylinder of the combustion engine.
- 128. (b) Petrol sample 30% *n*-heptane + 70% *iso*-octane since *iso*-octane is 70%. Hence, octane no. is 70.

131. (a)
$$CH_3 - CH = CH_2 + H_2 \xrightarrow{Ni} CH_3 - CH_2 - CH_3$$

Propene Propane

132. (a) As the number of branches increases, surface area decreases, due to which Vander Waal forces of attraction decreases. Hence, boiling point also decreases.

135. (b)
$$CH_3CH_2CH_2CH_3 \xrightarrow{\text{Anhyd.AlCl}_3} CH_3 - CH_3 - CH_3$$

 $n-\text{butane} \xrightarrow{Anhyd.AlCl}_3 \xrightarrow{CH}_3 - CH_3$
iso butane

136. (c)
$$CH_3 - CH_2 - Br + KOH$$
 Benythonalogenation
alk $CH_2 = CH_2 + KBr + H_2O$

In alcoholic *KOH* alkoxide ions (RO^-) are present which is a strong base. They abstract proton from β -carbon of alkyl halide and favours elimination reaction

$$\begin{array}{l} ROH + KOH \rightarrow ROK + H_2O \\ \text{Alcohol} & \text{Potassium alkoxide} \end{array}$$

$$ROK \rightarrow RO^- + K^+ \\ \text{Alkoxideion} & K^- + H^- CH_2 - CH_2 - Br \rightarrow ROH + CH_2 = CH_2 + Br \\ Al_4C_3 + 6H_2O \rightarrow 3CH_4 + 2Al_2O_3 \\ \text{Methane} \end{array}$$

138. (c) In C_2H_6 , C-C bond length is 1.54Å.

137.

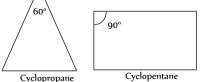
(a)

139. (a)
$$R - COOK + 2H_2O \xrightarrow{\text{Electrolysis}} R - R + CO_2 + 2KOH + H_2$$

Alkane

142. (b)
$$CH_3COONa + NaOH \xrightarrow{CaO} CH_4 + Na_2CO_3$$

143. (a) \bigtriangleup 108°



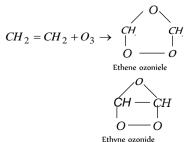
Cyclopentane Cyclobutane

Cyclopropane with a bond angle of 60^o is very strained and hence very reactive.

145. (b) Marsh gas mainly consists of methane.

146. (c)
$$CH_3 - Cl + 2H \xrightarrow{Zn / HCl} CH_4 + HCl$$

149. (d) Propane is a saturated compound. Ozonide is formed only by alkenes or alkynes



$$CH \equiv CH + O_3 \rightarrow$$

150. (b) $H - \overset{sp^2}{C} = \overset{sp^2}{C} - H$ sp^2 -hybridisation (trigonal planar).

(a)
$$Ag - C \equiv C - Ag + 2HCl \rightarrow CH \equiv CH + 2AgCl$$

152. (c) Wurtz reaction

151.

159.

$$C_2H_5 - I + 2Na + I - C_2H_5 \xrightarrow{\text{Dry}} C_2H_5 - C_2H_5 + 2NaI$$

Ether Butane

154. (b) All the C-C bond are single bonds. Hence sp^3 - hybridization and tetrahedral structure.

155. (a.b)
$$CH_3MgI + CH_3 - CH_2 - NH_2 \rightarrow$$

$$CH_4 + CH_3CH_2NHMgI$$
$$CH_3MgI + C_2H_5OH \rightarrow CH_4 + C_2H_5OMgI$$

Alkyl group of Grignard's reagent is involved in the formation of alkane.

- (a) General formula of alkane $C_n H_{2n+2}$ (*n* = no. of atoms).
- **160.** (c) $CH_3Br + H_2 \xrightarrow{LiAlH_4} CH_4$ (methane)

$$\xrightarrow{Na}$$
 $CH_3 - CH_3$ (Ethane)

161. (e) Photochemical chlorination of alkane take place by free radical mechanism which are possible by Homolysis of C - C bond $Cl_2 \xrightarrow{hv} Cl^{\bullet} + Cl^{\bullet}$

$$CH_3 - CH_3 + Cl^{\bullet} \rightarrow CH_3Cl^{\bullet} + \dot{C}H_3$$

- **163.** (a) Producer gas CO and N_2
- 164. (c) Among alkanes, boiling point increase with increasing molecular weight. For isomeric alkanes straight chain alkanes have higher boiling point than the branched alkanes.
- 165. (b) Graphite is a good conductor of heat of electricity.
- 166. (d) Among the isomeric alkanes, the normal isomer has a higher boiling point than the branched chain isomer. The greater the branching of the chain, the lower is the boiling point. The *n*-alkane have larger surface area in comparison to branched chain isomer (as the shape approaches that of a sphere in the branched chain isomers). Thus, intermolecular forces are weaker in branched chain isomers, there fore they have lower point in comparision to straight chain isomers.
- 167. (d) The octane numbers of Fuel can be improved by increasing the percentage of branched chain alkanes, alkenes and aromatic hydrocarbon. Thus octane number can be changed by isomerisation (reforming), alkylation and aromatisation (cyclisation) etc.
- **168.** (c) The approximate composition of gasoline is $C_6 C_{11}$ at boiling point 70-200°*C* and is used in motor fuel, dry cleaning, petrol gas etc.
- 169. (c) $CH_4 + O_2 \rightarrow CO_2 + 2H_2O$
- **170.** (c) Straight chain olefins has highest knocking.
- 171. (a) $Al_4C_3 + 12H_2O \rightarrow 3CH_4 + 4Al(OH)_3$

$$CaC_2 + 2H_2O \rightarrow C_2H_2 + Ca(OH)_2$$

172. (d) Except 2,2 dimethyl butane rest compound contain 5 carbon i.e., pantane while 2,2 dimethyl butane contain 6 carbon i.e., Hexane

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$$CH_{3} - CH_{2} - CH_{3} + Br_{2} \longrightarrow CH_{3}$$

$$I73. (b) H_{3}C - CH - CH_{2} - CH_{3} + Br_{2} \longrightarrow CH_{3} - CH_{3$$

This reaction is used for the preparation of pure alkanes.

Alkene2. (b)
$$CH_2 - CH_2 + Zn \rightarrow CH_2 = CH_2 + Br_2$$

 $| | | Alkene Br Br 3. (a) $CH_2 = CH_2 + Br_2 \xrightarrow{CCl_4} CH_2 - CH_2$
 $| | Br | Br$
 Br
 $1, 2-dibromo$
ethane4. (b) $CH_2 = CH_2 \xrightarrow{HOCl} CH_2 - CH_2 \xrightarrow{aq NaHCO_3} CH_2 - CH_2 \xrightarrow{aq NaHCO_3} CH_2 - OH_2$ Cl OH $CH_2 - OH_2$ $CH_2 - OH_2$ $CH_2 - OH_3$ $CH_3 - OH_3$$

7. (a)
$$CH_3 - CH_2 - OH \xrightarrow{COH_1 H_2 \cup G_4} CH_2 = CH_2 + H_2 O$$

 $CH_3 \qquad CH_3 \qquad CH_3 \qquad CH_3 \qquad CH_3 \qquad CH_3 \qquad CH_3$

8. (d)
$$C = C$$
 CH_3 CH_3

$$10. (d) C_2H_5I + alcKOH \to C_2H_4 + KI + H_2O$$

12. (a)
$$CH_3 - CH_2 - Br + KOH \rightarrow CH_2 = CH_2 + KBr + H_2O$$

13. (a) Methane can not be obtained by Sabatier and Sendern's reaction because in this the product obtained contain minimum two carbon atoms.

$$CH_{2} = CH_{2} + H_{2} \xrightarrow{Ni} CH_{3} - CH_{3}$$

$$CH = CH + 2H_{2} \xrightarrow{Ni} CH_{3} - CH_{3}$$

$$CH_{3}$$

$$(c) \quad CH_{3} - CH - C - CH_{3} \xrightarrow{H_{2}SO_{4}} \xrightarrow{H_{2}SO_$$

20. (c)
$$CH_3 - CH = CH - CH_3 + HBr \xrightarrow{\text{Peroxide}}$$

14.

$$CH_3 - CH_2 - CH - CH_3$$

Br
2-Bromobutan e

Anti-markownikoff's rule is not applicable to symmetrical alkenes.

21. (b)
$$CH_2 = CH_2 + KMnO_4 \xrightarrow{[O]}_{H_2O} CH_2 - CH_2 + MnO_2$$

alk. $OH OH$
 $COOH + MnO_2$
 $CH = CH + KMnO_4 \xrightarrow{[O]}_{Alk.} COOH + MnO_2$
 $COOH$ Brown
 $OXalic acid$
22. (d) Octane number increases in the order

 (d) Octane number increases in the order Straight chain alkanes < Branched chain alkanes < Olefins < Cyclo alkanes < Aromatic compounds Since, straight chain alkane has minimum octane number. Hence, it produces maximum knocking. dia amore KMrO

23. (c)
$$R - CH = CH - R \xrightarrow{\text{dif.aqueous } KMBO_4} R - CH - CH - R$$

room temp.
 $OH OH$
(Alcohol)

$$R - CH = CH - R \xrightarrow{\text{Conc. } KMnO_4} R - COOH + R - COOH$$

heat

24. (b)
$$CH_{2} \stackrel{|}{=} \stackrel{C-CH_{2}}{=} CH_{3} + H_{2}O \xrightarrow{H_{2}SO_{4}}_{\text{Markownikoffs rule}} O \xrightarrow{H_{2}SO_{4}}_{\text{Markownikoffs rule}} O \xrightarrow{CH_{3}} O \xrightarrow{H_{2}SO_{4}}_{\text{Markownikoffs rule}} O \xrightarrow{CH_{3}} O \xrightarrow{H_{2}SO_{4}}_{\text{Markownikoffs rule}} O \xrightarrow{CH_{3}} O \xrightarrow{H_{2}SO_{4}}_{\text{Markownikoffs rule}} O \xrightarrow{CH_{3}}_{\text{Markownikoffs rule}} O \xrightarrow{CH_{3}}_{\text{Markowni$$

$$CH_{3} - C - CH_{2} - CH_{3}$$

$$OH$$

2-Methyl-2-butanol

27. (b)
$$CH_3 - CH = CH_2 + H_2O \xrightarrow{\text{Conc. } H_2SO_4}{\text{Markownikoff's rule}} CH_3 - CH - CH_3 \\ OH \\ \text{Isopropyl alcohol}$$

32. (d)
$$CH_3 - CH - CH_2 - CH_3 \xrightarrow{alc.KOH} CH_3CH = CHCH_3$$

 \downarrow
 Br

The reaction is dehydrohalogenation.

$$\begin{array}{c} & & \\ & &$$

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34. (a)
$$CH_2 = CH_2 + O_3$$

35. (c) Oil are unsaturated esters which are converted into fats by saturating it by catalytic hydrogenation.

36. (c)
$$>C = C < \xrightarrow{\text{Hydrogenat ion}} H$$

37. (a) CH_2

CH 2 CH 2 Cyclo Propane

38. (b) e.g. $CH_2 = CH_2 + Br_2 \rightarrow CH_2 - CH_2$ | | Br Br

D.,

Half of the double bond is broken. It means π bond is broken while sigma bond is retained also two new C-Br bonds are formed.

40. (b)
$$CH_3 - CH - CH_2 - CH_3 + KOH \rightarrow CH_3 - CH = CH - CH_3 + KBr + H_2O$$

Butene-2
41. (c) $AH_3 - CH = CH - CH_3 + KBr + H_2O$
 $Butene-2 - CH = CH - CH_3 + KBr + H_2O$
 $Butene-2 - CH = CH - CH_3 + KBr + H_2O$

42. (a) We know that greater the number of alkyl groups attached to double bonded carbon atoms, more stable is the alkene. Therefore most stable is $R_2C = CR_2$



43. (c)
$$CH_2 = CH_2 + 2[O] \xrightarrow{KMnO_4} HCHO + HCHO$$

Formaldehy de

44. (c) Paraffins are non-polar compounds. The intermolecular forces are weak Vander Waal's forces. As the molecular mass increases Vander Waal's forces increases. Hence boiling point increases.

45. (a)
$$CH_2 - CH_2 + Zn \rightarrow ZnBr_2 + CH_2 = CH_2$$

 $|$ $|$ Br Br

46. (c)
$$CH_3CH_2I + KOH(alc) \rightarrow CH_2 = CH_2 + KI + H_2O$$

$$CH_{2} = CH_{2} + KMnO_{4} \xrightarrow{H_{2}O} CH_{2} - CH_{2} + MnO_{2}$$

Alk.Pink
$$OH OH Colourless$$

47. (d)
$$CH_2 = CH - Br \xrightarrow{HBr} CH_3 - CH < Br \xrightarrow{Br} Br$$

According to Markownikoff's rule ${\cal H}$ atom or positive part goes to that carbon atom which is more hydrogenated.

48. (d)
$$CH_3 - CH_2 - Br + KOH \rightarrow CH_2 = CH_2 + KBr + H_2O$$

(alc) Ethene

49. (a)
$$CH_3 - CH_2 - OH \xrightarrow{\text{Conc.} H_2SO_4} CH_2 = CH_2 + H_2O$$

Dehydration

 (c) Electrophillic addition reactions are shown by alkenes or alkynes in these reactions attacking species is electrophiles

$$CH_3 - CH = CH_2 + H^+ \xrightarrow{\text{Slow}} CH_3 - \overset{+}{CH} - CH_3$$

 $2^o \text{ carbonium ion}$

$$CH_{3} - CH - CH_{3} + Br^{-} \xrightarrow{Fast} CH_{3} - CH - CH_{3}$$

$$Br$$
2-Bromo propane
(a) $CH_{3}CH_{2}CH_{2}Cl + KOH \rightarrow CH_{3} - CH = CH_{2} + KCl + H_{2}O$

$$CH_{3} - CH - CH_{3} + KOH \rightarrow CH_{3} - CH = CH_{2} + KCl + H_{2}O$$

$$Cl$$

52. (d)
$$CH_2 = CH_2 \xrightarrow{\text{Cold.alk.}KMnO_4} CH_2 - CH_2$$

Ethene $|$ $|$
 $OH = OH$
Ethylene glycol

51.

53. (c) Ethane and Methane does not decolourise $KMnO_4$ and does not react with ammonical cuprous chloride. Acetylene decolourise $KMnO_4$ solution and also gives red ppt. with ammonical cuprous chloride. On the other hand ethene decolourize $KMnO_4$ solution but does not react with ammonical cuprous chloride.

54. (a)
$$CH_2 = CH_2 + HOCl \rightarrow CH_2 - CH_2$$

 $| | | OH Cl$
 $1-Chloro-2-hydroxyethane$

55. (b)
$$n(CH_2 = CH_2) \xrightarrow{400^{\circ} C} (-CH_2 - CH_2 -)_n$$

(ethylene) (polyethylene)

57. (d)
$$\begin{array}{c} CH_{3} \\ H-C-Br \\ H-C-Br \\ H-C-Br \\ CH_{3} \\ CH_{3} \\ Meso-dibromo-butane \end{array} \xrightarrow[-Br_{2}]{} \begin{array}{c} CH_{3} \\ CH \\ H \\ CH_{3} \\ CH$$

Trans-2-butene is more stable than its *cis* isomer.

58. (a)
$$ClCH_2 - CH_2 - CH_2 - CH_3 \xrightarrow{alc.KOH} CH_2 = CH - CH_3$$

$$CH_2 = CH - CH_2 - CH_3$$

1-butene

59. (d)
$$CH_3CH_2CH = CHCH_3 \xrightarrow[Zn/H_2O]{O_3} CH_3CH_2CHO + CHOCH_3$$

Propanal Ethanal

61. (c)
$$CH_3 = C = CH_2$$

 $sp^2 sp sp^2$
Propadiene

Propadiene has both sp and sp^2 -hybridized carbon atoms.

62. (a)
$$C_2H_4 + Cl_2 \xrightarrow{CCl_4} Cl - CH_2 - CH_2 - Cl_2$$

Ethelene Chloride

64. (b) Paraffins or alkanes are non-polar compounds. Hence soluble in benzene.

65. (b)
$$CH_3 - CH = CH_2 + HCl \xrightarrow{Peroxide} CH_3 - CH - CH_3$$

 Cl

Peroxide rule is applicable only to HBr .

66. (d)
$$CH_3 - CH = CH_2 + HI \xrightarrow{\text{Peroxide}} CH_3 - CH_2 - CH_2I$$

69. (c)
$$CH_3 - CH - CH - CH_2 \xrightarrow{alc. NaOH} H Cl H$$

$$CH_3CH = CH - CH_3$$

73. (c) $CH_3 - CH = CH - CH_2 - CH_3$ it decolourizes $KMnO_4$ solution because double bond is present.

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77. (a)
$$CH_2 = CH - CH_2 - C \equiv CH + Br_2 \rightarrow CH_2 = CH - CH_2 - C \equiv CH + Br_2 \rightarrow CH_2 = CH - CH_2 - C \equiv CH + Br_2 - CH_2 = CH_2 - CH_2 - CH_2 - CH_2 = CH_2 + CH_2 - CH_2 - CH_2 - CH_2 + POCl_3$$

78. (d) $CH_3COCH_3 + PCl_5 \rightarrow CH_3 - CCl_2 - CH_3 + POCl_3$
80. (b) $3R - CH = CH_2 + \frac{1}{2}B_2H_6 \xrightarrow{Dry} (R - CH_2CH_2)_3B + OH_2CH_2 - CH_2CH_2 - CH_2 - CH_2 - CH_2 - CH_2 - CH$

83. (c)
$$CH$$
 Cl Anhydrous AlCl₃
 $|||$ CH + AsCl₂
Arsenic trichloride

CHCl

CH AsCl₂

Lewisite (β-Chlorovinyl dichloroarsine)

Lewisite is more poisonous than mustard gas and was used in world war -11.

84. (a)
$$CH_3 - CH = CH_2 + Cl_2 \xrightarrow{500^{\circ}C}$$

 $CH_2 - CH = CH_2 + HCl$

This reaction is called allylic halogenation reaction because halogenation occurs at the allylic position of an alkene Polymorization

85. (c)
$$n(CH_2 = CH - Cl) \xrightarrow{\text{Polymenzation}} (-CH_2 - CH -)_n \xrightarrow{Cl} (PVC)$$

86. (c) $CH_2 = CH_2 + Br_2 \xrightarrow{NaCl} CH_2 - CH_2 \xrightarrow{|} Br = Br$

B*r* **B***r*
1,2-dibromo ethane

$$\begin{array}{c} 2 & 1 \\ + CH_2 - CH_2 \\ | & | \\ Cl & Br \\ 1 - bromo -2 - chloro ethane \end{array}$$
87. (b) $CH_3 - CH = CH_2 + HBr \xrightarrow{\text{Markownikoff rule}} CH_3 - CH - CH_3$

Br 2-Bromopropane

88. (a)
$$CH_3 - CH = CH_2 + HBr \xrightarrow{\text{Peroxide}} CH_3 - CH_2 - CH_2 - Br$$

89. (c)
$$CH_3 - C = CH - CH_3 \xrightarrow{(1)O_2}_{(2)Zn/H_2O}$$

 CH_3

$$CH_{3}COCH_{3} + CHOCH_{3}$$
Retore Aldehyde

$$R - CH = C - R \xrightarrow{(1)O_{3}}_{(2)Zn/H_{2}O} R - CHO + R_{2}CO$$
Retore R

$$R$$

$$(c) \quad CH_{3} - CH_{2} - OH \xrightarrow{Conc.}_{H_{2}SO_{4}} CH_{2} = CH_{2} + H_{2}O$$

93. (b)
$$CH_3 - CH_2 - Cl \xrightarrow{\text{alc. KOH}} CH_2 = CH_2 + KCl + H_2O$$

Ethyl Chloride Alkene

(b) Olefin because double bond is present. 94.

(b) In $CH_2 \stackrel{\pi}{=} CH_2$ double bond consist of one σ and one π 95. bond

96. (b)
$$R - CH_2 - CH_2 - X \xrightarrow{\text{Elimination}} alc. KOH$$

$$R - CH = CH_2 + HX_{\text{Halogen}}$$

97. (a)
$$CH_3 - CH_2 - CH_2 - CH_3 \xrightarrow{H_2SO_4}{475 K}$$

 $CH_3 - CH = CH - CH_3$ More symmetrica 1(major product) 11 50

$$CH_{3} - CH_{2} - CH_{2} - CH_{3} \xrightarrow{H_{2} \circ O_{4}} 475K$$

$$CH_{2} = CH - CH_{2} - CH_{3}$$

$$Less symmetrical or unsymmetrical (minor product)$$

$$Less symmetrical (minor product)$$

It is based on Saytzeff's rule. According to this more symmetrical or more alkylated alkene predominates. PCl₂

(b)
$$CH_3 - CH_2 - CH_2 - OH \xrightarrow{PCl_3}$$

 $CH_3 - CH_2 - CH_2 - Cl \xrightarrow{Alc.KOH} CH_3 - CH = CH_2$
(a) (b)
propylchloride Pr opene

99. (b)
$$CH_3 - CH_2 - CH_2 - Br + KOH \xrightarrow{C_2H_5OH} n$$
-Propyl bromide

$$CH_3 - CH = CH_2 + KBr + H_2O$$

Propene

100. (b)
$$CH_3 \xrightarrow{-1}_{-C} - CH_2 - Br + KOH \xrightarrow{-1}_{(alc)} CH_3$$

98.

$$CH_{3}$$

$$CH_{3} - C = CH - CH_{3} + KBr + H_{2}O$$

In this reaction 1^o carbonium ion is formed which rearranges to form 3^{o} carbonium ion from which base obstruct proton. Hence 2-methyl-2-butene is formed as a main product.

$$CH_{3} \xrightarrow[]{} CH_{3} \xrightarrow[]{} CH_{2} \xrightarrow[]{} Methyl shift \longrightarrow CH_{3} \xrightarrow[]{} CH_{3} \xrightarrow[]{} CH_{2} \xrightarrow[]{} CH_{2} \xrightarrow[]{} CH_{2} \xrightarrow[]{} CH_{3} \xrightarrow[]{} C$$

Elimination of proton from β carbon $C\!H_3$ which is less hydrogenated

$$CH_{3} - C = CH - CH_{3}$$
2-Methyl-2-Butene
101. (b) Alkyne > Alkene > Alkane
$$H - H$$

102. (c)
$$H$$
 $C = C$ H

Ethylene sp^2 -hybridization; Shape = Planar.

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104. (b)
$$CH_2 = CH - Cl \xrightarrow{HCl} CH_3 - CH < \binom{Cl}{Cl}$$

According to Markownikoff's rule *H* atom of the reagent goes to that carbon atom which is more hydrogenated.

105. (b)
$$CH_3 - CH = CH_2 + HBr \xrightarrow{\text{Narkownikous fulle}}$$

 $CH_3 - CH - CH_3 + HBr \xrightarrow{\text{Presence of peroxide}}$
 Br
2-Bromopropane

$$CH_3 - CH_2 - CH_2 - Br$$

1-Bromopropane

106. (a) Peroxide rule is applicable only to *HBr* and not for *HCl*, *HF* and *HI*.

109. (a)
$$n \begin{pmatrix} CH_2 = C - CH = CH_2 \\ Cl \\ Chloroproene \end{pmatrix} \xrightarrow{\text{Polymerization}} \begin{pmatrix} -CH_2 - C = CH - CH_2 - \\ Cl \\ Cl \\ Cl \\ Neoprene \end{pmatrix}_n$$

110. (c)
$$CH_3 - CH_3 - CH_2 - H_2 - H_2 - H_2 - H_2 - H_3 - H_3 + C_2 + C_$$

m. (c)
$$CH_3 - CH_2 - C = CH - CH_3 + HOCl \rightarrow$$

$$CH_{3} - CH_{2} - CH_{2} - CH_{2} - CH_{3}$$

Addition takes place according to Markownikoff's rule in which Cl^+ goes to that carbon atom which is more hydrogenated.

- 112. (a) In case of ethene double bond is present. Hence, addition reactions occur easily.
- **113.** (a) $CH_3 CH = CH_2 + Br_2 \rightarrow CH_3 CH_2 CH_2$ Propane 1 mole 42 gms Br Br 42 gms 1,2-dibromo propane
 - \therefore 42 *gms* of propene reacts with 160 *gms* of bromine.

$$\therefore 21 gms \text{ of propene } \frac{160}{42} \times 21 = 80 gms.$$

114. (b) Butadiene
$$CH_2 = CH - CH = CH_2$$

A single bond separated by two double bonds is known as conjugated double bond.

115. (d)
$$CH_3 \xrightarrow[]{CH_3} CH_3 \xrightarrow[]{CH_3} CH_3 \xrightarrow[]{CH_3} CH_3 \xrightarrow[]{CH_3} CH_3 \xrightarrow[]{CH_2} CH_3 \xrightarrow[]{CH_2} CH_2$$

Isobutene

117. (a) Cyclic hydrocarbon in which all the carbon atoms are present in the same plane is benzene. In this C-C bond length is 1.39Å which is more than 1.34A but less than 1.54Å. Hence bond angle is 120° with sp^2 hybridization.

119. (a)
$$CH_3 - CH_2 - CH = CH_2 \xrightarrow{I)Hg(OAc)_2;H_2O}_{ii) NaBH_4}$$

$$CH_{3} - CH_{3} - C$$

120. (b) C_3H_6 is an alkene therefore decolourizes alkaline $K\!MnO_4$ solution.

123. (c)
$$CH_3 - C = C - CH_3 \xrightarrow{(1)O_3} (2)Zn/H_2O$$

 $CH_3 CH_3$

$$CH_3 - CO + OC - CH_3$$

 $| | | CH_3 CH_3$
Acetone

124. (b)
$$CH_3 - CH = CH - CHO \frac{Acidic}{KMnO_4}$$

127. (b)
$$CH_3 - CH_2 - CH = CH_2 \xrightarrow{HBr} CH_3 - CH_2 - CH_3 - CH_2 - CH_3$$

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128. (b)
$$CH_2 = C - CH_3 + HCl \rightarrow CH_3 - C - CH_3$$

 $| CH_3 \qquad CH_3$
 2 -chloro-2-methyl
propane

(a) Ozonolysis is useful in locating the position of a double bond in an alkene. The double bond is obtained by joining the carbon atoms of the two carbonyl compounds. For example Let the product of ozonolysis be two molecules of ethanal.

$$CH_3 - C = O + O = C - CH_3 \rightarrow CH_3 - CH = CH - CH_3$$

$$2-Butene$$

131. (c)
$$CH_3 - CH - CH_2 - CH_3 \rightarrow CH_3 - CH = CH - CH_3 + HBr$$

Br

2-Brono butane

$$CH_{3} \qquad CH_{3} \qquad CH_{3} \qquad H_{2}SO_{4} \qquad H_{3} - CH_{3} - H_{2}OH_{3} \qquad H_{2}SO_{4} \qquad H_{3} - CH_{3} - CH_{2} + H_{2}OH_{3} - CH_{3} - CH_{2} + H_{2}OH_{3} - CH_{3} - CH_{3}$$

135. (c)
$$CH_2 = CH_2 + H_2 \xrightarrow[-300]{Ni} CH_3 - CH_3$$

Ethene

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136. (c)
$$\begin{array}{c} CH_2COOK \\ | \\ CH_2COOK \end{array} + 2H_2O \xrightarrow{\text{Electrolysis}} \\ CH_2 + 2CO_2 + 2KOH + H_2 \\ \\ \| \\ CH_2 \\ CH_2 \\ CH_2 \\ Ch_2 \\ Cathode \end{array}$$

137. (c)
$$CH_2 = CH_2 + H_2 \xrightarrow{Ni} CH_3 - CH_3$$

Ethylene does not give precipitate with ammonical silver nitrate solution because it does not have acidic hydrogen.

139. (a)
$$CH_2 = CH - CH = CH_2 \xrightarrow{Br_2} CH_2 - CH = CH - CH_2$$

1,3 butadiene
 Br
1.4-di bromo -2-butene

(d) Pd acts as catalyst. 143.

144. (a)
$$CH - CH = CH_2 + HBr \xrightarrow{\text{peroxide}} CH_3 - CH_2$$

 $_2 - CH_2 - Br$ n-propylbromide

In presence of peroxide addition takes place according to Anti Markownikoff's rule and hydrogen atom goes to that carbon atom which is less hydrogenated.

. .

145. (d)
$$CH_3 - CH_2 - OH + H_2SO_4 \xrightarrow{110^{\circ}C} Ethanol$$
 Ethanol Conc.

 $CH_3CH_2HSO_4$ Ethylhydrogensulphate

CH₃

146. (a)
$$CH_2 = CH_2 \xrightarrow{1/O_3} HCHO + HCHO$$

 $2)Zn/H_2O$ Formaldehy de

(d) C_2H_4, C_3H_6 and C_4H_8 all an alkene. Therefore they 147. discharge the red colour of bromine.

$$149. (a) HI \rightarrow H^+ + I^-$$

$$CH_3 - CH = CH_2 + H^+ \rightarrow$$

+

$$\begin{array}{c} CH_3-CH_2-CH_2+CH_3-CH-CH_3\\ ({\rm Minor}) & ({\rm Major}) \\ 1^{\rm o} {\rm Carbonium \ ion} \\ ({\rm Less \ stable}) & 2^{\rm o} {\rm Carbonium \ ion} \\ ({\rm More \ stable}) \end{array}$$

150. (a)
$$CH_3 - CH_2 - CH = CH_2 + Br_2 \rightarrow CH_3 - CH_2 - CH - CH_2$$

 $| | | | Br | Br | Br$
1,2-dibromo butane

151. (a)
$$CH_2 = CH_2 \xrightarrow{(1)O_3} HCHO + HCHO$$

153. (c) $(CH_3)_2 - C = CH \xrightarrow[hydro genation]{} CH_3 CH_3)_2 - CH - CH_2 CH_3$

154. (b)
$$CH_3 - C = CH_2 + HBr \xrightarrow{\text{Peroxide}} CH_3 - \stackrel{I}{\underset{C}{C}} - CH_2 - Br \xrightarrow{I}_{CH_3} CH_3$$

155. (a)
$$CH_2 = CH - C = CH$$

156. (c)
$$CH_3 - CH = CH_2 + H^+Br^- \rightarrow CH_3 - CH - CH_3$$

Br
2-Bromopropa ne

157. (b) Reaction is of dehydration

$$C_2H_5OH \xrightarrow{\text{Conc.}H_2SO_4} \rightarrow CH_2 = CH_2$$

158. (d) $CH_3 - CH = CH - CH_2 - CH_3$ will be the most stable because greater the number of alkyl groups attached to double bonded carbon atoms, more stable is the alkene.

159. (b) Markownikoff's rule can not be applied for symmetrical alkene.
$$Ph$$
 Ph

(d) Solution of bromine in carbon tetrachloride is used to test for 161. unsaturation of alkene. Red colour of bromine disappears due to the formation of colourless dibromo ethane $(C_2H_4Br_2)$.

162. (b)
$$CH_2 = CH - CH_3 + H_2O \xrightarrow{H_2So_4} CH_3 - CH - CH_3$$

Propylene Isopropylalcohol

Thus in this reaction isopropyl alcohol is formed.

$$CH_{2} = CH.CH_{3} \xrightarrow{O_{3}} CH_{2} - CH.CH_{3} - \frac{Zn/H_{2}O}{H_{2}O_{2}} + HCHO + CH_{3}CHO$$

~

164. When ethylene is treated with cold alkaline KMnO4, (a) ethylene glycol is formed.

$$H \rightarrow C = C < H \xrightarrow{KMnO4} H \rightarrow C - C < H \\ H \xrightarrow{Cold alkaline} H \rightarrow C - C < H \\ | | H \\ OHOH \\ Ethylene glycol$$

165. (a)
$$C_6H_6 + H_2C = CH_2 \xrightarrow{AlCl_3.Hl} C_6H_5CH_2CH_3$$

- 166. Markownikoff as well as anti-Markownikoff's rule is valid only (a) for unsymmetrical alkenes. 167.
 - The formation of *n*-propyl bromide in presence of peroxide can (b) be explained as follows. Step-1: Peroxide undergo fission to give free radicals

 $R - O - O - R \rightarrow 2 - R - O$ Step-2 : HBr combines with free radical to form bromine free

radical $R - O + HBr \rightarrow R - OH + B\dot{r}$ Step-3 : $B\dot{r}$ attacks the double bond of the alkene to form a

more stable free radical

$$CH_{3}CH = CH_{2} + B\dot{r}$$

$$CH_{3}CH = CH_{2} + B\dot{r}$$

$$Br$$

$$CH_{3} - CH - \dot{C}H_{2}$$

$$(ess stable)$$

Step-4 : More stable free radical attacks the $\,H\!Br$ $CH_3 - \dot{C}H - CH_2 - Br + HBr \rightarrow CH_3CH_2CH_2Br + B\dot{r}$ n-propyl bromide Step-5 : $B\dot{r} + B\dot{r} \rightarrow Br_2$

CLICK HERE >>>



168. (c)
$$CH_2 = CH_2 \xrightarrow{KMnO_4} CH_2 - CH_2$$

 $H_2 - CH_2 \rightarrow CH_2 - CH_2$
 $OH OH$
No reaction

169. (b) According to Markownikoff's rule, the negative part of the unsymmetrical reagent adds to less hydrogenated (more substituted) carbon atom of the double bond. Br

$$CH,CH = CH - CH + HBr \rightarrow C_6H_5CHCH_2CH_3$$

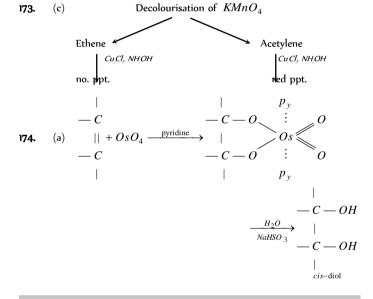
171. (a)

$$\begin{array}{c} CH_2 \\ \parallel \\ H_2SO_4 \rightarrow \mid \\ CH_2HSO_4 \end{array} \xrightarrow{H_2O} \begin{array}{c} CH_3 \\ \parallel \\ H_2O \\ H_2OH \end{array} + H_2SO_4$$

Except ethyl alcohol, no other primary alcohol can be prepared by this method as the addition of H_2SO_4 follows Markownikoff's rule. Generally secondary and tertiary alcohols are obtained.

172. (c)
$$CH_3 - C = CH_2 \xrightarrow{HBr / peroxide} CH_3 - CHCH_2 - Br$$

 $CH_3 \xrightarrow{\downarrow} CH_3 \xrightarrow{\downarrow} CH_3$



Alkyne

1. (c) $2 CH \equiv CH + 5O_2 \rightarrow 4 CO_2 + 2H_2O \Delta H = -1300 KJ$ The combustion of acetylene is highly exothermic and the heat produced during the combustion can be used for welding purposes in the form of oxy acetylene flame.

2. (c)
$$CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$$

 $CH \equiv CH + 2[Ag(NH_3)_2]OH \rightarrow$
 $Ag-C \equiv C - Ag + 4NH_3 + 2H_2O$
Whiteppt.

3. (c)
$$CH_3 - CH_2 - C \equiv CH \xrightarrow{\text{Cold}} CH_3 CH_2 COOH + CO_2$$

4. (c)
$$CH_3 - COOH \xrightarrow{LiAlH_4} CH_3 - CH_2 - OH \xrightarrow{H^+} 443 K$$

$$CH_{2} = CH_{2} \xrightarrow{Br_{2}} CH_{2} - CH_{2} \xrightarrow{alc.}_{KOH}$$

$$Br Br Br$$

$$CH \equiv CH + 2KBr + 2H_{2}O$$
Acetylene

5. (b)
$$C \equiv C < C = C < C - C$$

 $1.20A^{\circ}$ $1.34A^{\circ}$ $1.54A^{\circ}$
 sp sp^{2}

$$\textbf{6.} \qquad \textbf{(a)} \quad HC \equiv C - CH = CH_2$$

7. (a)
$$3 CH \equiv CH \xrightarrow{\text{Red hot}} O$$

Fe tube Benzene

10. (c)
$$H \longrightarrow Cyclohexane$$

Cyclohexane $Cyclohexane$
 $O \longrightarrow Cyclohexane$
 $Cyclohexane$
 $CH \longrightarrow CHO$
 $CH \longrightarrow CHO$
 $CH \longrightarrow CHO$

n. (a)
$$HC \equiv CH + AsCl_3 \longrightarrow Cliff d = CH AsCl_2$$

2-chlorovinyl dichloroarsine
(Lewsite)

12. (c)
$$CH_3 - C \equiv C - CH_2 - CH_3 \xrightarrow{O_3} CH_3 - C \equiv C - CH_2 - CH_3 \xrightarrow{O_3} CH_3 - C \xrightarrow{O} C - CH_2 - CH_3 \xrightarrow{O_3} CH_3 - C \xrightarrow{O} CH_3 - CH_2 - CH_3 + H_2O_2 \xrightarrow{O} O O CH_3 - CH_2 - CH_3 + H_2O_2 \xrightarrow{O} O O CH_3 - CH_2 - CH_3 - CH$$

14. (a)
$$-C \equiv C$$
 – is most reactive because *sp*-hybridization.

(d)
$$CH \equiv CH \xrightarrow{NaNH_2} CH \equiv C^-Na^+ \xrightarrow{CH_3I} CH \equiv C - CH_3$$

$$C_2H_5 - C \equiv C - CH_3 \xleftarrow{C_2H_5I}{-NaI} Na^+ C^- \equiv C - CH_3$$

Pent-2-yne

$$17. (d) CH_3 - C \equiv CH + H_2O \xrightarrow{H_2SO_4/H_gSO_4} \rightarrow$$

18. (b)
$$CH = CH + HCl \rightarrow CH_2 = CH - Cl - \frac{HCl}{MCl}$$

$$CH_{3} - CH < Cl$$

$$I-di-chloroethane$$
19. (c) $CaC_{2} \xrightarrow{H_{2}O} HC \equiv CH \xrightarrow{Dil.H_{2}SO_{4}} CH_{3}CHO$

$$Acetaldelyde$$

$$\xrightarrow{Ni}{H_{2}} CH_{3}CH_{2} - OH$$
Ethylalcohol

20. (c)
$$R - CH_2 - CCl_2 - R \xrightarrow{KOH + C_2H_5OH} R - C \equiv C - R + 2HCl$$

This reaction is an example of dehydrohalogenation Hence, alcoholic KOH is used as a reagent. CH - COOK

21. (d) |||
$$+2H_2O \xrightarrow{\text{Electrolyisis}} CH - COOK$$

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16.

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 α

$$CH$$

$$||| + 2CO_2 + 2KOH + H_2$$

$$CH$$

$$CH$$

$$CH$$

$$CH$$

$$CH_2 - CH_2 + 2KOH \rightarrow CH \equiv CH$$

$$CH_2 - CH_2 + 2KOH \rightarrow CH \equiv CH + 2KBr + 2H_2O$$

$$Br$$

$$Br$$

$$Br$$

$$22. (b) CH - COOK + 2H_2O \xrightarrow{Electrolysis} CH + 2CO_2$$

$$||$$

$$CH - COOK \qquad CH$$

$$+2KOH + H_2$$

 $CH_2 - COONa + 2H_2O \xrightarrow{Electrolysis} \\ \downarrow \\ CH_2COONa \\ CH_2 + 2CO_2 + 2NaOH + H_2$

23. (d)
$$CH_3 - C \equiv C - H + AgNO_3 \rightarrow CH_3 - C \equiv C - Ag$$

Propyne Ammonical Siversaltof
Propyne

24. (c)
$$CH \equiv CH \xrightarrow{H_2O/Hg^{2+}} H_3C \xrightarrow{O}_{(x)} H \xrightarrow{LiAlH_4} H_2SO_4$$

 $CH_3 - CH_2 - OH \xrightarrow{P_4/Br_2} C_2H_5Br$
(y) (c) $4 CH \equiv CH \xrightarrow{Ni(CN)_2} C_2V_5$ (c) C_2V_5 (c) C_2

26. (d) Ethyne have acidic hydrogen to form salt.

27. (a)
$$CH_3 - CH_2 - C \equiv CH + 2Br_2 \rightarrow CH_3 - CH_2 - \begin{bmatrix} Br & Br \\ I & I \\ - & CH_2 - H \\ Br & Br \end{bmatrix}$$

Since the molecule takes 2 moles of Br_2 . Therefore it is alkyne. Also it gives white *ppt* with Tollen's reagent therefore acidic *H* is present. Hence it is 1-Butyne.

28. (d)
$$2CH \equiv CH + 2Na \rightarrow 2CH \equiv C^-Na^+ + H_2$$

29. (a)
$$CH_3 \equiv CH + AgNO_3 \rightarrow Ag - C \equiv C - Ag$$

(Ammonical) White ppt.

$$CH_3 \equiv CH + CuCl_2 \rightarrow Cu - C \equiv C - Cu$$

(Ammonical) $(Ammonical)$

32. (c)
$$sp - sp > sp^2 - sp^2 > sp^3 - sp^3$$

Order of bond strength

(c) Ethylene and Benzene

33.

$$\frac{120^{\circ}}{sp^2} \qquad \frac{120^{\circ}}{sp^2}$$

34. (a)
$$CH_3 - CH_2 - C \equiv CH \xrightarrow{HgSO_4,60^\circ C} CH_3 - CH_2 - CH_3$$

 $H_2SO_4 \rightarrow CH \equiv CH + NaNH_2 \rightarrow CH \equiv C^-Na^+ + NH_3$

38. (d) C_2H_2 and C_3H_4 are homologue because they differ by $-CH_2$ group. Both have triple bond in their molecule.

39. (c)
$$CH \equiv CH + HCl \xrightarrow{HgCl_2} CH_2 = CH - Cl$$

Vinylchloride

40. (c)
$$CH_3 - C \equiv CH + H_2O \xrightarrow{40\% H_2SO_4}{1\% H_gSO_4}$$

 $CH_3 - C \equiv CH_2 \xrightarrow{\text{Rearrangem ent}} CH_3 - C - CH_3$
 OH
41. (a) $3CH_3 - C \equiv CH \xrightarrow{CH} CH$
 $CH CH$
 $CH CH$
 CH
 CH

Mesitylene or 1,3,5-trimethyl benzene
42. (c)
$$2NH_4OH + Cu_2Cl_2 \rightarrow 2CuOH + 2NH_4Cl$$

$$NH_4OH + CuOH \rightarrow [Cu(NH_3)_2]OH$$

Diammine copper
(I) hydroxide

$$2[Cu(NH_3)_2]OH + HC \equiv CH \rightarrow$$

 $Cu - C \equiv C - Cu + 4 NH_3 + 2H_2O$ copper acetylide Red ppt.

43. (a)
$$3CH \equiv CH \xrightarrow{\text{Hot } Cu \text{ tube}}_{AlCl_3}$$
 Benzene

44. (c)
$$CH \xrightarrow{KMnO_4} COOH$$

 $||| \xrightarrow{CH} COOH$
 $CH \xrightarrow{COOH} Oxalic acid$
45. (b) $CH \equiv CH + H_2O \xrightarrow{40\% H_2SO_4} CH_3 - CHO$

46. (c) Acetylene reacts with ammonical cuprous chloride to give brown *ppt* where as ethylene does not give this reaction.

47. (a) $Ag(NH_3)_2^+$ gives white *ppt* with terminal alkynes.

50. (b) Bond length decreases with increase in number of bonds.

55. (d)
$$3 HC \equiv CH \xrightarrow{\text{Red}} 6$$

56. (a) Reaction of acetic acid with acetylene is catalysed by *Hg* salts.

$$HC = CH \xrightarrow{CH_3COOH} CH_2 = CHOOCCH_3$$

$$\xrightarrow{CH_3COOH} CH_3 - CH(OOCCH_3)_2$$

$$H_g(OOCCH_3)_2$$
 ethylidene diacetate

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57. (c)
$$2C + H_2 \xrightarrow{Electric arc} CH \equiv CH$$

58. (c)
$$CH \equiv CH \xrightarrow{40\% H_2 SO_4} CH_2 = CH - OH$$

 $1\% HgSO_4 \xrightarrow{} CH_2 = CH - OH$
Vinylalcohol
 $\xrightarrow{} CH_3 - CHO$

Acetaldehyde

- **59.** (a) $2CH \equiv CH + 2Na \rightarrow 2CH \equiv C^{-}Na^{+} + H_2$ Reaction with sodium metal shows that hydrogen is acidic.
- **63.** (d) In $CH \equiv CH$ triple bond consists of one σ and two π bonds.
- **65.** (a) Nucleophiles and alkalies normally do not react with acetylene. Thus NaOH does not react.

66. (c)
$$HC \equiv CH + 2HOCl \rightarrow [CHCl_2 - CH(OH)_2]$$

 $\downarrow -HO$
 $CHCl_2 - CHO$
Dichloroacetal dehyde
60. (b) $CH = CH = CH$ $C = C = H$ Avidi budwar

69. (b) $CH_3 - CH = CH - C \equiv C - H$. Acidic hydrogen (*H* atom attached to triple bond) is present therefore it gives reaction with ammoniacal $AgNO_3$.

70. (b)
$$CH \equiv CH + H_2O \xrightarrow{40\% H_2SO_4} CH_2 = CHOH \downarrow CH_3CHO$$

 Rr

71. (b)
$$CH_3C \equiv CH + 2HBr \longrightarrow CH_3 - \stackrel{|}{C} - CH_3$$

72. (c) $CH_3 - C \equiv C - CH_3$, 2-butyne does not have acidic hydrogen. Hence, does not give white ppt. with ammonical $AgNO_3$ solution.

73. (a)
$$(CH \equiv CH) \xrightarrow[NaOH]{O_3} CH - CH \xrightarrow[Hydrolysis]{Hydrolysis} OH OH OH$$

$$CHO - CHO \xrightarrow{Zn} | CH_2 - OH$$

$$G|yoxal \xrightarrow{CH_2 - OH} CH_2 - OH$$

77. (b)
$$| + 2KOH \text{ (alcoholig)} \longrightarrow CH \equiv CH + 2KBr$$

 CH_2Br

$$+2H_{2}O$$

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- $\textbf{78.} \qquad (d) \quad \text{All are alkenes but 2-butyne is not.}$
- **80.** (c) Reduction of alkynes with liquid NH_3 / Li gives trans alkenes.
- 82. (a) Ethyne reacts with ammonical $AgNO_3$ to give white ppt of silver acetylide while ethane and ethene do not react because acidic hydrogen is absent.
- (d) Acidic property because H atoms are replaced by Silver metal atoms.
- **87.** (c) The hydrogen atom which is attached to triple bond is acidic.
- **88.** (c) In acetylene both carbons are *sp*-hybridised so it has linear structure.

89. (d)
$$CaC_2 + 2H_2O \rightarrow CH \equiv CH + Ca(OH)_2$$

Acetylene

90. (c)
$$CH \equiv CH + HCN \xrightarrow{Ba(CN)_2} CH_2 = CH - C \equiv N$$

Vinyl cyanide

91. (c) Because
$$CH_3CH_2 - C \equiv CH$$
 has one acidic hydrogen.

92. (d)
$$CH \equiv CH + 2Na \xrightarrow{Liq.NH_3} C.Na \equiv C.Na + H_2$$

94. (b)
$$CH \equiv CH + H_2O \xrightarrow{\text{dil}.H_2SO_4} CH_2 = C - OH \rightarrow H_gSO_4$$

 $CH_3 - C - H_2$

$${}^{C}H_{3} - C - H$$

 $\downarrow O$

95. (d) $CH_3 - C \equiv C - CH_3$ has not acidic character.

96. (d) Addition –
$$CH \equiv CH + 3H_2 \xrightarrow{Ni} CH_3 - CH_3$$

Substitution –

$$CH \equiv CH + Na \longrightarrow CH \equiv C^{-}Na^{+} + \frac{1}{2}H_{2}$$

Polymerization -

$$3CH \equiv CH \xrightarrow{\text{hot } Cu \text{ tube}}_{\text{Polymerization}} C_6H_6$$
Benzene

- **97.** (d) Bond length decrease with increase in Bond order. Hence triple bonded carbon has minimum bond length.
 - C C bond length = 1.54 Å

$$C = C$$
 bond length = 1.33 Å

- $C \equiv C$ bond length = 1.22 Å
- **98.** (b) Acetylene can be obtained by the reaction of silver and chloroform (or iodo form)

$$2CHI_3 + 6Ag \xrightarrow{\Delta} C_2H_2 + 6AgI$$
acetylene

- 99. (d) The partial reduction of alkynes by active metal in liquid ammonia takes place through trans vinylic anion which ultimately produces trans alkene.
- 100. (a) We know that C C bond length = 1.54 A, C = C bond length =1.34A and $C \equiv C$ bond length = 1.20A. Since propyne has triple bond; there fore it has minimum bond length.

101. (b)
$$CH \equiv CH + H_2 \xrightarrow[Catalyst]{Catalyst} CH_2 = CH_2 \\ Catalyst \\ pd. BaSO_4$$

102. (a) $HC\sigma \equiv_{\pi}^{\mu} CH$ one sigma and two π bond

103. (a) Propyne reacts with ammoniacal $AgNO_3$ due to presence of acidic hydrogen atom.

$$CH_3C \equiv CH + AgNO_3 + NH_4OH \rightarrow$$

$$CH_3C \equiv CAg + NH_4NO_3 + H_2O$$

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104. (a)
$$CH \equiv CH \xrightarrow{H_gSO_4} CH_3CHO \xrightarrow{CH_3M_gBr}$$

$$OM_{g}Br \qquad OH$$

$$| \qquad | \qquad | \qquad | \qquad CH_{3} - C - CH_{3} - C - H \qquad | \qquad P/Br_{2} \rightarrow$$

$$| \qquad | \qquad H \qquad CH_{3} \qquad | \qquad H \qquad CH_{3} \qquad Br$$

$$CH_{3} - C - H \qquad | \qquad | \qquad CH_{3} - C - H \qquad | \qquad CH_{3} - C - H \qquad | \qquad CH_{3} \rightarrow$$

105. (c) $Mg_2C_3 + 4H_2O \rightarrow CH_3C \equiv CH + 2Mg(OH)_2$

Aromatic Hydrocarbon

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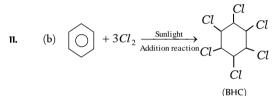
2. (d) Anhydrous AlCl₃
$$\longrightarrow$$
 Acetophenone

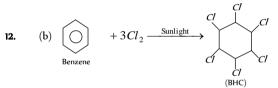
5. (a) Coal tar is a main source of aromatic hydrocarbons like benzene, naphthalene, anthracene, phenol etc

Hence 12σ and 3π bonds

8. (b) Ratio =
$$\frac{\sigma \text{ bonds}}{\pi \text{ bonds}} = \frac{12}{3} = 4$$

7.



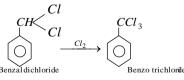


14. (a)
$$C_6H_6 + C_2H_5Cl \xrightarrow{AlCl_3} C_6H_5 - C_2H_5 + HCl$$

15. (a) $C_6H_5CHC_6H_5$ is the most stable carbonium ion due to resonance.

16. (d)
$$(H_{3}) + Cl_{2} \rightarrow (H_{3}) + Cl_{2} \rightarrow (H_{3}) + HCl_{2} \rightarrow (Cl_{2}) + HCl_{2} \rightarrow (Cl_{2}) + HCl_{2} \rightarrow (Cl_{2}) + HCl_{2} \rightarrow (Cl_{2}) \rightarrow ($$

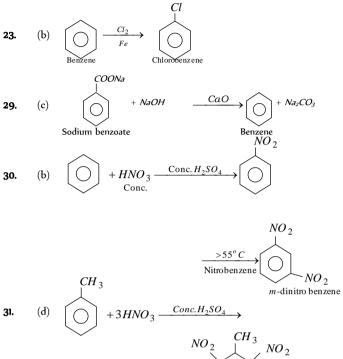
17. (a)
$$(\operatorname{Light\& heat})$$
 $(\operatorname{Light\& heat})$ $(\operatorname{Light\& heat})$ $(\operatorname{Benzylchloride})$



18. (b) $HO - NO_2 + H^+HSO_4^- \rightarrow H_2O + NO_2^+ + HSO_4^-$ Nitroniumion (attacking species)

19. (b)
$$\bigcirc$$
 + $HNO_3 \xrightarrow{Conc. H_2SO_4}$ \bigcirc NO 2

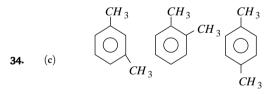
22. (a) $C_6H_6 + CH_3Cl \xrightarrow{\text{anhyd.}} C_6H_5CH_3 + HCl$, it is a Friedel-craft's reaction.



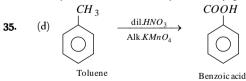
$$+3H_2O$$

SØ, 4H₀- trinitro toluene

32. (b)
$$\bigcirc +H_2SO_4 \rightarrow \bigcirc +H_2O$$



m-xylene o-xylene p-xylene m-xylene is most easily sulphonated because O and P both positions are free with respect to methyl group.



36. (c)
$$+\frac{9}{2}O_2 \xrightarrow{V_2O_5} H \xrightarrow{CH-COOH} \xrightarrow{-H_2O}$$

Maleic acid

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38. (b) Phenol is most easily nitrated.

43. (a) Nitrobenzene is least reactive towards bromine because of presence of $-NO_2$ group decreases electron density at *o* and *p* positions and hence attack of electrophile on the benzene nucleus is difficult because + *ve* charge on *o* and *p* position repel the incoming electrophile.

$$0 \leftarrow N \in \mathcal{O} \quad 0 \leftarrow N - O^{-} \quad 0 \leftarrow N - O^{-} \quad 0 \leftarrow N - O^{-}$$

46. (d) *AICI* is an electron deficient compound. It generates electrophile in the reaction

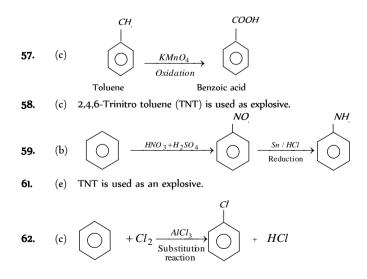
$$CH_3Cl + AlCl_3 \rightarrow CH_3^+ + AlCl_4^-$$

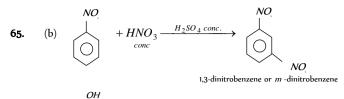
Electrophile

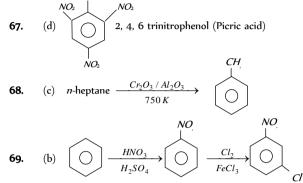
47. (d)
Benzene
$$S_{\text{JUSIWING}} \xrightarrow{Cl_2} Cl + HCl$$

 $Anhyd.AlCl_3$
 Cl_2
 $Cl + HCl$
 $Cl + Cl$
 $Cl +$

- 51. (b) Benzene can be obtained by polymeris@ti@n of acetylene.
- **53.** (b) Benzene C_6H_6 is made up of hydrogen and carbon only.
- 54. (c) They have a relatively high percentage of carbon
- **55.** (c) All 6 carbons of Benzene are sp^2 -hybridised so it is planar.







71. (b) In benzene due to resonance all the carbon-carbon bond lengths are equal 1.39Å which is between C - C(1.54 Å) and C = C(1.34 Å)

72. (c)
$$C_6H_5COONa + NaOH \xrightarrow{CaO} C_6H_6 + Na_2CO_3$$

Sodium benzoate Benzene

- **73.** (a) Friedel-Craft's reaction involves the introduction of an alkyl or acyl group into benzene ring in the presence of a catalyst. The presence of an electron withdrawing group in the ring hinders the reaction. Therefore phenyl acetanilide is not used.
- 74. (a) Halogenation is initiated by free redical.76. (b) In benzene all the six carbon atoms at
 - (b) In benzene all the six carbon atoms are present in the same plane. All the carbon atoms are sp^2 hybridized. Hence, it is a planar molecule.
- 77. (d) Basicity of amines is due to availability of an unshared pair (lone pair) of electrons on nitrogen. This lone pair of electrons is available for the formation of a new bond with a proton or Lewis acid.

Pyridine is less basic than triethylamine because lone pair of nitrogen in pyridine is delocalised.

78. (a) In chlorination electrophile is Cl^+ (chloronium ions).

79.

80.

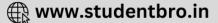
(c)

Ethyl benzoate

 $-\acute{COOH}$ group is meta directing group hence, ethyl benzoate undergo meta substitution.

$$(d) 2 \bigcirc CH_3 \\ CH_3 \\$$

o- and p- nitro toluene



+ HCl

chloro ethyl benzoate

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81. (d)
$$H - C = O$$
 $H - C - O^ H - C - O^ H - C - O^-$

Presence of -CHO decrease electron density at *o* to *p* positions. Hence, attack of an electrophile occurs at *m*-position. therefore it is meta directing group.

84. (b)
$$\bigcirc$$
 $+3H_2 \xrightarrow{Ni}$ \bigcirc $Cyclohexane$
87. (b) \bigcirc $+3Cl_2 \xrightarrow{hv}$ $Cl \xrightarrow{Cl}$ $Cl \xrightarrow{Cl}$ Cl
BHC

88. (a) Benzene on fractional distillation gives light oil [It is lighter than water and hence called as light oil]

89. (d) Because Ammonical
$$AgNO_3$$
 reduce $C \equiv CH$ bond of yne.

90. (a) Bond length
$$\propto \frac{1}{\text{Bond order}}$$

Bond order = $\frac{\text{Bonding} - \text{antibonding electron}}{2}$

Bond order is highest for C_2H_6 so it has minimum bond strength.

91. (b)
$$C_6H_5COOH + NaOH \rightarrow C_6H_5COONa + H_2O$$

 $\xrightarrow{NaOH} C_6H_6 + Na_2CO_3$

- **92.** (c) Unsaturated hydrocarbons are more reactive than saturated hydrocarbons. Among ethyne (C_2H_2) and ethene (C_2H_4) the later is more reactive as $C \equiv C$ triple bond is quite strong bond and therefore ethyne generally require catalysts (like Hg^{2+} etc) in its reactions.
- 93. (a) Kolbe's methods Electrolysis of a concentrated aqueous solution of either sodium or potassium salts of saturated mono carboxylic acids yields higher alkanes at anode.

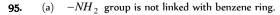
 $CH_3COONa \Rightarrow CH_3COO^- + Na +$

Anode :
$$2CH_3COO^- \xrightarrow{-2e^-} CH_3 - CH_3 + 2CO_2$$

Cathode :
$$2Na^+ + 2e^- \rightarrow 2Na$$

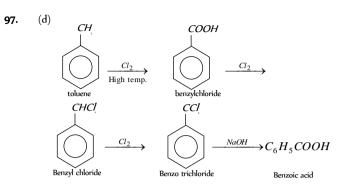
 $2Na + 2H_2O \rightarrow 2NaOH + H_2$

94. (b)
$$H_2C$$
 CH_3
 H_2C CH_3
 H_2C CH_3
 H_2C CH_3
 H_2C CH_2
 H_2C CH_2
 H_2C CH_2
 H_2C CH_2
 $T73 K$ Toluene



 $(d) \qquad \underbrace{CH}_{i} \qquad \underbrace{KMnO_4}_{i} \qquad \underbrace{COOH}_{i} \qquad \underbrace{COOH}_{i}$

96.



Critical Thinking Question

(a) The difference between any two successive members of the homologous series $-CH_2 - i.e.$, the molecular weight of every two adjacent members differ by 14. $(CH_2 = 12 + 2 = 14)$

2. (a)
$$\begin{array}{c} & & & & & & \\ & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & &$$

 $1^{o} \Rightarrow$ Primary 6, $2^{o} \Rightarrow$ Secondary 2

 $3^{\circ} \Rightarrow$ Tertiary 2, $4^{\circ} \Rightarrow$ Quanternary 1

3. (c) Octane number of fuel is the percentage of *iso*- octane in mixture.

(b)
$$CH_3 - CH - CH_2 - CH_3 \rightarrow CH_3 - CH = CH - CH_3$$

 $OH_2 - Butanol$
 $+H_2O$

According to this rule ${\cal H}$ atom goes from that β – carbon which is less hydrogenated.

5. (c)
$$CH_3 - C \equiv C - CH_3 \xrightarrow{(i) O_3} CH_3 - C - C - CH_3$$

(ii) Zn / H_2O \parallel \parallel \parallel \square
 O O

4

6

7.

q

$$\begin{array}{c} CH_{3}COCl+C_{6}H_{6} & \xrightarrow{\text{anhydrous } AlCl_{3}} \\ \text{Acetylchloride } & \text{Benzene} & \xrightarrow{\text{Acetylchloride } Benzene } \end{array}$$

(a)
$$C_2H_6(\text{excess}) + Cl_2 \xrightarrow{U.V.\text{Light}} C_2H_5Cl + HCl$$

Ethylchloride
(Major product)

8. (a)
$$CH_3CH_2 - OH + 2HI \xrightarrow{Red P} CH_3 - CH_3 + H_2O + I_2$$

Ethylalcohol Ethane

$$\underbrace{CO + H_2}_{\text{Water gas}} + \underbrace{H_2}_{\text{Excess}} \xrightarrow[\text{heat}]{} \xrightarrow{\text{CO or Ni}} \text{Mixtureof hydrocarbons} + H_2O$$

Br

10. (c)
$$CH_3 - CH_2 - CH_2 - Br + O + 2Na \xrightarrow{Dry}_{ether} + 2Na \xrightarrow{Dry}_{ether}$$

$$2NaBr + CH_3 - CH_2 - CH_2$$

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 (a) Hydroboration of alkenes followed by hydrolysis in basic medium yield alcohols and not the alkanes.

$$R - CH = CH_2 \xrightarrow{B_2H_6} (R - CH_2 - CH_2)_3 - B$$
$$\xrightarrow{OH^-} R - CH_2 - CH_2OH$$

12. (b) Koch reaction : (Carboxylation of Alkene)

CH 3

$$CH_3 - CH = CH_2 \xrightarrow{\text{Watergas}(CO + H_2)} CH_3 - CH_3 - CH_3 - CH_3$$
Isobutyric acid

соон

13. (d)
$$CH_3 - \overset{i}{C} = CH - CH_3 \xrightarrow{NalO_4} CH_3 COCH_3 + CH_3CHO$$

14. (b)
$$HC \equiv CH + 2AgNO_3 \xrightarrow{NH_4OH}$$

 $Ag - C \equiv C - Ag + 2NH_4NO_3 + 2H_2O$

- 15. (d) Naphthalene is a molecular solid. If the crystals contains only individuals atoms; as in solid argon or krypton or if they are composed of non polar molecules as in naphthalene, the only attraction between the molecules are the London forces.
- **16.** (d) A compound is said to be aromatic if it is planar and there is complete delocalization of π electrons, which is only possible if it is a conjugated cyclic system and number of electrons used in delocalization is (4n + 2). 1, 3, 5 heptatriene is not an aromatic compound because complete delocalization of π electrons, is not possible in it.



17. (c)
$$CH \equiv CH + HCN \xrightarrow{Ba(CN)_2} CH_2 = CHCN$$

Acetylene Vinylcyanide

18. (a) Addition reaction means addition on double bond.

19. (d)
$$CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$$

64 g

$$C_2H_2 + H_2 \rightarrow C_2H_4$$

$$28 g$$

64g of CaC_2 gives 28g of ethylene

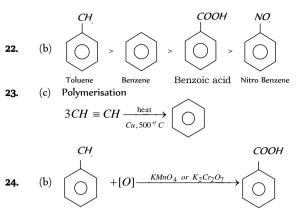
 $\therefore~64 \textit{kg}$ of $~\textit{CaC}_2~$ will give 28 kg of polyethylene

20. (a)
$$\bigcirc$$
 $\xrightarrow{Conc.H_2SO_4}$ \bigcirc \bigvee \bigvee \bigcirc NO_2
HNO₃ \longrightarrow \bigcirc NO 2

21. (b) Electron accepting groups which make the substitution difficult are known of deactivating groups. the group or substituent already present on the ring also decides the position of incoming group.

ortho and para directing groups are as follow

$$-CH_3, C_2H_5(-R), -NH_2, -OH$$
, halogens, (Cl, Br, I)



25. (a) Wohler reaction :

$$CaC_2 + 2H_2O \longrightarrow C_2H_2 + Ca(OH)_2$$

$$\begin{array}{c} C_2H_2 \xrightarrow{dil.H_2SO_4 / HgSO_4} [CH_2 = CHOH] \rightarrow CH_3CHO\\ \text{Acetylene} \xrightarrow{60^{\,o}C} [CH_2 = CHOH] \rightarrow CH_3CHO\\ \text{Acetaldehyde} \end{array}$$

26. (a)
$$CH \equiv CH + H_2O \xrightarrow{HgSO_4} CH_2 = CH - OH \xrightarrow{KMnO_4} CH_3CHO \xrightarrow{Oxidation} CH_3COOH$$

$$\rightarrow CH_3COOH$$

Acetic acid

27. (a)
$$CaC_2 + 2D_2O \longrightarrow C_2D_2 + Ca(OD)_2$$
 calciumcarbide heavy water

28. (d) It is a unsymmetrical olefin. In such cases addition of H - X is governed by 'Markownikoff's rule'

29. (d)
$$CH_3 - CH = CH_2 \xrightarrow[Acidic KMnO_4]{Conc.} CH_3 COOH + HCOOH$$

32. (d)
$$CH \equiv CH \xrightarrow{HDr} CH_2 = CH - Br \xrightarrow{HDr}$$

IID.

$$CH_{3}CH < Br \\ Br$$

Ethylidene dibromide

(c) Electron accepting groups which make the substitution difficult are known or deactivating groups.

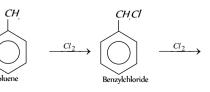
o. p. directing groups are as follow :

$$-C\!H_3, C_2H_5(-R), -N\!H_2, -OH$$
 , halogens $(Cl, Br, I).$

34. (a) 2-butene shows geometrical isomerism.

$$\begin{array}{ccc} H-C-CH_3 & H-C-CH_3 \\ || & || \\ H-C-CH_3 & CH_3-C-H \\ \text{cis-Butene-2} & \text{trans-Butene-2} \end{array}$$

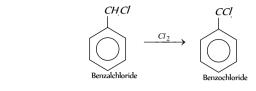
35. (d) Sidechain chlorination and bromination is favoured by high temperature, light and in absence of halogen carrier.



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33.



- $C_2H_4 + CO + H_2O \xrightarrow{\text{Ligh temp.}} C_2H_5 COOH$ 36. (b) Propionic acid
- (b) Cyclohexane C_6H_{12} is alicyclic compound. 37.

38. (c)
$$CH_2 = CH_2 \xrightarrow{HBr} CH_3 - CH_2 \xrightarrow{Hydrolysis} Br$$

$$\begin{array}{c} H_{3} - CH_{2} \xrightarrow{I_{2} \text{ excess}} CH_{3} \\ | \\ I_{2} \text{ excess} \\ OH \end{array} \xrightarrow{Vellowpt} (Iodoform)$$

(d) On oxidation, with $KMnO_4$, they give different alcohols 39

$$CH_{3}CH_{2}CH_{2}CH_{2}CH_{3} \xrightarrow{KMnO_{4}} [O]$$

$$CH_{3}CH_{2}CH_{2}CH_{2}CH_{2}CHOH_{2}$$

$$CH_{3}CH_{2}CH_{2}CH_{2}CHOH_{2}CHOH_{2}$$

OH

8.

9

10.

11.

$$CH_{3}CH_{2} - CH - CH_{3} \xrightarrow{KMnO_{4}} CH_{3}CH_{2} - CH_{3}CH_{2} - CH_{3}$$

$$CH_{3} \xrightarrow{CH_{3}} CH_{3}$$

$$CH_{3}$$

$$CH_{3}$$

$$CH_{3}$$

$$CH_{3}$$

 $CH \equiv CH + HBr \rightarrow CH_2 = CHBr$ Acetylene Vinvl bromide (b) 40. Vinyl bromide

Assertion & Reason

This reaction is followed by against of Markownikoff rule 1. (a) H H H H

$$\begin{array}{c|c} & | & | & | \\ H - C - C - C - C = C \\ & | & | \\ H & H \\ H & H \\ H & H \end{array} \xrightarrow{\text{Peroxide}} H$$

H H H H | | | | H - C - C - C - C | | | H H H B T I Promo but as c

In this reaction anti Markownikoff's addition is explained on the basis of the fact that in the presence of peroxide the addition takes place Via a free radical mechanism rather than the ionic mechanism.

2. (a)
$$CH_3 - CH_2 - CH = CH_2 + Br_2 \rightarrow 1$$
 Butene

$$CH_2 - CH_2 - C\bullet - CH_2Br$$

$$Br$$
1,2 dibromobut ane

IJ

4. Pyrrole is a heterocyclic compound having five membered ring. (a) It has 6π electrons. As 4π electrons in the ring and 2π electrons donated by nitrogen atom present in the ring.

- (b) The assertion that chlorination of CH_4 does not take place in 5. dark is correct because it is a free radical reaction and free radicals are obtained in presence of sun light.
- The alkyl benzene is not prepared by Friedel Craft's alkylation 6. (b) of benzene because the monoalkyl product formed undergo alkylation to produce polyalkylated benzene.

The reason that alkyl halides are less reactive than acyl halides is also correct but this is not the correct explanation of assertion.

2-bromobutane on reaction with sodium ethoxide in ethanol 7. (d) 2-butene maior product. gives as а EtO^{-}

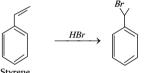
$$\begin{array}{c} & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & &$$

 $EtOH + CH = CH + Br^{-}$

This is according to saytzeff's rule i.e. the Predominant product is the most substituted alkene, i.e. are carrying the largest number of alkyl substituents of hydrogen is eliminated preferentially from the carbon atom joined to the least number of hydrogen atoms.

2-butene is more stable than 1-butene due to presence of large number of hyperconjugating structures in 2-butene.

HBr adds to the double bond of the styrene forming 1-(b) bromo-1-phenylethane.



This is an example of elimination-addition reaction.

Note : Here given assertion is wrong.

- Alkanes with odd carbon atoms have their and carbon atom on (b) the same side of the molecule and in even carbon atom alkane, the end carbon atom on opposite side. Thus alkanes with even carbon atoms are packed closely in crystal lattice to permit greater intermolecular attractions and hence higher melting point.
- (b) lodination is reversible since formed HI is a strong reducing agent and reduces the alkyl iodide back to alkane.

$$CH_4 + I_2 \Rightarrow CH_3I + HI$$

(b) Normally oxidising agents have no effect on alkanes. However, alkanes containing a tertiary hydrogen atom can be oxidised by oxidising agents such as $KMnO_4$ to the corresponding alcohols. For example,

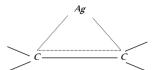
$$CH_{3} \xrightarrow[]{} CH_{3} \xrightarrow[]{} CH_$$

- (e) Halogenation of alkanes is catalysed by radical initiators like 12. benzoyl peroxide.
- Neopentane has four identical methyl groups attached on 4° 13. (c) carbon atom and thus only one product is possible during monosubstitution.

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- 14. (b) Neopentane is more symmetric than *n*-pentane and it is expected to show more stable crystal lattice than that of *n*-pentane and thus have high melting point.
- 15. (b) Knocking involves the production of metallic sound due to irregular burning of the fuel. This irregular burning lowers the efficiency of the engine.
- **16.** (b) Ag^+ coordinates with the alkene by $p\pi d\pi$ bonding giving an ion and the solubility increases.



17. (a) In the dehydration of secondary and tertiary alcohols. When there is a possibility of formation of two isomers. The hydrogen atom is preferentially eliminated from the adjacent carbon atom with the fewer number of hydrogen atoms. This is Saytzeff's rule.

18. (c) The addition of Br_2 follows ionic mechanism

$$H_{2}C = CH_{2} \xrightarrow{\overset{\delta^{+}}{\xrightarrow{Br_{2}(Br-Br)}}{NaCl \rightarrow Na^{+}+Cl^{-}}} H_{2}\overset{+}{C} = \overset{-}{C}H_{2} \xrightarrow{\overset{+}{\xrightarrow{Br}}}$$

$$H_{2}\overset{+}{C} = \overset{-}{C}H_{2}Br \xrightarrow{\overset{+}{\xrightarrow{Br}}}{\xrightarrow{Br}} H_{2}\overset{-}{C} = \overset{-}{C}H_{2}Br$$

$$\overset{+}{\xrightarrow{Br}} H_{2}\overset{+}{C} = \overset{-}{C}H_{2}Br \xrightarrow{\overset{+}{\xrightarrow{Br}}}{\xrightarrow{F}} H_{2}\overset{+}{\xrightarrow{F}} \xrightarrow{Br} H_{2} \xrightarrow{F} H_{2}Br$$

- 19. (b) Straight chain alkanes have very low octane number because as the length of the chain increases, octane number further decreases.
- **21.** (d) The two hydrogen atoms on first carbon and the two *H*-atoms on the third carbon atom lie in perpendicular planes. The central carbon atom is *sp*-hybridized while terminal carbon atoms are sp^2 -hybridized.
- 22. (d) Propene reacts with HBr in presence of benzoyl peroxide to give 1-bromopropane. In presence of peroxide, the addition of HBr to propane occurs by free radical mechanism.
- (b) Arylhalide shows resonance stabilization and thus resistant to substitution reaction.
- **25.** (e) During alkylation of bromobenzene, if benzene is used as solvent, alkylation of benzene will take place because benzene is more reactive for S_E reactions than bromo benzene, benzene is not used as a solvent for this reaction.

(b) Benzene is a polar solvent Butter is composed of organic compounds of low polarity. So it gets dissolved in benzene.
 (a) CH₃

In toluene , the $-CH_3$ group is electron

Pushing. It is an activating group. By its+l effect, $-CH_3$ group activates the benzene ring at ortho and para position relative to it. Due to increased activity towards electrophilitic substitution toluene can be more easily nitrated than benzene.

co 11

28. (e) With fuming H_2SO_4 or oleum (conc. $H_2SO_4 + SO_3$) at high temperature benzene forms *m*-benzene disulphonic acid.

$$\bigcirc \xrightarrow{\text{Oleum}} H_2 S_2 O_7 \qquad \bigcirc SO_3 H$$

m-Benzene disulphonic acid

(c) Like halogens, the nitroso group (-N = O) is also deactivating but *o*, *p*-directing. It is deactivating because *O* is more electronegative than *N* and hence No group as whole withdraws electrons from the benzene ring.

 (e) Completely conjugated polyenes containing even number of carbon atoms is known as annulenes.

32. (c) $(4n+2)\pi$ electrons and planar structure are the essential conditions for aromaticity.

33.

(a)

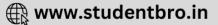
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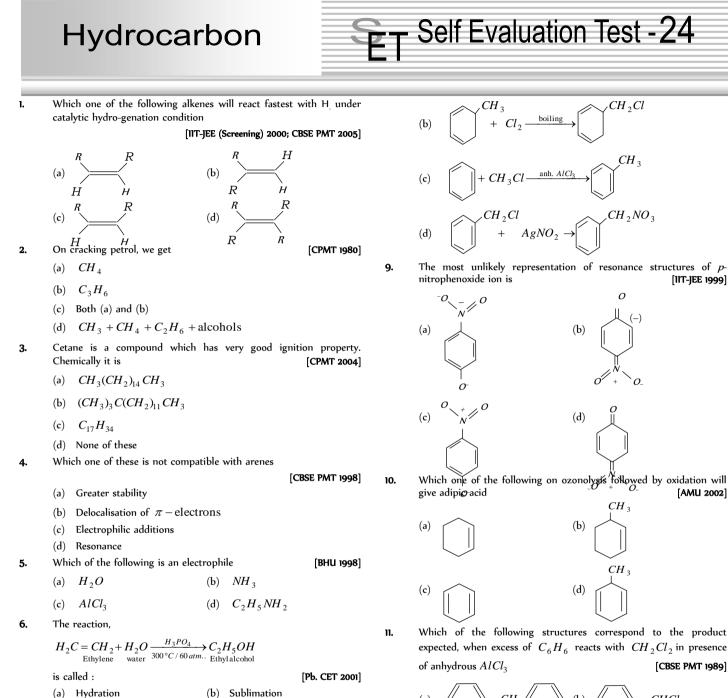


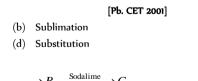
Due to severe non-bonded interactions between the internal hydrogen (as shown in figure), the ring assumes non-planar geometry.

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 $C_6H_5CH_3$ – $\xrightarrow{}$ Oxidation $\rightarrow A$ $\rightarrow B$ $\rightarrow C$ NaOH Then C is [MP PET 2004] (a) C_6H_6 (b) C_6H_5OH

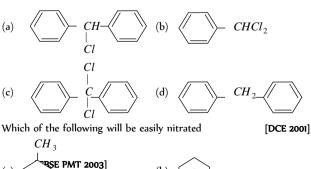
(c) C_6H_5COONa (d) C_6H_5ONa

(c) Dehydration

In reaction

7.

8. Which one of the following is a free-radical substitution reaction (a) $CH_3CHO + HCN \rightarrow CH_3CH(OH)CN$



(c) CH_3NO_2

(d) $C_6H_5NO_2$



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(a)

12.

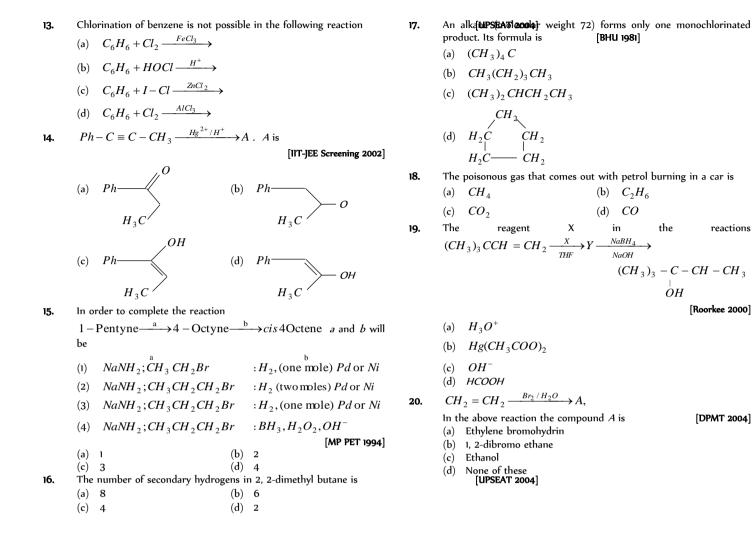
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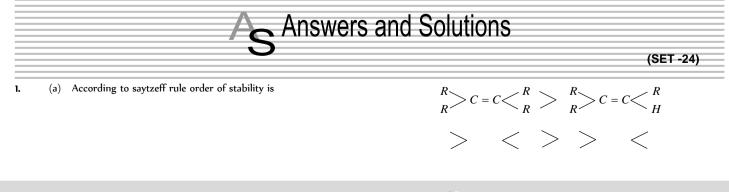
[IIT-IEE 1999]

[AMU 2002]

[CBSE PMT 1989]

(-)





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reactions

[Roorkee 2000]

[DPMT 2004]

$$\begin{array}{cccc} R \\ R \end{array} C = C \qquad \begin{array}{cccc} H \\ H \end{array} \qquad \begin{array}{cccc} R \\ H \end{array} \qquad \begin{array}{cccc} R \\ H \end{array} \qquad \begin{array}{cccc} R \\ H \end{array} \qquad \begin{array}{ccccc} R \\ H \end{array}$$

On cracking petrol gives smaller hydrocarbons like CH, CH. 2. (c)

Cetane is chemically hexadecane i.e, 3. (a) $CH_{3}(CH_{2})_{14}CH_{3}.$

- In arenes electrophillic substitution reaction takes place and it 4. (c) does not gives electrophillic addition reactions. We also know that benzene is a resonance hybrid of two structure's and greater stability of benzene is due to delocalization of π electron.
- AlCl₃ is an electron deficient compound. Hence, act as an 5. (c) electrophile.
- 6. Alkenes react with water in the presence of acid and form (a) alcohols. This reaction is called as hydration.

(b) Halogenation of alkyl group proceed via free radical 8. mechanism.

9. (c) The structure
$$O \longrightarrow N^+ N^+ O$$
 is most unlikely

as N containing 5 valence electrons should not carry positive charge.

$$HOOC - (CH_2)_3 - CH - COOH$$

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11. (d)
$$\bigcirc$$
 + CH_2Cl_2 + \bigcirc Anhydrous AlCl_3 \rightarrow
 \bigcirc - CH_2 \bigcirc + $2HCl$
Diphenylmethane

- 12. (a) The presence of an electron-releasing groups (+1 group) e.g., $-CH_3$, -OH, $-NH_2$ etc makes the process of nitration easier. ******* So $C_6H_3CH_3$ will be easily nitrated.
- (b) Reaction is called Gattermann-Koch synthesis, which is carried 13. by catalyst $AlCl_3$.

14. (a)
$$C_6H_5 - C \equiv C - CH_3 \xrightarrow{H_8SO_4} C_6H_5 - C - CH_2 - CH_3$$

15. (c) $CH_3 - CH_2 - CH_2 - C \equiv CH \xrightarrow{NaNH_2}$
 $CH_3 - CH_2 - CH_2 - C \equiv C - Na \xrightarrow{CH_3CH_2CH_2Br}$
 $CH_3 - CH_2 - CH_2 - C \equiv C - CH_2 - CH_2 - CH_3 \xrightarrow{H_2}$
 $CH_3 - CH_2 - CH_2 - C \equiv C - CH_2 - CH_2 - CH_3 \xrightarrow{H_2}$
 $CH_2 - CH_2 - CH_2 - CH_2 - CH_3 \xrightarrow{H_2}$
 $CH_3 - CH_2 - CH_3 \xrightarrow{CH_3CH_2CH_2Br}$

cis-4-Octene

16. (d)
$$H_3C - C - C - C - CH_3$$

 $| | | H CH_3$
 $2,2 \text{ dimethyl butane}$

- The alkane forms only one mono substituted product, it must (a) 17. have only one type of hydrogen atoms. there fore the alkane is 2, 2-dimethyl propane.
- 18. (d) On petrol burning CO comes out which is so much poisonous gas.
- 19. (b) Oxy mereuration-demercuration : with mercuricacetate (in THF) followed by reduction with $NaBH_4$ / NaOH is an example of hydration of alkene according to markowni koff's rule.

$$(CH_3)_3 C - CH = CH_2 \xrightarrow{(CH_3COO)_2H_g} (CH_3)_3 C - CH - CH_2 - HgOOCCH_3$$

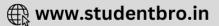
$$(CH_3)_3 C - CH - CH_3 \leftarrow \\ OH \\ 3, 3-Dimethyl-2-butanol$$

20. (a)
$$CH_2 = CH_2 \xrightarrow{Br_2, H_2O} CH_2 - CH_2$$

 $| | | Br OH$
Ethylene bromohydrin

Hence compound *A* is Ethylene bromohydrin.

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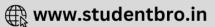
	G Ordin	Objective Questions
	AI	kane
	Which represents an alkane	[CPMT 1976]
	(a) $C_5 H_8$	(b) $C_8 H_6$
	(c) $C_9 H_{10}$	(d) $C_7 H_{16}$
	The decreasing order of boili	, 10
•	(a) <i>n</i> -Pentane > iso-Pentane	•••••••••••••••••••••••••••••••••••••••
	(b) iso-Pentane > <i>n</i> -Pentane	
	(c) neo-Pentane > iso-Penta	ne > <i>n</i> -Pentane
	(d) <i>n</i> -Pentane > <i>n</i> eo-Pentan	e > iso-Pentane
	To prepare a pure sample or reactant, the other reactant, the other reactant v	of n-hexane using sodium metal as one vill be [BHU 1999]
	(a) <i>n</i> -propyl bromide	. 1.1 1
	(b) Ethyl bromide and <i>n</i>-bu(c) Ethyl chloride and <i>n</i>-bu	· · · · ·
	(d) Methyl bromide and <i>n</i> -	
		rd reagent from haloalkane, the metal
	(a) <i>Mg</i>	(b) <i>Zn</i>
	(c) Li	(d) <i>K</i>
	Sodium acetate can be conve	
		[Pune CET 1998]
	(a) Heating with $LiAlH_4$	1.2
	(b) Electrolysing its aqueou(c) Heating with sodalime	s solution
	(d) Heating with calcium ac	cetate
	Which of the following compositions to prevent the	compounds is used in antiknock deposition of oxides of lead on spark
	plug, combustion chamber a	nd exhaust pipe [KCET 1998]
	(a) Glycerol	(b) Glycol
	(c) 1, 2-dibromoethane	(d) Benzene
	Which of petroleum correspo	onds to kerosene oil
		[DCE 1999]
	(a) $C_{15} - C_{18}$	(b) $C_{10} - C_{12}$
	(c) $C_5 - C_9$	(d) $C_1 - C_9$
	In the reaction $CH_{2} - Bt$	
		$+2Na + Br - CH_3 \rightarrow$, the product
	called	$+ 2Na + Br - CH_3 \rightarrow$, the product [Pb. CET 1999; CPMT 1983. 86; KCET 1992;
	called	
	called MP PMT 19 (a) Wurtz reaction	[Pb. CET 1999; CPMT 1983. 86; KCET 1992; 94; BHU 1998; MP PMT 2002; MP PET 1986] (b) Aldol condensation
	called MP PMT 19 (a) Wurtz reaction (c) Perkin's reaction	 [Pb. CET 1999; CPMT 1983. 86; KCET 1992; 94; BHU 1998; MP PMT 2002; MP PET 1986] (b) Aldol condensation (d) Levit reaction
	called MP PMT 19 (a) Wurtz reaction (c) Perkin's reaction Iodoethane reacts with sodi	[Pb. CET 1999; CPMT 1983. 86; KCET 1992; 94; BHU 1998; MP PMT 2002; MP PET 1986] (b) Aldol condensation (d) Levit reaction um in the presence of dry ether. The
	called MP PMT 19 (a) Wurtz reaction (c) Perkin's reaction	 [Pb. CET 1999; CPMT 1983. 86; KCET 1992; 94; BHU 1998; MP PMT 2002; MP PET 1986] (b) Aldol condensation (d) Levit reaction
	called MP PMT 19 (a) Wurtz reaction (c) Perkin's reaction Iodoethane reacts with sodi product is	[Pb. CET 1999; CPMT 1983. 86; KCET 1992; 94; BHU 1998; MP PMT 2002; MP PET 1986] (b) Aldol condensation (d) Levit reaction um in the presence of dry ether. The [AFMC 1997; KCET 1998]
	called MP PMT 19 (a) Wurtz reaction (c) Perkin's reaction Iodoethane reacts with sodi product is (a) Pentane	 [Pb. CET 1999; CPMT 1983. 86; KCET 1992; 94; BHU 1998; MP PMT 2002; MP PET 1986] (b) Aldol condensation (d) Levit reaction um in the presence of dry ether. The [AFMC 1997; KCET 1998] (b) Propane (d) Butane
	called MP PMT 19 (a) Wurtz reaction (c) Perkin's reaction lodoethane reacts with sodi product is (a) Pentane (c) Butene Which of the following is oxi (a) Methane	[Pb. CET 1999; CPMT 1983. 86; KCET 1992; 94; BHU 1998; MP PMT 2002; MP PET 1986] (b) Aldol condensation (d) Levit reaction um in the presence of dry ether. The [AFMC 1997; KCET 1998] (b) Propane (d) Butane dised by <i>KMnO</i> ₄ (b) Pentane
	called MP PMT 19 (a) Wurtz reaction (c) Perkin's reaction Iodoethane reacts with sodi product is (a) Pentane (c) Butene Which of the following is oxi	 [Pb. CET 1999; CPMT 1983. 86; KCET 1992; 94; BHU 1998; MP PMT 2002; MP PET 1986] (b) Aldol condensation (d) Levit reaction um in the presence of dry ether. The [AFMC 1997; KCET 1998] (b) Propane (d) Butane dised by <i>KMnO</i>₄ (b) Pentane (d) Neopentane
	called MP PMT 19 (a) Wurtz reaction (c) Perkin's reaction lodoethane reacts with sodi product is (a) Pentane (c) Butene Which of the following is oxi (a) Methane (c) Isobutane	 [Pb. CET 1999; CPMT 1983. 86; KCET 1992; 94; BHU 1998; MP PMT 2002; MP PET 1986] (b) Aldol condensation (d) Levit reaction um in the presence of dry ether. The [AFMC 1997; KCET 1998] (b) Propane (d) Butane dised by <i>KMnO</i>₄ (b) Pentane (d) Neopentane

	Н	CH ₃
		(d) $CH_3 - \frac{C}{C_+} - CH_3$
10		
12.	The most volatile compound is (a) 2, 2-dimethyl propane ([DPMT 2000] (b) 2-methyl butane
	(c) Isobutane ((d) <i>n</i> -pentane
13.	In Wurtz reaction, the reagent used	
		(b) $Na/liquid NH_3$
		(d) Na/dry alcohol
14.	Which of the following has highest	[MP PMT 2000]
		(b) <i>n</i> -heptane
15.	(c) <i>n</i> -pentane (What is freon-12	(d) 2, 2, 4-trimethyl pentane [RPET 1999]
1.3.		(b) Refrigerant
		(d) Lubricant
16.	The petrol having octane number 8 (a) 20% normal heptane + 80% is	
	(b) 80% normal heptane + 20% is	
	(c) 20% normal heptane + 80% n	normal octane
17.	(d) 80% normal heptane + 20% n Which of the following reactions w	
.,.	which of the following reactions w	[DPMT 2005]
	(a) $CH_3CH_2CH_2Cl - \frac{Mg/\text{ether}}{H_2O}$	er →
	(b) $CH_3COCl \xrightarrow{CH_3MgX} H_2O$ [RPET 1999] H_2O (c) $CH_3CH = CH_2 \xrightarrow{B_2H_6} CH_3COOH$	
	(c) $CH_3CH = CH_2 \xrightarrow{B_2H_6}$	*
	(d) $CH_3CH - CH_3 \xrightarrow{P/HI} \rightarrow$	
	ОН	
18.	The shape of methane molecule is	
		(b) Trigonal planar(d) Tetrahedral
19.	Which of the following shows only	
	(a) Butene-2 ((b) 2, 2-dimethylpropane
20.	(c) Butyne-1 (Kerosene is used as fuel because it	(d) Butanol-3 t is [CPMT 1996]
	(a) Less volatile ((b) More volatile
	(c) Cheap ((d) Abundantly available
21.	$CH_3 - CH_2 - CH_2 - CH_3 - $	$\xrightarrow{AlCl_3} \text{Product. Product in}$
	above reaction is	[RPMT 2003]
	(a) $CH_3 - CH - CH_2 - CH_3$	
	Br	
	(b) $CH_2 - CH - CH_2$	
	(b) $CH_3 - CH - CH_3$	
	CH_3	
	(c) $CH_2 - CH_2 - CH_2$	
	Br CH ₃	
	(d) All of these	
22.	Which of the following statements	
	(a) It can be chlorinated with chlorinat	[AIIMS 1996] lorine
	(b) It can be catalytically hydroge	
	(c) When oxidised produces CO	
	(d) It is a homologue of iso-butan	ne

(d) It is a homologue of iso-butane23. Petroleum refining is

- [AIIMS 1996; KCET 2004]
- (a) Distillation of petroleum to get different fractions
- (b) Obtaining aromatic compounds from aliphatic compounds present in petroleum
- $(c) \quad Cracking \ of \ petroleum \ to \ get \ gaseous \ hydrocarbons$
- (d) Purification of petroleum





	The chemical added to leade lead in the combustion chamb		(
	(a) lso-octane	[Kerala (Med.) 2003] (b) Ethylene dibromide	(
	(c) Tetraethyl lead	(d) Mercaptan	38. 1
	(e) <i>n</i> -Heptane	(d) Mercaptan	(
25.	•	the type of hydrocarbons which are	(
-0.	more desirable is	[CBSE PMT 1997; AFMC 1997]	39. 1
	(a) Branched hydrocarbon		s
	(b) Straight-chain hydrocarb	on	t
	(c) Linear unsaturated hydro	ocarbon	(
	(d) Toluene		(
26.	Which of the following is no	ot formed by the reaction of Cl_2 on	40. ŀ
	CH_4 in sunlight	[A11MS 1987]	(
			(
	(a) CHCl ₃	(b) CH_3Cl	(
	(c) CH_3CH_3	(d) $CH_3CH_2CH_3$	(
27.	Which of the following has the	0 01	41. F
		[DPMT 1986]	F
	(a) Neopentane	(b) <i>n</i> -butane	(
	(c) <i>n</i> -heptane	(d) Isobutane	(
28.	Which gives CH_4 when trea	ted with water	42. \
]	[CPMT 1974, 79; NCERT 1976; IIT-JEE 1990]	c
	(a) Silicon carbide	(b) Calcium carbide	(
	(c) Aluminium carbide	(d) Iron carbide	(
29.	Which of the following does n	ot react with PCl.	43. 1
		[CPMT 1973]	(
	(a) CH_3OH	(b) <i>CH</i> ₃ <i>COOH</i>	(44. k
			44. k (
	(c) CH_3CHO	(d) $C_2 H_6$	(
30.	Which of the following co- concentrated H_2SO_4	ompounds is insoluble even in hot [IIT-JEE 1983]	45. \
	(a) Ethylene	(b) Benzene	(
	(c) Hexane	(d) Aniline	(
31.		nagnesium bromide and ethyl alcohol	46. 1
	gives [CPMT 1979; MNR 1986; UF	· · · · ·	(
	(a) Methane	(b) Ethane	(
00	(c) Propane	(d) Butane	(
32.	Methane and ethane both can	$1 1 \cdot 1 \cdot 1 \cdot c$	-
	[CDMT 1074. A	be obtained in single step from	(
	-	AP PET 1995; AFMC 1998, 2000; BHU 2005]	-
	(a) CH_3I	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I	(47. 1
	-	AP PET 1995; AFMC 1998, 2000; BHU 2005]	(47. 7
33.	(a) CH_3I	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I	(47. 1 (
33.	 (a) CH₃I (c) CH₃OH 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH	(47. 7
33.	(a) $CH_{3}I$ (c) $CH_{3}OH$ Paraffin wax is	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH	47. 1 ((48. ()
33.	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbor 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993]	47. 1 ((48. (
33.	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbor (d) Saturated hydrocarbon 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993]	47. 7 ((48. () () () ()
33. 34.	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbor (d) Saturated hydrocarbon The number of possible enabling 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n ntiomeric pairs that can be produced	47. 7 ((48. () (((((((
	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbor (d) Saturated hydrocarbon 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n ntiomeric pairs that can be produced -methylbutane is	47. 1 ((48. () ((((((((((((
	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbor (d) Saturated hydrocarbon The number of possible enauduring monochlorination of 2- 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n ntiomeric pairs that can be produced -methylbutane is [IIT-JEE 1997]	47. 7 ((48. () (((((((
	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbor (d) Saturated hydrocarbon The number of possible enauduring monochlorination of 2- (a) 2 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n ntiomeric pairs that can be produced -methylbutane is [IIT-JEE 1997] (b) 3	47. 7 ((48. () ((((((49. N
34.	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbor (d) Saturated hydrocarbon The number of possible enauduring monochlorination of 2- (a) 2 (c) 4 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n n n n n (b) 3 (d) 1	47. 7 ((48. () (((((((49.)
	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbon (d) Saturated hydrocarbon The number of possible enauduring monochlorination of 2- (a) 2 (c) 4 Petroleum consists mainly of 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n ntiomeric pairs that can be produced -methylbutane is [IIT-JEE 1997] (b) 3 (d) 1 [CPMT 1985, 94; KCET 1991]	47. 7 ((48. () (((((((((((((((((((
34.	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbon (d) Saturated hydrocarbon The number of possible enanduring monochlorination of 2- (a) 2 (c) 4 Petroleum consists mainly of (a) Aliphatic hydrocarbons 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n n n n n (b) 3 (d) 1 [CPMT 1985, 94; KCET 1991] (b) Aromatic hydrocarbons	47. 7 ((48. () ((((((((((((((((((
34. 35.	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbon (d) Saturated hydrocarbon The number of possible enauduring monochlorination of 2- (a) 2 (c) 4 Petroleum consists mainly of 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n n n n n (b) 3 (d) 1 [CPMT 1985, 94; KCET 1991] (b) Aromatic hydrocarbons (d) None of these	47. 7 ((48. () (((((((((((((((((((
34.	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbon (d) Saturated hydrocarbon The number of possible enauduring monochlorination of 2- (a) 2 (c) 4 Petroleum consists mainly of (a) Aliphatic hydrocarbons (c) Aliphatic alcohols Petroleum ether can be used at a second second	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n n n n n (b) 3 (d) 1 [CPMT 1985, 94; KCET 1991] (b) Aromatic hydrocarbons (d) None of these	47. 7 ((48. () ((((((((((((((((((
34. 35.	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbon (d) Saturated hydrocarbon The number of possible enanduring monochlorination of 2- (a) 2 (c) 4 Petroleum consists mainly of (a) Aliphatic hydrocarbons (c) Aliphatic alcohols Petroleum ether can be used at 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n n n n n (b) 3 (d) 1 [CPMT 1985, 94; KCET 1991] (b) Aromatic hydrocarbons (d) None of these	47. 7 ((48. () (((((((((((((((((((
34. 35.	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbon (d) Saturated hydrocarbon The number of possible enanduring monochlorination of 2- (a) 2 (c) 4 Petroleum consists mainly of (a) Aliphatic hydrocarbons (c) Aliphatic alcohols Petroleum ether can be used at (a) Solvent for fat, oil, varnis 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n n n n n (b) 3 (d) 1 [CPMT 1985, 94; KCET 1991] (b) Aromatic hydrocarbons (d) None of these	47. 7 ((48. () () () () () () () () () () () () () (
34. 35.	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbon (d) Saturated hydrocarbon The number of possible enanduring monochlorination of 2- (a) 2 (c) 4 Petroleum consists mainly of (a) Aliphatic hydrocarbons (c) Aliphatic alcohols Petroleum ether can be used at (a) Solvent for fat, oil, varnis (b) As a fuel 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n n n n n (b) 3 (d) 1 [CPMT 1985, 94; KCET 1991] (b) Aromatic hydrocarbons (d) None of these	47. 7 ((48. () ((((((((((((((((((
34. 35.	 (a) CH₃I (c) CH₃OH Paraffin wax is (a) Ester (b) Alcohol (c) Unsaturated hydrocarbon (d) Saturated hydrocarbon The number of possible enanduring monochlorination of 2- (a) 2 (c) 4 Petroleum consists mainly of (a) Aliphatic hydrocarbons (c) Aliphatic alcohols Petroleum ether can be used at (a) Solvent for fat, oil, varnis (b) As a fuel (c) Both (a) and (b) 	AP PET 1995; AFMC 1998, 2000; BHU 2005] (b) C_2H_5I (d) C_2H_5OH [MP PMT 1986; CPMT 1993] n n n n n n n n n n n n n	47. 7 ((48. () ((((((((((((((((((

			[MNR 1987; UPSEAT 2002]
	(a) Synthetic dyes	(b)	Drugs
	(c) Perfumes	(d)	All the three
38.	In alkanes, the bond angle is		[MP PMT 1989; BHU 1996]
	(a) 109.5°	(b)	109°
	(c) 120°	(d)	180°
39.	In the preparation of alkanes; a		
	sodium or potassium salts of sat	urate	d carboxylic acid are subjected
	to [CPMT 1985; MP PET 1999] (a) Hydrolysis	(b)	Oxidation
	(c) Hydrogenation	(d)	Electrolysis
40.	Halogenation of alkanes is an exa	· · ·	
	C C	•	[MP PET 1993; KCET 1998]
	(a) Electrophilic substitution		
	(b) Nucleophilic substitution		
	(c) Free-radical substitution(d) Oxidation		
41.	Propionic acid is subjected to re	ductio	on with hydroiodic acid in the
•	presence of a little P, the product		
			[JIPMER 1997]
	(a) Ethane	• •	Propane None of these
42.	(c) Butane When ethyl iodide and propyl io	• •	
	of ether, they form	anae	[BHU 1997]
	(a) One alkane	(b)	Two alkanes
	(c) Four alkanes	(d)	Three alkanes
43.	The alkane that yields two isomer		
	(a) Neopentane(c) Methane	(b) (d)	Ethane Propane
44.	Kerosene is a mixture of	(u)	[CPMT 1979; AFMC 1992]
	(a) Alkanes	(b)	Aromatic compounds
	(c) Alcohols	(d)	Aliphatic acids
45.	When petroleum is heated the va	pours	s contain mainly
	I	P	-
			[CPMT 1981]
	(a) Kerosene (c) Diesel	(b) (d)	-
46.	(a) Kerosene	(b)	[CPMT 1981] Petroleum ether
	(a) Kerosene(c) Diesel	(b) (d)	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972]
	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petro 	(b) (d) ostanc	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees
	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petro (c) To increase boiling point of 	(b) (d) ostanc	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees
46.	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petro (c) To increase boiling point of (d) As an antiknock 	(b) (d) ostanc	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ses
	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petro (c) To increase boiling point of 	(b) (d) ostanc	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees [NCERT 1976, 79; DPMT 1984;
46.	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petro (c) To increase boiling point of (d) As an antiknock Tetraethyl lead is used as 	(b) (d) ostanc ol petro	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees [NCERT 1976, 79; DPMT 1984; CPMT 1989, 91; BHU 1995]
46.	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petro (c) To increase boiling point of (d) As an antiknock 	(b) (d) ostanc	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees [NCERT 1976, 79; DPMT 1984;
46.	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petro (c) To increase boiling point of (d) As an antiknock Tetraethyl lead is used as (a) Fire extinguisher 	(b) (d) ostanc ol petro (b) (d)	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees [NCERT 1976, 79; DPMT 1984; CPMT 1989, 91; BHU 1995] Pain reliever Mosquito repellent
46. 47.	 (a) Kerosene (c) Diesel lso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petro (c) To increase boiling point of (d) As an antiknock Tetraethyl lead is used as (a) Fire extinguisher (c) Petroleum additive 	(b) (d) ostanc ol petro (b) (d)	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees [NCERT 1976, 79; DPMT 1984; CPMT 1989, 91; BHU 1995] Pain reliever Mosquito repellent
46. 47.	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petrol (c) To increase boiling point of (d) As an antiknock Tetraethyl lead is used as (a) Fire extinguisher (c) Petroleum additive Cyclohexane, a hydrocarbon float (a) It is immiscible with water 	(b) (d) sstance l petro (b) (d) s on y	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees [NCERT 1976, 79; DPMT 1984; CPMT 1989, 91; BHU 1995] Pain reliever Mosquito repellent water because [NCERT 1976]
46. 47.	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petrol (c) To increase boiling point of (d) As an antiknock Tetraethyl lead is used as (a) Fire extinguisher (c) Petroleum additive Cyclohexane, a hydrocarbon float (a) It is immiscible with water (b) Its density is low as compared 	(b) (d) sstance l petro (b) (d) s on y	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees [NCERT 1976, 79; DPMT 1984; CPMT 1989, 91; BHU 1995] Pain reliever Mosquito repellent water because [NCERT 1976]
46. 47.	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petrol (c) To increase boiling point of (d) As an antiknock Tetraethyl lead is used as (a) Fire extinguisher (c) Petroleum additive Cyclohexane, a hydrocarbon float (a) It is immiscible with water (b) Its density is low as comparised 	(b) (d) sstanc ol petro (b) (d) s on y ed to	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees [NCERT 1976, 79; DPMT 1984; CPMT 1989, 91; BHU 1995] Pain reliever Mosquito repellent water because [NCERT 1976]
46. 47. 48.	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petrol (c) To increase boiling point of (d) As an antiknock Tetraethyl lead is used as (a) Fire extinguisher (c) Petroleum additive Cyclohexane, a hydrocarbon float (a) It is immiscible with water (b) Its density is low as comparised (c) It is inmiscible and lighter 	(b) (d) sstanc ol petro (b) (d) s on y ed to	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees [NCERT 1976, 79; DPMT 1984; CPMT 1989, 91; BHU 1995] Pain reliever Mosquito repellent water because [NCERT 1976]
46. 47.	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petrol (c) To increase boiling point of (d) As an antiknock Tetraethyl lead is used as (a) Fire extinguisher (c) Petroleum additive Cyclohexane, a hydrocarbon float (a) It is immiscible with water (b) Its density is low as comparised (c) It is inmiscible and lighter to Natural gas contains mainly 	(b) (d) stanc ol petro (b) (d) s on y ed to	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees [NCERT 1976, 79; DPMT 1984; CPMT 1989, 91; BHU 1995] Pain reliever Mosquito repellent water because [NCERT 1976]
46. 47. 48.	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petrol (c) To increase boiling point of (d) As an antiknock Tetraethyl lead is used as (a) Fire extinguisher (c) Petroleum additive Cyclohexane, a hydrocarbon float (a) It is immiscible with water (b) Its density is low as comparised (d) It is immiscible and lighter Natural gas contains mainly 	(b) (d) ostanc ol petro (b) (d) s on than v	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees [NCERT 1976, 79; DPMT 1984; CPMT 1989, 91; BHU 1995] Pain reliever Mosquito repellent water because [NCERT 1976] water T 1999, 2000, 01, 02; BCECE 2005]
46. 47. 48.	 (a) Kerosene (c) Diesel Iso-octane is mixed to the petrol (a) To precipitate inorganic sub (b) To prevent freezing of petrol (c) To increase boiling point of (d) As an antiknock Tetraethyl lead is used as (a) Fire extinguisher (c) Petroleum additive Cyclohexane, a hydrocarbon float (a) It is immiscible with water (b) Its density is low as comparised (c) It is inmiscible and lighter to Natural gas contains mainly 	(b) (d) stanc ol petro (b) (d) s on y ed to	[CPMT 1981] Petroleum ether Machine oil [NCERT 1972] ees [NCERT 1976, 79; DPMT 1984; CPMT 1989, 91; BHU 1995] Pain reliever Mosquito repellent water because [NCERT 1976]
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52.	The organic compound used as antiknock agent in petroleum is[DCE 199	99; CPMT	2 2(90); P&cCByTe2000 (b) Propene
	MP PET 2001]		(c) Ethane (d) Propyne
	(a) $(C_2H_5)_4Pb$ (b) <i>TNT</i>	66.	Anhydrous sodium acetate on heating with sodalime gives
	(c) CH_3MgBr (d) $(C_2H_5)_2Hg$		[CPMT 1972, 84; Pb. CET 2001, 2003] (a) Acetic acid (b) Methane
53.	In catalytic reduction of hydrocarbons which catalyst is mostly used		(c) Calicity (d) Ethane
55.	(a) Pt /Ni (b) Pd	67.	Water gas is [CPMT 1993, 2004; Pb. PMT 2004]
		-,.	(a) $CO + CO_2$ (b) $CO + N_2$
54.	Ethylene reacts with bromine to form [MP PET 2001]		(c) $CO + H_2$ (d) $CO + N_2 + H_2$
	(a) $Br - CH_2 - CH_3$ (b) $CH_3 - CBr_3$	68.	A sample of gasoline contains 81% <i>iso</i> -octane and 19% <i>n</i> -heptane. Its octane number will be [MP PMT 1995]
	(c) $Br - CH_2 - CH_2Br$ (d) $CHBr_3$		octane number will be [MP PMT 1995] (a) 19 (b) 81
55.	Gasoline is obtained from crude petroleum oil by its		(a) 19 (b) 61 (c) 100 (d) 62
	[MP PMT 1999]	69.	The natural petroleum contains [MP PMT 1995]
	(a) Fractional distillation (b) Vacuum distillation	-	(a) Saturated hydrocarbons
	(c) Steam distillation (d) Pyrolysis		(b) Cyclic saturated hydrocarbons
56.	Which of the following does not give alkane		(c) Compounds of sulphur
	[MP PMT 1999]		(d) All of these
	(a) Reaction of CH_3I with Na in ether	70.	The preparation of ethane by electrolysis of aqueous solution of
	(b) Reaction of sodium acetate with sodalime		potassium acetate is called as [MP PMT 1995]
	(c) Electrolysis of concentrated sodium acetate solution		(a) Wurtz reaction
	(d) Reaction of ethyl chloride with alco. KOH		(b) Sabatier-Senderen's reaction
57.	<i>LPG</i> is a mixture of [MP PMT 1999; KCET 2005]		(c) Kolbe's synthesis
	(a) $C_6H_{12} + C_6H_6$ (b) $C_4H_{10} + C_3H_8$		(d) Grignard reaction
	(c) $C_2H_4 + C_2H_2$ (d) $C_2H_4 + CH_4$	71.	Action of hydrogen chloride on $CH_3 - C = CH_2$ and on
~0			CH ₃
58.	Carbon black, which is used in making printer's ink, is obtained by decomposition of [MP PET 1993]		$CH \equiv CH$ will predominantly give the compounds, respectively
	(a) Acetylene (b) Benzene		(a) $CH_3 - CH = CH_2Cl$ and $CH_2Cl - CH_2Cl$
	(c) Carbon tetrachloride (d) Methane		
59.	The addition of tetraethyl lead to petrol [MP PET 1993]		CH_3
	(a) Lowers its octane number		(b) $CH_3 - CCl = CH_3$ and $CH_3 - CHCl_2$
	(b) Raises its octane number		
	(c) May raise or lower the octane number		CH ₃
	(d) Has no effect on octane number		(c) $CH_3 - CH = CH_2Cl$ and $CH_3 - CHCl_2$
60.	Which of the following compound has maximum boiling point[IIT-JEE 19	82; MP P	MT 1986; CH_3
	MADT Bihar 1995; Pb. PMT 1999]		5
	(a) <i>n</i> -hexane (b) <i>n</i> -pentane		(d) $CH_3 - CH = CH_3$ and $CH_2Cl - CH_2Cl$
	(c) 2, 2-dimethyl propane (d) 2-methyl butane		CH_3
61.	Knocking sound occurs in engine when fuel [CPMT 1981]	72.	As the number of carbon atoms in a chain increases the boiling
	(a) Ignites slowly		point of alkanes [AFMC 1989]
	(b) Ignites rapidly		(a) Increases
	(c) Contains water		(b) Decreases
60	(d) Is mixed with machine oil		(c) Remains same
62.	Petroleum is mainly a mixture of [CPMT 1984; Pb. PMT 1999]		(d) May increase or decrease
	(a) Alkanes (b) Cyclohexane	73.	In the fractional distillation of crude petroleum
	(c) Benzenoid hydrocarbons (d) Alkenes		[Roorkee 1989]
63.	Which of the following has maximum boiling point		(a) Petrol condenses at the bottom of the column
	[IIT-JEE 1986; MP PMT 1986; CPMT 1989]		(b) The gases condense at the top of the column
	(a) <i>iso</i> -octane		(c) High boiling constituents condense at the bottom of the column
	(b) <i>n</i> -octane		(d) High boiling constituents condense at the top of the column
	(c) 2, 2, 3, 3-tetramethyl butane	74.	Which of the following is not an endothermic reaction
	(d) <i>n</i> -butane		[] & K 2005]
64.	Aqueous solution of the following compound on electrolysis gives		(a) Dehydrogenation
	ethane		(b) Ethane to ethene
	[NCERT 1983; MP PET 1985; CPMT 1975, 79] (a) Acetic acid (b) Acetamide		(c) Combustion of propane
	(a) Acetic acid (b) Acetamide (c) Potassium acetate (d) Ethyl acetate		(d) Change of chlorine molecule into chlorine atoms.
65.	Which of the following does not decolourise bromine solution in	75.	Gasoline is the name of [Roorkee 1989]
-0.	carbon disulphide [MP PET 1986]		(a) Crude oil

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	(b) The gaseous constituents of petroleum		(a) Kekule (b) Le Bell and Van't Hoff
	(c) The mixture of uncondensed gases produced in the distillation		(c) Pauling (d) Armstrong and Bayer
	of crude oil	86.	Formation of alkane by the action of Zn on alkyl halide is called [DPMT 19
	(d) The mixture of the residue and gas oil obtained in the distillation of crude oil		(a) Frankland's reaction (b) Wurtz reaction
76.	In the process of cracking [Roorkee 1989]	•	(c) Cannizzaro reaction (d) Kolbe's reaction
,	(a) Organic compounds decompose into their constituent elements	87.	Which of the following compounds will form a hydrocarbon on reaction with Grignard reagent [CPMT 1988, 93]
	(b) Hydrocarbons decompose into carbon and hydrogen(c) High molecular weight organic compounds decompose to give		(a) CH_3CH_2OH (b) CH_3CHO
	low molecular weight organic compounds		(c) CH_3COCH_3 (d) $CH_3CO_2CH_2$
	(d) Hydrocarbons yield alkyl radicals and hydrogen	88.	Name the hydrocarbon that is a liquid at STP
7.	Octane number has 0 value for		(a) Ethane (b) Propane
	[Roorkee 1989; MP PET 1999, 2002; MP PMT 2001; KCET 2002]		(c) n-butane (d) <i>n</i> -pentane
	(a) iso-octane (b) <i>n</i> -hexane	89.	Which statement is not true concerning alkanes
	(c) <i>n</i> -heptane (d) iso-heptane		[MP PET 2003]
	Dry distillation of sodium propanoate with sodalime gives		(a) Large number alkanes are soluble in water
•	[CPMT 1996]		(b) All alkanes have a lower density than water
	(a) Propane (b) Propene		(c) At room temperature some alkanes are liquids, some solids and some gases
	(c) Ethane (d) Ethene		(d) All alkanes burn
•	What is the chief product obtained when <i>n</i> -butane is treated with	90.	Fischer Tropsch process is used for the manufacture of
	bromine in the presence of light at $130^{\circ} C$		[DCE 1999; MP PET 2003]
	[11T-JEE 1995]		(a) Synthetic petrol (b) Thermosetting plastics
	(a) $CH_3 - CH_2 - CH - Br$		(c) Ethanol (d) Benzene
	CH ₃	91.	Which one of the following compounds cannot be prepared by Wurtz reaction [Kurukshetra CEE 2002;
	(b) $CH_3 - CH - CH_2 - Br$		MP PMT 2002; MP PET 2003]
	CH ₃		(a) CH_4 (b) C_2H_6
	CH ₃		(c) $C_3 H_8$ (d) $C_4 H_{10}$
		92.	A fuel contains 25 % <i>n</i> -heptane and 75 % iso-octane. Its octane
	(c) $CH_3 - C - Br$		number is [MP PMT 1993; MP PET 1994]
	CH ₃		(a) 50 (b) 75
	(d) $CH_3 - CH_2 - CH_2 - CH_2 - Br$		$ \begin{array}{ccc} (c) & 100 \\ c & (d) & 25 \\ c & (c) & (c) & (c) \\ c &$
	A mixture of propene and methane is obtained by the cracking of	93.	Sodium ethoxide is a specific reagent for [CPMT 1985]
	(a) 1-butene (b) 2-butene		(a) Dehydration
	(c) <i>n</i> -butane (d) Isobutane		(b) Dehydrogenation
	Which of the following fractions of petroleum refining contains		(c) Dehydrohalogenation
	kerosene ? (Boiling ranges in ^{o}C are given below)		(d) Dehalogenation
	(a) 40 - 80 (b) 80 - 200	94.	Which of the following has highest percentage of hydrogen [CPMT 1975; 79]
	(c) 200 - 300 (d) Above 300 Which of the following statements is incorrect ? The members of		(a) CH_4 (b) C_2H_4
	the homologous series of alkanes		(c) $C_6 H_6$ (d) $C_2 H_2$
	(a) Are all straight chain compounds	95.	What is the molecular formula of the alkane, the 5.6 <i>litre</i> of which weight 11 g at STP [MP PMT 2003]
	(b) Have the general formula $C_n H_{2n+2}$		(a) $C_6 H_{14}$ (b) $C_4 H_{10}$
	(c) Have similar chemical properties		(c) $C_3 H_8$ (d) $C_2 H_6$
	(d) Show a regular gradation of physical properties	-	
	On mixing tetraethyl lead to gasoline available at petrol pumps (a) Calorific value of the fuel increases	96.	The ref ceptife 1981 ppound `iso-octane' which is used in determining the octane number of gasoline has the structure
	(b) Odour diminishes		(a) $CH_3 - CH(CH_3) - CH(CH_3) - CH(CH_3) - CH_3$
	(c) Less smoke is obtained on combustion		(b) $CH_3 - C(CH_3)_2 - CH_2 - CH(CH_3) - CH_3$
	(d) Antiknock property of fuel increases		
	A liquid hydrocarbon can be converted to gaseous hydrocarbon by [CPM	IT 1980; N	AP (RMT 2001] ₃ - $C(CH_3)_2 - CH(CH_3) - CH_2 - CH_3$
	(a) Cracking		(d) $CH_3 - C(CH_3)_2 - C(CH_3)_2 - CH_3$
	(b) Hydrolysis	97	Sample of 2 3-dibromo-3-methylpentane is heated with zinc dust
		ur7.	adjudie of A. 3-ODFOIDO-3-IDEDIVIDENTABLE IS DESTED with zine dust

Sample of 2, 3-dibromo-3-methylpentane is heated with zinc dust. 97. The resulting product is isolated and heated with HI in the presence of phosphorus. Indicate which is the structure that represent the final organic product formed in the reaction

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(d) Distillation under reduced pressure

The tetrahedral nature of carbon was first given by

[MP PMT 1994]

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(c) Oxidation

85.

(a)
$$CH_1 = CH = CH_2 - CH_1$$
 CH_1 CH

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20.		f the following is not link			132.	B.P. of branched chain alkanes a are [MP PMT 1987; AlIMS 1999]	s com	pared to straight	chain alkanes
	(a) Mar			Natural gas		(a) Lower			
	. ,	ducer gas	• • •	Coal gas		(b) Equal			
21.	Which of	f the following has highes	st oct						
				[MP PET 1996]					
	(a) <i>n-</i> he	2xane			100		- anta		
	(b) <i>n-</i> he	eptane			133.	Daily use candles (paraffin wax)		in	[CPMT 1996]
	(c) <i>lso-</i> c	octane				(a) Higher saturated hydrocart			
	(d) <i>n</i> -he	eptane and iso-octane mi	ixed i	n ratio 50 : 50		(b) Lower saturated hydrocarb			
22.	()	•		yl iodide is subjected to Wurtz		(c) Higher unsaturated hydroca	arbon		
-		The hydrocarbon that w				(d) Lower unsaturated hydroca	irbon		
				[IIT-JEE (Screening) 1990]	134.	The reaction $CH_4 + Cl_2 -$	uv lig	$\xrightarrow{\text{ght}} CH_2Cl + F$	<i>HCL</i> is an
	(a) <i>n</i> -bu	utane	(b)	<i>n</i> -propane	·•• .			-	_
	(c) <i>n</i> -pe	entane	(d)	<i>n</i> -hexane		example of		[CBSE P/	MT 1999, 2002]
23.		the hydrocarbons from p				(a) Addition reactions	(b)	Substitution rea	action
., ب	11032 -	le nyurocureone	CLI 2.	[CPMT 1974, 80]		(c) Elimination reaction	(d)	Rearrangement	reaction
	() F ra(· 1.1	(L)	• •	135.	Normal butane convert into isob	• • •		[RPMT 2002]
		ctional distillation		Fractional crystallization	100-		(1)	5	[
	· ·	porization	• • •	Polymerization		(a) $LiAlH_4$	(b)	AlCl ₃	
24.				oound or Which one of the		(c) $NaBH_4$	(d)	Zn/HCl	
	following	substances is used as an		•	136.	Alcoholic solution of <i>KOH</i> is use	d for		
		[CPMT 1974, 81,	, 99, 2 [,]	2000;RPMT 2002; CBSE PMT 1996;	130.	Alcoholic solution of Action and act	20.101	CPMT 1082. 8	11T IEE 1000]
		KCET ((Med.)	.) 2000 MP PET 1985, 87, 97, 2001;		() <u>p11</u>	(L)	-	36; 11T-JEE 1990]
				MP PMT 1994, 96; A11MS 2000]		(a) Dehydration	• • •	Dehydrogenatio	
	(a) Lead	d tetrachloride	(b)	Lead acetate		(c) Dehydrohalogenation	• • •	Dehalogenation	
	· · ·	c ethyl		Tetraethyl lead (TEL)	137.	Aluminium carbide on reacting	with w	U	_
~ K	()	,	• • •	pane, mixture of products are					1; MP PET 1985]
25.		Chlorination reaction of . How many isomers, the	• •			(a) Methane [Orissa JEE 2003]	(b)	Ethane	
		How many isomers, e.e.	(1)			(c) Ethene	(d)	Ethyne	
	(a) 2		• • •	-	138.	Maximum carbon-carbon bond o	distanc	ce is found in	
	(c) 4		(d)		-			1987; 11T-JEE 1981; B	Sihar MEE 1995]
26.				gives open chain compound,		(a) Ethyne	(b)	Ethene	
	when rea	acts with bromine	[Oris	issa JEE 2003]		(c) Ethane	(d)	Benzene	
	(a) Cycl	lopropane	(b)	Cyclopentane	139.	Which of the following react	()		andily give a
	., .	lohexane	• • •		1051	hydrocarbon product in good yie		[CBSE PMT 1997]	
27.			• • •	aqueous medium but prepared;		Ovidation Electric		• •	J
- ,.	0	medium because the reag		ducous meatures i i				>	
) -	[KCET 2002]		(b) $RCOOAg \xrightarrow{I_2} \rightarrow$			
	(a) Read	cts with water							
	(-)	nsoluble in water				(c) $CH_3 - CH_3 \xrightarrow{Cl_2}_{hv}$			
	()	ighly reactive in ether							
	()	omes inactive in water				(d) $(CH_3)_2 CCl - \frac{C_2H_5OH}{C_2H_5OH}$	>		
28.			- of	30% <i>n</i> -heptane and 70% <i>iso</i> -	140.	Out of the following fractions	•		U
20.	•	e of petrol is a mixture The sample has octane nu		•		lowest boiling point is or Wh	ich of	f the following is	is obtained at
	000000	le sumple nus comes	ine.	[MP PET 1985]		lowest temperature by fractional	l distil	lation of petroleu	m[MP PMT 1993; M
	(a) 30		(b)			(a) Kerosene	(b)	Diesel oil	
			(d)			(c) Gasoline	(d)	Heavy oil	
20	(c) 15 For the r		• • •	35 ocarbon, the appropriate agent	141.	The marsh gas detector used by	miner	rs works on the p	orinciple of
29.	For the r	eduction of ketones to a	nyaro	ocarbon, the appropriate agent [DPMT 2002]		(a) Difference in the rates of d			-
			(1)			(b) Avogadro's hypothesis		U	
	(a) <i>HI</i>		(b)	Zn - Hg/HCl		(c) Gay-Lussac's law of gaseous	s volu	mes	
	(c) Red	phosphorous	(d)	H_2SO_4		(d) Berzelius hypothesis	0.1		
30.	Heating	of alkanes with fuming		phuric acid or oleum at high	142.	Methane can be prepared by			[DCE 2001]
30.	•	ure, which forms sulpho			144.		(h)	Deserbourdation	
	Concession Provide Pro	пер плен техни т		[MH CET 1999]			(b)	5	1
	(a) Nitra	ration	(b)			(c) Hydrogenation reaction	(d)	All of these	·
		phonation			143.	The most strained cycloalkane is		-	[IIT-JEE 1981]
	•		(d)			(a) Cyclopropane	(b)	Cyclobutane	
	Propane 1	is obtained from propend	e by v			(c) Cyclopentane	(d)	Cyclohexane	
131.				[CPMT 1997; CBSE PMT 2001;	144.	Which does not react with chlor	ine in	dark	[Pb. PMT 2000]
31.								~	
31.		· · · · ··	41 \	AFMC 2001; MH CET 2001]		(a) C_2H_4	(b)	C_2H_2	
31.		alyst hydrogenation nydrogenation	(b) (d)	· · · · · ·		(a) C_2H_4 (c) CH_4	(b) (d)	2 2	

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145.	Main constituent of <i>marsh gas</i> is	3	
	-	IIT-JEE 1980; MP PMT 1994; AFMC 199	7]
	(a) C_2H_2	(b) CH_4	
	(c) H_2S	(d) <i>CO</i>	
146.		can be used for the preparation	of
	methane	(L) 1/-11	
	(a) Wurtz reaction(c) Reduction of alkyl halide	(b) Kolbe's reaction (d) Hydrogenation of alkene	
147.	Which hydrocarbon will be most		
		[MP PET 2000, 0	3]
	(a) Methane	(b) Ethane	
148.	(c) Propane<i>C-H</i> bond length is greatest in	(d) Butane	
		[11T-JEE 1989; MNR 1990; AMU 200	2]
	(a) C_2H_2	(b) $C_2 H_4$	
	(c) C_2H_6	(d) $C_2H_2Br_2$	
149.	Which one of the following comp	pounds does not form an ozonide	
	(a) Ethene	(b) Propyne	
	(c) Propene	(d) Propane	
150.	Which type of hybridisation occur [CBSE P	irs in ethylene PMT 1991; Bihar MEE 1996; JIPMER 199	7]
	(a) <i>sp</i>	(b) sp^2	• 1
	(c) sp^3	(d) sp^3d	
151.	Silver acetylide when heated with		
	(a) C_2H_2	(b) H_2	
	(c) $C_2 H_4$	(d) None of these	
152.	., 2 4	yl iodide, which of the followir	ıg
	hydrocarbons is produced	[NCERT 1984; BHU 198	-1
	(a) Methane	(b) Ethane	4]
	(c) Butane	(d) Ethene	- 1
153.	Solid methane is (a) Molecular solid	[DPMT 1983; CBSE PMT 198 (b) lonic solid	9]
	(c) Covalent solid	(d) Not possible	
154.	The shape of ethane is	(b) Tetrahedral	5]
	(a) Triangular (c) Linear	(d) None of these	
155.	CH_3MgI will give methane wit	ith [Roorkee 199	5]
	(a) C_2H_5OH	(b) $CH_3 - CH_2 - NH_2$	
	(c) $CH_3 - CO - CH_3$	(d) All of these	
156.	Propane-1-ol can be prepared from	om propene by its reaction with	
	(a) CH_3COOH	(b) H_3BO_3	
	(c) B_2H_6 / NaOH, H_2O_2		
157.	The process in which higher hy lower hydrocarbons by controlled	ydrocarbons are broken down in d pyrahvia is called	to
	lower hydrocarbons by controlled	[MP PMT 200	2]
	(a) Hydrolysis	(b) Cracking	
158.	(c) Oxidation Successive alkanes differ by	(d) Reduction [MP PMT 200	2]
	(a) $> CH_2$	(b) > <i>CH</i>	-1
	(c) $-CH_3$	(d) $C_2 H_4$	
159.	General formula of alkane is		
		[EAMCET 1979; Manipal MEE 199	5]
	(a) $C_n H_{2n+2}$	(b) $C_n H_{2n-1}$	
16.0	(c) $C_n H_{2n}$	(d) $C_n H_{2n+1}$	- r
160.	Methane and ethane both can be the following compound	e prepared in one step by which [BHU 200	-
	(a) C_2H_4	(b) <i>CH</i> ₃ <i>O</i>	- 4
		· -	

	(c) CH_3Br	(d)	CH ₃ CH ₂ OH
161.	Photochemical chlorination of all		
	(a) Pyrolysis		Substitution
	(c) Cracking	(d)	Peroxidation
	(e) Homolysis	1.	
162.	A petroleum fraction having boi 6-10 carbon atoms per molecule		
	o to carbon acomo per molecule	io cunc	[UPSEAT 2004]
	(a) Natural gas		Gas oil
163.	(c) Gasoline Producer gas is a mixture of	(d)	Kerosene
103.	rioducer gas is a mixture of		[Pb. CET 2002; UPSEAT 2004]
	(a) CO and N_2	(b)	CO_2 and H_2
	(c) N_2 and O_2	(d)	CH_4 and N_2
164.	The highest boiling point is expe		
	(a) n – butane		
	(b) iso-octane		
	(c) <i>n</i> – octane (d) 2, 15,5 CET al 927 by butane		
165.	Which of the following is a good	condu	ctor of heat of electricity
	(a) Diamond		Graphite
	(c) Anthracite	· · ·	Charcoal
166.	Which one of the following has t	ne mir	AIEEE 2004]
	(a) 1-Butene	(b)	1-Butyne
	(c) n-Butane	• •	Isobutane
167.	Octane number can be changed (a) Isomerisation		[AFMC 2004] Alkylation
	(c) Cyclisation		All of these
168.	Gasoline has composition		[AFMC 2004]
	(a) $C_8 - C_{12}$	(b)	$C_2 - C_5$
	(c) $C_6 - C_{11}$	(d)	None of these
169.	The complete combustion of Cl	H_4 giv	es [BHU 2004]
	(a) $CO + H_2$	(b)	$CO + N_2$
	(c) $CO_2 + H_2O$	(d)	$CO + N_2O$
170.	Which of the following has high	est kno	cking
	() of C		[UPSEAT 2004]
	(a) Olefins (b) Branched chain olefins		
	(c) Straight chain olefins		
	(d) Aromatic hydrocarbons		
171.	Which one of the following com		s gives methane on treatment Kerala PMT 2004; MH CET 2004]
	with wቒ ፟፟ዀ፝ PMT 2003] (a) Al_4C_3	(b)	CaC_2
	(c) VC	(d)	2
	(e) B_4C	(u)	sie
172.	Pick out the alkane which diffe	rs from	n the other members of the
-	group.		[KCET 2004]
	(a) 2,2-dimethyl propane(b) Pentane		
	(c) 2-methyl butane		
	(d) 2,2-dimethyl butane		
173.	2-Methylbutane on reacting v sunlight gives mainly	vith b	romine in the presence of [AIEEE 2005]
	(a) 1-bromo-2-methylbutane		
	(b) 2-bromo-2-methylbutane		
	(c) 2-bromo-3-methylbutane(d) 1-bromo-3-methylbutane		
174.	Of the five isomeric hexanes,	the i	somer which can give two
	monochlorinated compounds is		[AIEEE 2005]
	(a) <i>n</i> -hexane (b) 2, 3-dimethylbutane		

(b) 2, 3-dimethylbutane

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- (c) 2, 2-dimethylbutane
- (d) 2-methylpentane
- **175.** The product obtained on reaction of C_2H_5Cl with hydrogen over palladium carbon is [AFMC 2005]
 - (a) C_3H_8 (b) C_4H_{10} (c) C_2H_6 (d) C_2H_4

Alkene

- 1. Addition of bromine to 1, 3-butadiene gives
 [CPMT 1987, 93]
 - (a) 1, 2 addition product only
 - (b) 1, 4 addition product only
 - (c) Both 1, 2 and 1, 4 addition products
 - $(d) \quad \text{No reaction} \quad$

2. When ethylene bromide is treated with Zn, we get

- [RPMT 1997] (a) Alkane (b) Alkene
- (c) Alkyne (d) All
- **3.** Ethene when treated with Br_2 in the presence of CCl_4 which compound is formed

[RPMT 1997; DCE 2001; KCET (Med.) 1999]

CU

- (a) 1, 2-dibromoethane(b) 1-bromo-2-chloroethane
- (c) Both (a) and (b)
- (d) 1, 1, 1-tribromoethane
- 4. In a read

$$CH_2 = CH_2 \xrightarrow{\text{Hypochloro us}} M \xrightarrow{R} |$$

 $acid \xrightarrow{R} |$

Where M = molecule; R = reagent M and R are [CBSE PMT 1997; CPMT 2001]

- (a) CH_3CH_2Cl and NaOH
- (b) $CH_2Cl CH_2OH$ and aq. $NaHCO_3$
- (c) CH_3CH_2OH and HCl
- (d) $CH_2 = CH_2$ and heat

5. Alkenes usually show which type of reaction

- [AllMS 1999; MADT Bihar 1980] Addition (b) Substitution
- (a) Addition(b) Substitution(c) Elimination(d) Superposition
- The propene reacts with *HBr* to form

[AIIMS 1999; RPET 1999]

[RPET 1999]

- (a) Ethane (b) Hexane
- (c) 1-bromo-propane (d) 2-bromo propane Ethylene may be obtained by dehydration of which of the following
- with concentrated H_2SO_4 at $160 170^{\circ}C$

(a) C_2H_5OH (b) CH_3OH

(c)
$$CH_3CH_2CH_2OH$$
 (d) $(CH_3)_2CHCH_2OH$

$$H_{3}C$$

$$H_{3}C$$

$$CH_{3}$$

$$KOH (heat)$$

$$CH_{3}$$

(a) HNO_3 (b) O_2 (c) O_3 (d) $KMnO_4$

9.

The disappearance of the characteristic purple colour of $KMnO_4$ in its reaction with an alkene is the test for unsaturation. It is known as

[CPMT 1989, 94; CBSE PMT 1990]

[KCET 2003]

[CPMT 2003]

- (a) Markownikoff's test (b) Baeyer's test
- (c) Wurtz's test (d) Grignard test
- 10. A gas formed by the action of alcoholic KOH on ethyl iodide, decolourises alkaline $KMnO_4$. The gas is
 - (a) C_2H_6 (b) CH_4
 - (c) $C_2 H_2$ (d) $C_2 H_4$

11. $CH_3 - CH_2 - Cl \xrightarrow{alc.KOH} A$, the product is

(a) CH_3CH_2OK (b) CH_3CHO

(c)
$$CH_3CH_2OCH_2CH_3$$
 (d) $CH_2 = CH_2$

- The final product formed when ethyl bromide is treated with excess of alcoholic *KOH* is [MP PET 1999]
 - (a) Ethylene(b) Ethane(c) Ethyne(d) Vinyl bromide
- **13.** Which of the following hydrocarbons cannot be obtained by Sabatier and Senderen's reaction

(a)
$$CH_4$$
 (b) C_2H_6

(c)
$$C_3 H_8$$
 (d) All

- 14. When 3, 3-dimethyl-2-butanol is heated with H_2SO_4 the major product obtained is [CBSE PMT 1995]
 - (a) *cis* and *trans* isomers of 2, 3-dimethyl-2-butene
 - (b) 3, 3-dimethyl-1-butene
 - (c) 2, 3-dimethyl-2-butene
 - (d) 2, 3-dimethyl-1-butene
- The intermediate during the addition of *HCl* to propene in the presence of peroxide is [IIT-JEE 1997]

(a)
$$CH_3 CHCH_2 Cl$$
 (b) $CH_3 CHCH_3$

(c)
$$CH_3CH_2CH_2$$
 (d) $CH_3CH_2CH_2$

16. $CH_2 = CH_2 \xrightarrow{KMnO_4} X$. Product 'X in above reaction is

[RPMT 2003]

(a)	Ethylene glycol	(b)	Glucose
(c)	Ethanol	(d)	All of these

17. Which of the following compounds represents acrylonitrile

- [JIPMER 1997] (a) Vinyl cyanide (b) Cyanoethene
- (c) Prop-2-ene nitrile (d) All of them
- When acetylene reacts with arsenic trichloride in the presence of anhydrous aluminium chloride, it produces
 [AFMC 1999]
 - (a) Lewisite
 - (b) β -chlorovinyl dichloroarisine
 - (c) Nitrobenzene
 - (d) Both (a) and (b)
 - Ozonolysis of which one of the following will give two molecules of acetaldehyde

19.



8.

6.

7.

	[Bihar MEE 1997; MP PET 2000] (a) 1-butene (b) 2-butene
	(c) 1-pentene (d) 2-pentene
20.	(e) None of these In which of the following, addition of HBr does not take place
20.	against Markownikoff's rule or Anti-Markownikoff addition of <i>HBr</i> is not observed for
	[IIT-JEE 1985; CBSE PMT 1994; MADT Bihar 1995; MP PMT 1999; AMU 2002]
	(a) Propene (b) But-1-ene
	(c) But-2-ene (d) Pent-2-ene
21.	Which one of the following characteristics apply to both ethene and ethyne [NCERT 1990]
	(a) Explode when mixed with chlorine
	(b) Decolourise Baeyer's reagent giving brown precipitate (c) Rapidly absorbed by cold conc. H_2SO_4
	(d) Form white precipitate with silver nitrate solution
22.	Which of the following has highest knocking property
	(a) Aromatic hydrocarbons(b) Olefins
	(c) Branched chain paraffins
	(d) Straight chain paraffins
23.	Dilute aqueous KMnO_4 , at room temperature reacts with
	R - CH = CH - R to give [Roorkee 1992] (a) $R - CHO$ (b) $R - COOH$
	(a) $n = CHO$ (b) $n = COOH$ (c) $RCHOH - CHOHR$ (d) $CO_2 + H_2O$
24.	Aqueous sulphuric acid reacts with 2-methyl-1-butene to give
-	predominantly [Roorkee 1992]
	(a) Isobutyl hydrogen sulphate(b) 2-methyl-2-butanol
	(c) 2-methyl-1-butanol
	(d) Secondary butyl hydrogen sulphate
25.	How can ethene be produced from ethanol [BHU 1996] (a) By dehydrohalogenation
	(b) By dehydrogenation
	(c) By dehydration with conc. H_2SO_4 at $170^{o}C$
n 6	(d) By reduction with hydrogen iodide
26.	Baeyer's reagent is used in the laboratory for [CBSE PMT 1991, 92; AIIMS 1998; AFMC 1999]
	(a) Detection of double bonds
	(b) Detection of glucose(c) Reduction
	(d) Oxidation
27.	Isopropyl alcohol is obtained by reacting which of the following
	alkenes with conc. H_2SO_4 and H_2O
	[MP PMT 1999] (a) Ethylene (b) Propylene
	(c) 2-methyl propene (d) Isoprene
28.	Which of the following compound is produced when
	$CH_2 = CH - (CH_2)_2 COOH$ reacts with <i>HBr</i> in presence of peroxides [AllMS 2000]
	(a) $CH_3CH(CH_2)_5COOH$
	(b) $BrCH_2CH_2(CH_2)_5COOH$
	(c) $CH_3CH_2CH_2(CH_2)_5COOH$ (c) $CH_3CH_2(CH_2)_5COOH$
	(d) $CH_3CH_2BrCH_2CH_2COOH$
20	One mole of each of the following alkenes is catalytically
29.	hydrogenated. The quantity of heat evolved will be the lowest in the case of [Roorkee 2000]
	(a) 1-butene (b) Trans-2-butene
	(c) Cis-2-butene (d) 1, 3-butadiene
30.	Which of the following is not used to distinguish ethene from ethane
	[KCET (Med.) 2001; UPSEAT 2002; CBSE PMT 2002]

(a)	lodine in	CCl_4	(b)	Bromine in	CCl_4
-----	-----------	---------	-----	------------	---------

- (c) Alkaline $KMnO_4$ (d) Ammonical Cu_2Cl_2
- A hydrocarbon X adds on one mole of hydrogen to give another 31. hydrocarbon and decolourised bromine water. X reacts with KMnO_4 in presence of acid to give two moles of the same carboxylic acid. The structure of X is

[JIPMER 2001]

(a)
$$CH_2 = CH - CH_2CH_2CH_3$$

(b) $CH_3CH_2CH_2 - CH = CHCH_3$
(c) $CH_3CH_2CH = CHCH_2CH_3$
(d) $CH_3CH = CHCH_2CH_2CH_3$
32. When 2-bromobutane reacts with alcoholic *KOH*, the reaction is called [KCET (Med.) 200]
(a) Halogenation (b) Hydrogenation
(c) Chlorination (d) Dehydro-halogenation
(a) Benzene (b) Cyclohexane
(c) Cyclohexene (d) 2, 3 dimethyl butane
34. Ethylene reacts with ethylene to form [BHU 200]
(a) Benzene (b) Cyclohexane
(c) Cyclohexene (d) 2, 3 dimethyl butane
34. Ethylene reacts with ozone gas to form the compound
(a) *HCHO* (b) C_2H_5OH
(c) $O < CH_2 - O (CH_2 - O)$
(d) CH_3CHO
35. Oils are converted into fats by [Kerala (Med.) 2002]
(a) Hydration (b) Decarboxylation
(c) Hydrogenotysis
36. Which process converts olefins into parafins
[MP PET 2002]
(a) Halogenation (d) Hydrolysis
37. Of the following the formula which represents a saturated cyclic
compound is [AMU 1983; NCERT 1978; CPMT 1983]
(a) C_3H_6 (b) C_3H_8
(c) C_8H_{10} (d) C_8H_{12}
38. In a reaction, if half of the double bond is broken and two new
bonds are formed, this is a case of
[AMU 1983; NCERT 1978; CPMT 1983]
(a) Elimination (b) Addition
(c) Displacement (d) Rearrangement
39. Which of the following are formed on addition reaction of DCI with
3-methyl-butene [Roorkee 2000]
(a) $CH_2DCHCICH(CH_3)_2$ (b) $CH_2DCH_2CCI(CH_3)_2$
(c) $CH_3CDCICH(CH_3)_2$ (d) $CICH_2CHDCH(CH_3)_2$
40. Major product of the following reaction is
 Br
 $CH_3 - C - CH_2 - CH_3 + alco.KOH → [MP PMT 1986]$
 H
(a) Butene-1 (b) Butene-2
(c) Butane (d) Butyne-1

Cyclopentene on treatment with alkaline $KMnO_4$ gives

[CPMT 1987]

- (a) Cyclopentanol
- (b) trans 1, 2-cyclopentanediol
- (c) cis 1, 2-cyclopentanediol
- (d) 1:1 mixture of *cis* and *trans* 1, 2-cyclopentanediol

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41.



42.	Which of the following is the most stable alkene	54.
	[AIIMS 1998; KCET (Med.) 2000; CPMT 2003] (a) $R_2C = CR_2$ (b) $RCH = CHR$	
	(c) $RCH_2 = CH_2R$ (d) $CH_2 = CH_2$	
43.	Ethene gives with acidic $KMnO_4$ solution [MP PMT 1997]	55.
	(a) Ethylene glycol (b) Ethylene oxide	
44.	(c) Formaldehyde (d) Acetaldehyde In paraffins, with the increasing molecular weight, it is found that	
	(a) Freezing point decreases	
	(b) Boiling point decreases	56.
	(c) Boiling point increases	
45.	(d) Vapour pressure decreases When alcoholic solution of ethylene dibromide is heated with	
-10-	granulated zinc, the compound formed is [CPMT 1990]	
	(a) Ethylene (b) Ethyne	
	(c) Cyclobutane (d) Butane	
46.	A gas formed by the action of alcoholic <i>KOH</i> on ethyl iodide, decolorises alkaline $KMnO_4$ solution. The gas is	
	[CPMT 1974, 91; MP PET 1985; IIT-JEE 1982]	57.
	(a) CH_4 (b) C_2H_6	
	(c) C_2H_4 (d) C_2H_2	58.
47.	Markownikoff's rule provides guidance of addition of <i>HBr</i> on [MNR 1994]	•
	(a) $CH_2 = CH_2$ (b) $CH_3 - CH_2 - CH_3$	
	(c) $CH_3CH = CHCH_3$ (d) $CH_2 = CHBr$	59.
48.	Ethyl bromide gives ethylene when reacted with [CPMT 1982, 93; RPET 2000; Pb. PMT 2001]	
	(a) Ethyl alcohol (b) Dilute H_2SO_4	
	(c) Aqueous <i>KOH</i> (d) Alcoholic <i>KOH</i>	
49.	Ethylene is prepared by the dehydration of	60.
	[CPMT 1974, 79; DPMT 1985; BHU 1989]	
	(a) Ethyl alcohol (b) Methyl alcohol	
50	(c) Acetic acid (d) Oxalic acid	-
50.	Which reactions are most common in alkenes [Pb. CET 1989]	61.
	(a) Electrophilic substitution reactions	
	(b) Nucleophilic substitution reactions	62.
	(c) Electrophilic addition reactions	
	(d) Nucleophilic addition reactions	
51.	A mixture of 1-chloropropane and 2-chloropropane when treated with alcoholic <i>KOH</i> gives [NCERT 1990]	63.
	(a) 1-propene (b) 2-propene	
	(c) Isopropylene (d) All the three	
52.	The compound formed by passing ethylene gas into cold alkaline	64.
	solution of $KMnO_4$ is	04.
	[NCERT 1974, 81; CPMT 1979, 86, 88;	
	(a) Ethyl alcohol (b) Acetaldehyde	65.
	(c) Acetic acid (d) Ethylene glycol	
53.	A gas decolourised $KMnO_4$ solution but gives no precipitate with	
	ammoniacal cuprous chloride is or Which of the following gases does not give a precipitate with ammoniacal solution of silver nitrate but decolourizes $KMnO_4$ (neutral or slightly alkaline)	66.
	[NCERT 1974, 77; CPMT 1974, 77, 78;	
	MP PMT 1996; MP PET 1996, 99]	67.
	(a) Ethane (b) Methane	
	(a) Ethane (b) Methane	

54.	A hydrocarbon reacts with hype hydroxyethane. The hydrocarbon i		prous acid to give 1-chloro-2-
	, ,		[CBSE PMT 1989]
	(a) Ethylene	(b)	Methane
	(c) Ethane	(d)	Acetylene
55.	When ethene is heated at 40 product is/are	0° (C under high pressure, the
	(a) Carbon and H_2 CPMT 1974]	(b)	Polyethylene
['		(J)	None of these
- 6		• •	
56.	Which decolorize aqueous bromin reaction with PCl_5	e an	d gives white fumes of <i>HCI</i> on [Pb. PMT 1999]
	(a) $CH_3COCH_2CH = CH_2$		
	(b) $CH_3CH_2CH_2CH_2CH_3$		
	(c) $CH_3CH = CHCH_2CH_2C$	ЭH	
	(d) $CH_3OCH_2CH_2CH_2CH_2$	ОН	[
57.	During debromination of meso-dil formed is	oron	nobutane, the major compound [IIT-JEE 1997]
	(a) <i>n</i> -butane	(b)	1-butane
	(c) <i>cis</i> -2-butene	(d)	<i>trans</i> -2-butene
58.	What product is formed when 1- <i>KOH</i>	-chlo	probutane react with alcoholic [RPMT 2002]
	(a) 1-butene	(b)	2-butene
	(c) 1-butanol	(d)	2-butanol
59.	The olefin which on ozonolys	sis	gives CH_3CH_2CHO and
	$CH_{3}CHO$ is		[Roorkee 1992]
	(a) 1-butene	(b)	2-butene
	(c) 1-pentene	(d)	2-pentene
60.	Bond length between carbon-carbo	on ir	n ethylene molecule is
			[MP PET 1997]
	(a) 1.54 Å	(b)	1.35 Å
	(c) 1.19 \mathring{A}	(d)	2.4 <i>Å</i>
61.	The compound having both <i>sp</i> and	d sp	p^2 hybridised carbon atom is
	(a) Propene	(b)	Ргорупе
	(c) Propadiene	(d)	None of these
62.	The halogen which is most react	ive	
	under sunlight is (a) Chlorine	(b)	[11T-JEE 1981] Bromine
	(a) Chlorine (c) Iodine	(d)	All equal
		()	· ··· · · · · · · · · · · · · · · · ·

When ethene reacts with bromine, it forms [AFMC 2000; KCET 2001] (a) Chloroethane (b) Ethylene dibromide (c) 1 bromopropane (d) 1,2-dichloroethene Paraffins are soluble in [NCERT 1978] (a) Distilled water (b) Benzene (c) Methanol (d) Sea water Addition of HCl to propene in presence of peroxides gives [BHU 1981, 98] (b) 2-Chloropropane (a) 1-Chloropropane (c) 3-Chloropropane (d) Propene dichloride The name of the product obtained by the addition of HI to propene [KCET 2000] in presence of peroxide catalyst is (a) Isopropyl iodide (b) 2-lodopropene (c) 2-lodopropane (d) 1-lodopropane In the reaction $C_2H_5CH = CH_2 + H - X \rightarrow$ Product. What is the product [BHU 2002]

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- (b) $C_2H_5CH_2 CH_2X$
- (c) $C_2H_5 CHX CH_3$
- (d) $CH_3 CH_2X CH = CH_2$

68. Alkene can be prepared from alkyl halide by the following reagent $R = Y \pm Nu^{-} \rightarrow \text{Allege} + NuH$

	$K - A + Nu \rightarrow \text{Alkelle}+$	мип	[RPET 2000]
	(a) Alc. <i>KOH</i> + heat	(b)	<i>Aq. KOH</i> + cold water
	(c) NaOH	(d)	LiOH
69.	2-chlorobutane is heated with	alcoholic	NaOH, the product formed in
	larger amount is		[RPET 1999; AMU 2000]
	(a) 1-Butene	(b)	1-Butyne
	(c) 2-Butene	(d)	All of these

- Ethylene has high b.p. and high vapour pressure at $100^{\,o}\,C$ and 70. does not dissolve in water. Hence ethylene is separated by this method [UPSEAT 1999]
 - (a) Simple distillation (b) Vacuum distillation (c) Vapour distillation (d) Alkali treatment

Addition of bromine to 1, 3-butadiene gives [AMU 1999]

- (a) 1, 4-addition product only
- (b) 1, 2-addition product only
- (c) Both 1, 2-and 1, 4 addition product
- (d) None of these

71.

- 72. In the presence of peroxide, hydrogen chloride and hydrogen iodide do not give anti-Markovnikoff's addition to alkenes because[IIT-JEE Screening (a) Both are highly ionic

 - (b) One is oxidising and the other is reducing (c) One of the steps is endothermic in both the cases
 - (d) All the steps are exothermic in both the cases
- The compound most likely to decolourize a solution of potassium 73. permanganate is [NCERT 1978]

(a)
$$CH_3CH_3$$

(b)
$$CH_3CH = CHCH_2CH_3$$

(c) $CH_3CH = CHCH_2CH_3$
(d) $CH_3 - C - CH_3$

74. Ethylene is converted to X on passing through a mixture of an acidified aqueous solution of palladium chloride and cupric chloride. Which of the following reagents readily take part in addition reaction with X[UPSEAT 2003]

(a)	Br_2	(b)	HBr
(c)	HC1	(d)	HCN

75. Addition of HCl does not obey antimarkownikoff's rule because

[UPSEAT 2003]

- (a) It is a strong acid (b) It is a gas
- (c) Its bond energy is high (d) Its bond energy is less
- Correct statement about1, 3-dibutene [UPSEAT 2003] 76.
 - (a) Conjugated double bonds are present
 - (b) Reacts with HBr
 - (c) Forms polymer
 - (d) All of these
- At low temperatures, the slow addition of molecular bromine to 77. $CH_2 = CH - CH_2 - C \equiv CH$ gives

[Roorkee Qualifying 1998]
(a)
$$CH_2 = CH - CH_2 - CBr = CHBr$$

(b)
$$BrCH_2 - CHBr - CH_2 - C \equiv CH$$

(c) $CH_2 = CH - CH_2 - CH_2 - CBr_3$

	(C)	$\operatorname{en}_2 = \operatorname{en}_2 \operatorname{en}_2$	2	CD13	
	(d)	$CH_3 - CBr_2 - CH_2 - C$	$\equiv C$	Н	
78.	PC	l_5 reacts with propanone, to g	give	[Pb. PMT 2001]	
	(a)	<i>vic</i> -dichloride	(b)	Propanal	
	(c)	propane-chloride		gem-dichloride	
79.		compounds that will give an lytic hydrogenation are		er of 2; 2-dimethyl propane on U 1999]	
	(1)	$CH_3CH = C - CH_3$	(2)	$CH_{3}CH = CHCH_{3}$	
		$\overset{ }{CH}_{3}$			
		H			
	(-)		$\langle \cdot \rangle$		
	(3)	$CH_{3}C$ = $CHCH_{2}CH_{3}$	(4)	$CH_3C = C - CH_3$	
				$CH_3 CH_3$	
	(a)	1 and 4		2 and 4	
	• •	1 and 3		1 and 2	
80.	Alkene $R - C - H = CH_2$ reacts readily with B_2H_6 and the				
	-	luct on oxidation with alkaling	-		
		-		$R - CH_2 - CH_2 - OH$	
	(c)	$\begin{array}{c} R-C-CH_{3} \\ \\ \\ \\ O \end{array}$	(d)	$\begin{array}{c} R-CH-CH_{3} \\ \downarrow \\ OH \end{array} \begin{array}{c} OH \end{array}$	
		$\overset{\scriptscriptstyle \parallel}{O}$		OH OH	
ng 2001] 81.		er's reagent is used for detecti			
		Amines		Glucose	
	(c)	Unsaturated bond		Alcohol	
82.			examj	ple(s) of nucleophilic addition	
		tion in case of acetylene	(1)		
	(a)	Addition of water	. ,	Addition of <i>HCN</i>	
	(c)	Addition of $AsCl_3$	(d)	All	
83.	Stru	ctural formula for lewisite is			
		CHCl		CHCl ₂	
	(a)		(b)		
		CHAsCl ₃		CHAsCl ₃	
		CHCl			
	(c)		(d)	None of these	
		CHAsCl ₂			
84.	Pror	oene when heated with chlorin	ne at	about $500^{\circ}C$ forms	
с т.			ie ac	[MP PET 1997]	
	(a)	$CH_2Cl.CH = CH_2$	(b)	CH ₃ .CHCl.CH ₂ Cl	
	(c)	CH ₂ Cl.CHCl.CH ₂ Cl	(d)	All the three	
85.		is obtained from vinyl chlori	de by	a reaction called	
-	(a)	Addition		lsomerization	
	(c)	Polymerization	(d)	Substitution	
86.	Read	ction of Br_2 on ethylene in p	oresei	nce of NaCl gives	
	(a)	$BrCH_2 - CH_2Br$	(b)	$ClCH_2 - CH_2Br$	
	. ,	Both (a) and (b)		None of these	
	(-)	(-) (0)	(-)		

87. is [AIIMS 1983; CPMT 1997; RPMT 1999, 2003]

(a)
$$CH_3 - CH_2 - CH_2 - Br$$
 (b) $CH_3 - CHBr - CH_3$

(c) $BrCH_2 - CH = CH_2$ (d) $CH_2 = C = CH_2$

- 88. The product of reaction between propene and *HBr* in the presence of a peroxide is
 - (a) $CH_3 CH_2 CH_2Br$ (b) $CH_3 CHBr CH_3$

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	(c) $CH_3 - CH_2Br$	(d) $CH_3 - CH = CHBr$
89.	Ozonolysis of 2-methyl butene-	2 yields
-	(a) Only aldehyde	, ,
	(b) Only ketone	
	(c) Both aldehyde and ketone	
	(d) None of these	
90.		by the ozonolysis of compound
	$RCH = CR_2$ is	[NCERT 1978]
	(a) RCHO	(b) $R_2 CO$
	(c) Both (a) and (b)	(d) None of these
91.	Which one is an unsaturated co	ompound [BIT 1990]
	(a) $C_6 H_{14}$	(b) C_4H_8
	(c) C_3H_7OH	(d) CH_3OH
92.	Ethyl alcohol on heating with c	onc. $H_{a}SO_{a}$ gives
	Ettijf dieonor on nedenig with e	[EAMCET 1979; MP PMT 1996]
	(a) $CH_3COOC_2H_5$	(b) $C_2 H_6$
	(c) $C_2 H_4$	(d) $C_2 H_2$
93.	Monohalides on reacting with a	alcoholic <i>KOH</i> give PET 1982, 86; DPMT 1981; CPMT 1979, 83]
	(a) Alkanes	(b) Alkenes
	(c) Alkynes	(d) Aromatic hydrocarbons
94.	Ethylene is a member of seri	
	(a) Alkyne	(b) Olefin
	(c) Paraffin	(d) Amine
95.	In a double bond between two	carbon atoms of ethene, there are
	(a) Two sigma bonds perpend	
	(b) One sigma and one pi bor	
	(c) Two pi bonds perpendicul	
	(d) Two pi bonds at an angle	of 60°
96.		of 60^o ılkyl halide is an example of
96.	(d) Two pi bonds at an angle The formation of alkene from a	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986]
96.	(d) Two pi bonds at an angleThe formation of alkene from a(a) Addition	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination
96. 97.	(d) Two pi bonds at an angle The formation of alkene from a	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986]
-	 (d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution In the following reaction 	of 60° lkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c)
-	 (d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution 	of 60° lkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c)
-	 (d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution In the following reaction 	of 60 ° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c) $\xrightarrow{H_2SO_4}_{475 K}$ [AllMS 1983]
-	(d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution In the following reaction $CH_3 - CH_2 - CH_2 - CH_3$	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c) $\xrightarrow{H_2SO_4}_{475 K}$ [AllMS 1983] redominates
-	(d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution In the following reaction $CH_3 - CH_2 - CH_2 - CH_3$ (a) $CH_3CH = CHCH_3$ pr	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c) $\xrightarrow{H_2SO_4}_{475 K}$ [AllMS 1983] redominates predominates
-	(d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution In the following reaction $CH_3 - CH_2 - CH_2 - CH_3$ (a) $CH_3CH = CHCH_3$ pr (b) $CH_2 = CHCH_2CH_3$ (c) Both are formed in equal	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c) $\xrightarrow{H_2SO_4}_{475 K}$ [AllMS 1983] redominates predominates
-	(d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution In the following reaction $CH_3 - CH_2 - CH_2 - CH_3$ (a) $CH_3CH = CHCH_3$ pr (b) $CH_2 = CHCH_2CH_3$ (c) Both are formed in equal (d) The amount of production The compound <i>B</i> formed in the	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c) $\xrightarrow{H_2SO_4}_{475 K}$ [AIIMS 1983] redominates predominates amounts n depends on the nature of catalyst e following sequences of reactions is
97.	(d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution In the following reaction $CH_3 - CH_2 - CH_2 - CH_3$ (a) $CH_3CH = CHCH_3$ pr (b) $CH_2 = CHCH_2CH_3$ f (c) Both are formed in equal (d) The amount of production	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c) $\xrightarrow{H_2SO_4}_{475 K}$ [AIIMS 1983] redominates predominates amounts n depends on the nature of catalyst e following sequences of reactions is
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97.	(d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution In the following reaction $CH_3 - CH_2 - CH_2 - CH_3$ (a) $CH_3CH = CHCH_3$ pr (b) $CH_2 = CHCH_2CH_3$ f (c) Both are formed in equal (d) The amount of production The compound <i>B</i> formed in the $CH_3CH_2CH_2OH - \frac{PCl_3}{2}$ (a) Propyne (c) Propanol	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c) $\xrightarrow{H_2SO_4}$ [AllMS 1983] redominates predominates amounts n depends on the nature of catalyst e following sequences of reactions is $\Rightarrow A \xrightarrow{Alca, KOH} B$ [NCERT 1981] (b) Propene (d) Propane
97.	(d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution In the following reaction $CH_3 - CH_2 - CH_2 - CH_3$ (a) $CH_3CH = CHCH_3$ pr (b) $CH_2 = CHCH_2CH_3$ f (c) Both are formed in equal (d) The amount of production The compound <i>B</i> formed in the $CH_3CH_2CH_2OH - \frac{PCl_3}{2}$ (a) Propyne (c) Propanol <i>n</i> -propyl bromide on treatment	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c) $\xrightarrow{H_2SO_4}$ [AIIMS 1983] redominates predominates amounts n depends on the nature of catalyst e following sequences of reactions is $\Rightarrow A \xrightarrow{Alca, KOH} B$ [NCERT 1981] (b) Propene (d) Propane it with ethanolic potassium hydroxide
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97.	(d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution In the following reaction $CH_3 - CH_2 - CH_2 - CH_3$ (a) $CH_3CH = CHCH_3$ pr (b) $CH_2 = CHCH_2CH_3$ formed in equal (c) Both are formed in equal (d) The amount of production The compound <i>B</i> formed in the $CH_3CH_2CH_2OH - \frac{PCI_3}{2}$ (a) Propyne (c) Propanol <i>n</i> -propyl bromide on treatment produces (a) Propyne (c) Propyne (c) Propyne (c) Propyne (c) Propyne The dehydrohalogenation of ne	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c) $\xrightarrow{H_2SO_4}$ [AIIMS 1983] $\xrightarrow{H_2SO_4}$ [AIIMS 1983] redominates predominates predominates amounts n depends on the nature of catalyst e following sequences of reactions is $\Rightarrow A \xrightarrow{Alca KOH} B$ [NCERT 1981] (b) Propene (d) Propane it with ethanolic potassium hydroxide [IIT-JEE 1987; MP PMT 1997] (b) Propene
97. 98. 99.	(d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution In the following reaction $CH_3 - CH_2 - CH_2 - CH_3$ (a) $CH_3CH = CHCH_3$ pr (b) $CH_2 = CHCH_2CH_3$ f (c) Both are formed in equal (d) The amount of production The compound <i>B</i> formed in the $CH_3CH_2CH_2OH - \frac{PCl_3}{2}$ (a) Propyne (c) Propanol <i>n</i> -propyl bromide on treatment produces (a) Propyne (c) Propane (c) Propyne	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c) $\xrightarrow{H_2SO_4}$ [AIIMS 1983] redominates predominates predominates amounts n depends on the nature of catalyst e following sequences of reactions is $\Rightarrow A \xrightarrow{Alca KOH} B$ [NCERT 1981] (b) Propene (d) Propane it with ethanolic potassium hydroxide [IIT-JEE 1987; MP PMT 1997] (b) Propene (d) Propanol eopentyl bromide with alcoholic <i>KOH</i>
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97. 98. 99.	(d) Two pi bonds at an angle The formation of alkene from a (a) Addition (c) Substitution In the following reaction $CH_3 - CH_2 - CH_2 - CH_3$ (a) $CH_3CH = CHCH_3$ pr (b) $CH_2 = CHCH_2CH_3$ formed in equal (c) Both are formed in equal (d) The amount of production The compound <i>B</i> formed in the $CH_3CH_2CH_2OH - \frac{PCI_3}{2}$ (a) Propyne (c) Propanol <i>n</i> -propyl bromide on treatment produces (a) Propyne (c) Propyne (c) Propyne (c) Propyne (c) Propyne The dehydrohalogenation of ne	of 60° ilkyl halide is an example of [CPMT 1983; AMU 1982; Pb. CET 1986] (b) Elimination (d) (a) and (c) $\xrightarrow{H_2SO_4}$ [AllMS 1983] redominates predominates predominates amounts n depends on the nature of catalyst e following sequences of reactions is $\Rightarrow A \xrightarrow{Alca KOH} B$ [NCERT 1981] (b) Propene (d) Propane it with ethanolic potassium hydroxide [IIT-JEE 1987; MP PMT 1997] (b) Propene (d) Propanol eopentyl bromide with alcoholic <i>KOH</i>

			[JIPMER 2002]
	(a) Ethane	(b)	Ethyne
	(c) Ethene	(d)	Methane
102.	Shape of ethylene molecule is	()	[MP PET 1993]
	(a) Tetrahedral	(b)	Pyramidal
	(c) Planar	(d)	Linear
103.	Electrophilic addition on a carb intermediate formation of a mor is called		
	(a) Saytzeff's rule	(b)	Baeyer's effect
	(c) Markownikoff's rule	(d)	None of these
104.	$CH_2 = CHCl$ reacts with HC	/ to fo	rm [CPMT 1985, 93]
	(a) $CH_2Cl - CH_2Cl$	(b)	$CH_3 - CHCl_2$
	(c) $CH_2 = CHCl.HCl$	(d)	None of these
105.	Deviation from Markownikoffs r	ule oc	curs in presence of
	(a) Zinc	(b)	Peroxides
	(c) $Hg - Zn / HCl$	(d)	All of these
106.	Presence of peroxides affects the	addit	ion of [BHU 1987]
	(a) <i>HBr</i>	(b)	HCl
	(c) HI	(d)	All of these
107.	Catalyst used in dimerisation of	acetyl	ene to prepare chloroprene is
	(a) $HgSO_4 + H_2SO_4$	(b)	Cu_2Cl_2
	(c) $Cu_2Cl_2 + NH_4Cl$	(d)	$Cu_2Cl_2 + NH_4OH$
108.	Chloroprene is		
	 (a) 2-chloro-1, 3-butadiene (b) 3-{NGEBT21981}utadiene 		
	(c) 2, 3-dichlorobutadiene		
	(d) None of these		
109.	Chloroprene is used in making		[MP PET 1985]
	(a) Synthetic rubber	(b)	Plastic
	(c) Petrol	(d)	All of these
110.	When isobutyl magnesium bro absolute ethyl alcohol, the produ		
			[IIT-JEE 1995]
	(a) $CH_3 - CH - CH_2OH$	and C	$CH_3 CH_2 MgBr$
	CH ₃		
	(b) $CH_3 - CH - CH_2 - CH_3$	$I_2 - 0$	CH ₃ and Mg(OH)Br

(b)
$$CH_3 - CH - CH_2 - CH_2 - CH_3$$
 and $Mg(OH)Br$
 CH_3

(c)
$$CH_3 - CH - CH_3$$
 and $CH_3 - CH_2OMgBr$
 $\downarrow CH_3$

(d)
$$CH_3 - CH - CH_3, CH_2 = CH_2$$
 and $Mg(OH)Br$
 CH_3

(a)
$$CH_{3} - CH_{2} - C - CH - CH_{3}$$

 CH_{3}
(b) $CH_{3} - CH_{2} - C - CH - CH_{3}$
 CH_{3}
 $CI CI$
 $CH_{3} - CH_{2} - C - CH - CH_{3}$
 CH_{3}

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(c)
$$CH_3 - CH_2 - CH_2 - CH_3 - CH_3$$

 $CH_3 OH$
(d) $CH_3 - CH_3 - CH_3 - CH_3$
 $CH_3 OH$
 $CH_3 OH_3 - CH_3 - CH_3 - CH_3$
 $CH_3 OH_3 - CH_3 - CH_3$

Which of the following occurs easily in ethylene 112.

			[MNR 1987; NCERT 1979]
(a)	Addition	(b)	Substitution
(c)	Elimination	(d)	Rearrangement

- How many gm of bromine will react with 21 gm C_3H_6 113.
- (a) 80 (b) 160 (c) 240 (d) 320 114. Conjugate double bond is present in [MP PMT 1987]
 - (a) Propylene (b) Butadiene
 - (c) Isobutylene (d) Butylene
- 115. On passing vapours of an organic liquid over finely divided Cu at 573K the product was an alkene. This reaction is
 - (a) Catalytic oxidation of primary alcohol
 - (b) Catalytic dehydrogenation of secondary alcohol
 - (c) Catalytic dehydrogenation of tertiary alcohol
 - (d) Catalytic dehydration of tertiary alcohol
- 116. The total number of sigma σ and pi(π) bonds in an ethylene molecule are
 - (b) 4σ , $l\pi$ (a) $4\sigma, 2\pi$
 - (c) $5\sigma, 2\pi$ (d) $5\sigma, 1\pi$
- 117. Cyclic hydrocarbon molecule A has all the carbon and hydrogens in a single plane. All the carbon-carbon bonds are of same length and less that 1.54 Å but more than 1.34 Å. C - C - C bond angle will be [CBSE PMT 1989]

(a) 120°	(b)	180^{o}
-------------------	-----	-----------

(c) 100° (d) 109°28'

General formula of alkenes is

118.

[CPMT 1975, MNR 1987; NCERT 1987; MP PMT 1994] (a) $C_{\mu}H_{\alpha}$ (b) $C_n H_{2n-2}$

(c)
$$C_n H_{2n+2}$$
 (d) $C_n H_{2n-2}$

(c)
$$C_n H_{2n+2}$$
 (d) $C_n H_{2n+2}$

119. The product of following reaction is

$$CH_{3} \xrightarrow[]{(i)}{} CH_{3} \xrightarrow[]{(i)}{} CH_{2} \xrightarrow[]{(i)}{} H_{g}(OAc)_{2};H_{2}O \xrightarrow[]{(i)}{} NaBH_{4} \xrightarrow[]{(i)}{} NaBH_{4}$$

[MP PMT 1986; MP PET 1997]

(a)
$$CH_{3} - C - CH - CH_{2}$$

 $H_{3} - C - CH - CH_{2}$
 $CH_{3} OH$
(b) $CH_{3} - C - CH_{2} - CH_{2}OH$
 CH_{3}

 CH_{2}

(c)
$$CH_{3} - C - CH - CH_{3}$$

 $CH_{3} - C - CH - CH_{3}$
 CH_{3}
(d) $HOCH_{2} - C - CH_{2} - CH_{2}$
 CH_{3}

120. Which one of the following organic compounds decolourizes an alkaline $KMnO_4$ solution [CPMT 1987, 93]

(a)
$$CS_2$$
 (b) C_3H_6
(c) C_2H_2 (d) CH_2OH

Decolourization of alkaline $KMnO_4$ is used as a test for 121.

- (a) Aromatic hydrocarbons (b) Olefinic hydrocarbons
- (c) Acetylenic hydrocarbons
- (d) Cycloalkanes

The reaction 122.

[MP PET 1985]

$$CH_2 = CH_2 + H_2 \xrightarrow{Ni} CH_3 - CH_3$$
 is called

[MP PMT 1996; CBSE PMT 2001; MH CET 2001; BHU 2002]

[AMU 1983]

[MP PMT 1986, 2000]

- (a) Wurtz's reaction
- (b) Kolbe's reaction
- Sabatier and Senderen's reaction (c)
- (d) Carbylamine reaction
- 123. The alkene which on ozonolysis yields acetone is

(a)
$$CH_2 = CH_2$$

- (b) $CH_3 CH = CH_2$
- (c) $(CH_3)_2 C = C(CH_3)_2$
- (d) $CH_3 CH = CH CH_3$

124.
$$CH_3CH = CHCHO$$
 is oxidized to $CH_3CH = CHCOOH$
using [NCERT 1978]

- (a) Alkaline potassium permanganate
- Acidified potassium permanganate (b)
- Selenium dioxide (c)
- (d) Osmium tetroxide
- The order of increasing reactivity towards HCl of the following 125. compounds will be
 - $CH_2 = CH_2$ (1)
 - (2) $(CH_3)_2 C = CH_2$
 - $CH_{3}CH = CHCH_{3}$ (3) [MP PET 1994]
 - (a) 1 < 2 < 3(b) 1 < 3 < 2(c) 3 < 2 < 1
 - (d) 2 < 1 < 3
 - The reagent which is used to distinguish between propene and propyne is [MP PET 1994; IIT-JEE (Screening) 2000; AIIMS 2000; Pb. PMT 2002; BHU 2003]

(b) Alkaline $KMnO_4$

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(a) Bromine

>>

126.

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- (c) Ammoniacal AgNO₃ (d) Ozone
- 127. Which one of the following reactions would be the best for the formation of 2-bromobutane [MP PET 1994]
 - (1) $CH_3CH = CHCH_2CH_3 \xrightarrow{HBr}$

(2)
$$CH_3CH_2CH = CH_2 \xrightarrow{HBr}$$

(3)
$$CH_{3}CH = CHCH_{3} \xrightarrow{Br_{2}}$$

(4) $CH_{3}CH_{2}CH = CH_{2} \xrightarrow{HBr}$
(a) 1 (b) 2
(c) 3 (d) 4

If *HCl* is added over $CH_2 = C$ CH_3 128.

formed

(a) $CH_2 = CH$ CH_3 CH_3 CH_3 (b) $CH_2 - CH \leftarrow CH_3$ CH_3 CH_3 (c) $CH_2 = C \leftarrow CH_3$ CH_2 CH_2Cl (d) None of these

then what is

[CPMT 1996]

- (d) None of these
- 129. Position of double bond in an organic compound is determined by[DCE 20 (a) Ozonolysis (b) Oxidation
 - (c) Reduction (d) Hydrogenation
- A gas decolourises Bayer's reagent but does not react with Tollen's 130. reagent, this gas is [MP PMT 2001] (a) Ethene (b) Ethyne
 - (c) Ethane (d) Methane
- Formation of 2-butene from 2-bromobutane is according to 131.
 - (a) Markowikoff's (b) Bayer
 - (c) Saytzeff (d) Wurtz
- An alkene on ozonolysis gave acetaldehyde the alkene is 132.
 - (a) Ethylene (b) Propene
 - (c) 1-butene (d) 2-butene
- Indicate the organic structure for the product expected when 2-133. methyl propene is heated with acetyl chloride in presence of anhydrous zinc chloride [CBSE PMT 1989] CH_3

(a)
$$CH_3 - \overset{|}{C} - CH_2 - CO - CH_3$$

 Cl
(b) $CH_3 - \overset{|}{C} - CH_2 - CO - CH_3$
 CH_3
(c) $CH_3 - \overset{|}{C} - O - C \checkmark \overset{Me}{Me}$
 $O - CH_3$
(d) $CH_3 - \overset{|}{C} - O - C = CH_2$
The reaction

134.

$$CH_{3} \xrightarrow{H_{2}SO_{4}} CH_{3} \xrightarrow{H_{2}SO_{4}} CH_{3} \xrightarrow{H_{2}} CH_{3} \xrightarrow{H_{2}} CH_{3} \xrightarrow{H_{2}} CH_{3}$$

is the example of (a) Sulphonation

(b) Dehydration

~~~

X is
$$[MP PMT]$$
(a)  $CH_3CH_2COOH$ (b)  $CH_3COOH$ (c)  $CH_3CH_2CHO$ (d)  $CH_3CH_2OH$ 

142. Which of the following alkenes gives only acetic acid and on oxidation with potassium permanganate solution

|      |                                                   | [MP PET 2003]                                                      |
|------|---------------------------------------------------|--------------------------------------------------------------------|
|      | (a) Ethylene                                      | (b) 1-Butene                                                       |
|      | (c) Propene                                       | (d) 2-Butene                                                       |
| 143. | Butene-1 may be converted to                      | butane by reaction with                                            |
|      |                                                   | [AIEEE 2003]                                                       |
|      | (a) Zn-HCl                                        | (b) Sn-HCl                                                         |
|      | (c) Zn-Hg                                         | (d) $Pd/H_2$                                                       |
| 144. | The major product formed presence of peroxides is | when propene reacts with <i>HBr</i> in [NCERT 1980; CBSE PMT 1989] |
|      | (a) <i>n</i> -propyl bromide                      | (b) Isopropyl bromide                                              |
|      |                                                   |                                                                    |

(d) 1, 3-dibromopropane (c) *n*-propyl alcohol

Ethyl hydrogen sulphate is obtained by the reaction of  $H_2SO_4$  on 145.



**CLICK HERE** >>

[AMU 1983]



| (a) Formaldehyde (b) Ethyl alcohol<br>(c) Ozonide (d) Acetaldehyde<br>147. Which of the following aliphatic compounds will discher<br>(a) $C_2H_4$ (b) $C_3H_6$<br>(c) $C_4H_8$ (d) All of these<br>148. Chlorination can be done on<br>(a) $CH_3 - CH = CH_2$ (b) $CH_2 = CH_2$<br>(c) $CH \equiv CH$ (d) None of these<br>149. Addition of <i>HI</i> on the double bond of propene yields<br>iodide and not <i>n</i> -propyl iodide as the major product. This is<br>the addition proceeds through<br>(c) A more stable carbonium ion<br>(c) A more stable free radical<br>(d) None of the above being a concerted reaction | isopropyl<br>is because<br>CPMT 1988]<br>expected              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
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| (c) Ozonide (d) Acetaldehyde<br>147. Which of the following aliphatic compounds will discher<br>(a) $C_2H_4$ (b) $C_3H_6$<br>(c) $C_4H_8$ (d) All of these<br>148. Chlorination can be done on<br>(a) $CH_3 - CH = CH_2$ (b) $CH_2 = CH_2$<br>(c) $CH \equiv CH$ (d) None of these<br>149. Addition of $H$ on the double bond of propene yields<br>iodide and not <i>n</i> -propyl iodide as the major product. This is<br>the addition proceeds through<br>(a) A more stable carbonium ion<br>(b) A more stable carbonium ion<br>(c) A more stable free radical<br>(d) None of the above being a concerted reaction          | isopropyl<br>is because<br>CPMT 1988]<br>expected              |
| colour of bromine<br>(a) $C_2H_4$ (b) $C_3H_6$<br>(c) $C_4H_8$ (d) All of these<br>148. Chlorination can be done on<br>(a) $CH_3 - CH = CH_2$ (b) $CH_2 = CH_2$<br>(c) $CH \equiv CH$ (d) None of these<br>149. Addition of $H$ on the double bond of propene yields<br>iodide and not <i>n</i> -propyl iodide as the major product. This is<br>the addition proceeds through<br>(a) A more stable carbonium ion<br>(b) A more stable carbonium ion<br>(c) A more stable free radical<br>(d) None of the above being a concerted reaction                                                                                     | isopropyl<br>is because<br>CPMT 1988]<br>expected              |
| (c) $C_4 H_8$ (d) All of these<br>148. Chlorination can be done on<br>(a) $CH_3 - CH = CH_2$ (b) $CH_2 = CH_2$<br>(c) $CH \equiv CH$ (d) None of these<br>149. Addition of $H$ on the double bond of propene yields<br>iodide and not <i>n</i> -propyl iodide as the major product. This is<br>the addition proceeds through<br>[Cl<br>(a) A more stable carbonium ion<br>(b) A more stable carbonium ion<br>(c) A more stable free radical<br>(d) None of the above being a concerted reaction                                                                                                                               | expected                                                       |
| 148.Chlorination can be done on<br>(a) $CH_3 - CH = CH_2$ (b) $CH_2 = CH_2$<br>(c) $CH \equiv CH$ (d) None of these149.Addition of $HI$ on the double bond of propene yields<br>iodide and not <i>n</i> -propyl iodide as the major product. This i<br>the addition proceeds through(a)A more stable carbonium ion<br>(b) A more stable carbonium ion<br>(c) A more stable free radical<br>(d) None of the above being a concerted reaction                                                                                                                                                                                   | expected                                                       |
| (a) $CH_3 - CH = CH_2$ (b) $CH_2 = CH_2$<br>(c) $CH \equiv CH$ (d) None of these<br>149. Addition of $HI$ on the double bond of propene yields<br>iodide and not <i>n</i> -propyl iodide as the major product. This is<br>the addition proceeds through<br>[CI<br>(a) A more stable carbonium ion<br>(b) A more stable carbonium ion<br>(c) A more stable free radical<br>(d) None of the above being a concerted reaction                                                                                                                                                                                                    | expected                                                       |
| <ul> <li>(c) CH = CH</li> <li>(d) None of these</li> <li>149. Addition of HI on the double bond of propene yields iodide and not <i>n</i>-propyl iodide as the major product. This i the addition proceeds through</li> <li>[CI (a) A more stable carbonium ion</li> <li>(b) A more stable carbanion</li> <li>(c) A more stable free radical</li> <li>(d) None of the above being a concerted reaction</li> </ul>                                                                                                                                                                                                             | expected                                                       |
| <ul> <li>149. Addition of <i>HI</i> on the double bond of propene yields iodide and not <i>n</i>-propyl iodide as the major product. This is the addition proceeds through</li> <li>[Ci (a) A more stable carbonium ion</li> <li>(b) A more stable carbanion</li> <li>(c) A more stable free radical</li> <li>(d) None of the above being a concerted reaction</li> </ul>                                                                                                                                                                                                                                                     | expected                                                       |
| iodide and not <i>n</i> -propyl iodide as the major product. This i<br>the addition proceeds through<br>[Cl<br>(a) A more stable carbonium ion<br>(b) A more stable carbanion<br>(c) A more stable free radical<br>(d) None of the above being a concerted reaction                                                                                                                                                                                                                                                                                                                                                           | expected                                                       |
| <ul> <li>(a) A more stable carbonium ion</li> <li>(b) A more stable carbanion</li> <li>(c) A more stable free radical</li> <li>(d) None of the above being a concerted reaction</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                    | expected                                                       |
| <ul> <li>(b) A more stable carbanion</li> <li>(c) A more stable free radical</li> <li>(d) None of the above being a concerted reaction</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | •                                                              |
| <ul><li>(c) A more stable free radical</li><li>(d) None of the above being a concerted reaction</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | •                                                              |
| (d) None of the above being a concerted reaction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | •                                                              |
| · · · · · · · · · · · · · · · · · · ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | •                                                              |
| 150. When butene-1 is mixed with excess of bromine, the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | •                                                              |
| reaction product is [CPMT 1974;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | впи 1980]                                                      |
| (a) 1, 2-dibromobutane (b) 1, 1-dibromobutane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                |
| (c) 2, 2-dibromobutane (d) Perbromobutane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ( ucuo                                                         |
| <b>151.</b> A compound ' $X$ on ozonolysis forms two molecules o Compound ' $X$ is [AllMS 1987; C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                |
| (a) $C_2 H_4$ (b) $C_2 H_2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                |
| (c) $C_2 H_6$ (d) $C_6 H_6$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                |
| <b>152.</b> For the reaction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                |
| $CH_3 - CH = CH_2 + HOCl \rightarrow A$ the product A is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                |
| -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | JEE 2002]                                                      |
| (a) $CH_3 - CHCl - CH_2OH$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                |
| (b) $CH_3 - CH - CH_2 - Cl$<br>OH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                |
| (c) $CH_3 - CH_2 - CH_2 - COCl$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                |
| Cl                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                |
| (d) $CH_3 - \overset{ }{C} - CH_3$<br>OH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                |
| CIII) C. CIII Catalyst . O .: 1:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                |
| <b>153.</b> $(CH_3)_2 C = CH \xrightarrow[]{Catalyst}_{H_2} Optical isomers [ICH_3]$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | [BHU 2003]                                                     |
| (a) 2 (b) 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                |
| (c) Zero (d) 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                |
| reloxide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | BHU 2003]                                                      |
| (a) Tertiary butyl bromide (b) Isobutyl bromide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                |
| <ul><li>(c) Tertiary butyl alcohol</li><li>(d) Isobutyl alcohol</li><li>155. Which of the following represents the given mode of hyb</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | bridication                                                    |
| <i>sp sp sp-sp</i> from left to right                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | on ruioduluit                                                  |
| [11T-JEE (Screen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | •/ .                                                           |
| (a) $H_2C = CH - C \equiv CH$ (b) $HC \equiv C - C \equiv CH$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H                                                              |
| (c) $H_2C = C = C = CH_2$ (d) $CH_2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |

| 156. | with least number of hydrogen at                                        | adds on to the carbon atom linked<br>toms". This statement is called[ <b>DPMT 1982; A11/</b> |
|------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
|      | (a) Thiele's principle                                                  | (b) Bayer's strain theory                                                                    |
|      | (c) Markownikoff's rule                                                 |                                                                                              |
| 157. |                                                                         | g ethanol with conc. $H_2SO_4$ at                                                            |
|      | $165^{o} - 170^{o}$ , is                                                | [MP PMT 2003]                                                                                |
|      | (a) $(C_2H_5)_2SO_4$                                                    | (b) $CH_2 = CH_2$                                                                            |
|      | (c) CH <sub>3</sub> COOH                                                | (d) $C_2H_5HSO_4$                                                                            |
| 158. | Which of the following is the mos                                       | ost stable                                                                                   |
|      | (a) 1-butene                                                            | (b) 2-butene                                                                                 |
|      | (c) 1-pentene                                                           | (d) 2-pentene                                                                                |
| 159. | Which doesn't follow Markownik                                          |                                                                                              |
|      | -                                                                       | rissa 2004; MP PMT 2004; BCECE 2005]                                                         |
|      | (a) $CH_3 - CH = CH_2$                                                  |                                                                                              |
|      | (b) $CH_3CH = CHCH_3$                                                   |                                                                                              |
|      | (c) $CH_3 - CH - CH = CH_2$                                             | 2                                                                                            |
|      | CH <sub>3</sub>                                                         |                                                                                              |
|      | (d) $CH_3 - CH_2 - CH = CH_2$                                           | 2                                                                                            |
| 160. |                                                                         | dration of 2-phenyl propene is [ <b>11T JEE (Screeni</b>                                     |
|      |                                                                         | (b) 1-phenyl-2-propanol                                                                      |
|      | (c) 2-phenyl-2-propanol                                                 | (d) 2-phenyl-1-propanol                                                                      |
| 161. | A reagent used to test for unsatu                                       |                                                                                              |
|      | ()                                                                      | [BHU 2004]                                                                                   |
|      |                                                                         | (b) Ammonical $Cu_2Cl_2$                                                                     |
|      | (c) Ammonical $AgNO_3$                                                  |                                                                                              |
| 162. | Propylene on hydrolysis with sulp                                       | -                                                                                            |
|      | (a) a propul alcohol                                                    | [MH CET-2003]                                                                                |
|      | <ul><li>(a) <i>n</i>-propyl alcohol</li><li>(c) Ethyl alcohol</li></ul> | <ul><li>(b) Isopropyl alcohol</li><li>(d) Butyl alcohol</li></ul>                            |
| 163. | · · ·                                                                   | formaldehyde and acetaldehyde. The                                                           |
| -    | alkene is :                                                             | [BVP 2004]                                                                                   |
|      | (a) Ethene                                                              | (b) Propene                                                                                  |
|      | (c) Butene-1                                                            | (d) Butene-2                                                                                 |
| 164. | In the reaction, $H_2C = CH_2$ —                                        | $\operatorname{cold} \operatorname{alkaline} \xrightarrow{\operatorname{KMnO}_4} (A):$       |
|      | Product <i>A</i> is :                                                   | [Pb. CET 2000]                                                                               |
|      | (a) Ethylene glycol                                                     | (b) Acetic acid                                                                              |
|      | (c) Ethane                                                              | (d) Butyric acid                                                                             |
| 165. | Using anhydrous $AlCl_3$ as cal                                         | talyst, which one of the following                                                           |
|      | reaction produces ethylbenzene (                                        | (PhEt)                                                                                       |
|      | () H a are                                                              | [CBSE PMT 2004]                                                                              |
|      | (a) $H_2C = CH_2 + C_6H_6$                                              |                                                                                              |
|      | (b) $H_3C - CH_3 + C_6H_6$                                              |                                                                                              |
|      | (c) $H_3C - CH_2OH + C_6H_6$                                            |                                                                                              |
|      | (d) $CH_3 - CH = CH_2 + C_6$                                            |                                                                                              |
| 166. | Which of these does not follow A                                        | Anti-Markownikoff's rule<br>[ <b>Orissa JEE 2005</b> ]                                       |
|      | (a) 2-butene                                                            | (b) 1-butene                                                                                 |
| 16-  | (c) 2-pentene                                                           | (d) 2-hexene                                                                                 |
| 167. | Reaction of <i>HBr</i> with propene in (a) Allyl bromide                | (b) <i>n</i> -propyl bromide                                                                 |
|      | (c) Isopropyl bromide                                                   | (d) 3-bromo propane                                                                          |
| 168. | Which of the following react with                                       | h $\mathit{KMnO}_4$ but does not react with                                                  |
|      | $AgNO_3$ ?                                                              | [BCECE 2005]                                                                                 |
|      |                                                                         |                                                                                              |

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(a) 
$$C_2 H_6$$
 (b)  $C H_4$ 

(c) 
$$C_2 H_4$$
 (d)  $C_2 H_2$ 

169. 3-Phenylpropene on reaction with *HBr* gives (as a major product)[AllMS 2005]

(a) 
$$C_6H_5CH_2CH(Br)CH_3$$

(b) 
$$C_6H_5CH(Br)CH_2CH_3$$

- (c)  $C_6H_5CH_2CH_2CH_2Br$
- (d)  $C_6H_5CH(Br)CH = CH_2$
- Reaction of one molecule of HBr with one molecule of 1,3-170. butadiene at  $40^{\circ}C$  gives predominantly [AIEEE 2005] (a) 3-bromobutene under kinetically controlled conditions
  - (b) 1-bromo-2-butene under thermodyanamically controlled conditions
  - 3-bromobutene under thermodynamically controlled conditions (c)
  - (d) 1-bromo-2-butene under kinetically controlled conditions
- 171. The only alcohol that can be prepared by the indirect hydration of alkene is [AFMC 2005] (b) Propyl alcohol (a) Ethyl alcohol

(c) Isobutyl alcohol (d) Methyl alcohol  $CH_3$ 

The reaction of *HBr* with  $CH_3 - C = CH_2$  in the presence of 172. peroxide will give [BHU 2005]

| (a) | $CH_{3}CBrCH_{3}$ | (b) CHCHCHCHBr |
|-----|-------------------|----------------|
|     |                   |                |
|     | $CH_3$            |                |
|     | $CH_3$            | $CH_3$         |
|     |                   |                |

- (c)  $CH_3CHCH_2Br$ (d)  $CH_3CH_2CHCH_3$
- A gas decolourised by  $KMnO_4$  solution but gives no precipitate 173. with ammoniacal cuprous chloride is

|                              | [KCET 2005]                       |
|------------------------------|-----------------------------------|
| (a) Ethane                   | (b) Methane                       |
| (c) Ethene                   | (d) Acetylene                     |
| Cyclohexene on reaction with | $OsO_4$ followed by reaction with |
| $NaHSO_{2}$ gives            | [Orissa lEE 2005]                 |

|     | J <b>U</b> |     |            | • |  |
|-----|------------|-----|------------|---|--|
| (a) | cis-diol   | (b) | trans-diol |   |  |
| (c) | ероху      | (d) | alcohol    |   |  |

#### Alkyne

Which of the following gases is used for welding 1.

174.

| (a) | Methane   | (b) | Ethane |
|-----|-----------|-----|--------|
| (c) | Acetylene | (d) | Ethene |

A metallic carbide on treatment with water gives a colourless gas 2. which burns readily in air and which gives a precipitate with ammoniacal silver nitrate solution. Gas evolved is

[NCERT 1975; CPMT 1977; MP PET 2002]

(a) Methane (b) Ethane

| (c) | Acetylene | (d) | Ethylene |
|-----|-----------|-----|----------|
|-----|-----------|-----|----------|

1-butyne reacts with cold alkaline  $KMnO_4$  to produce 3.

(a)  $CH_3CH_2COOH$ 

CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>COOH (b)

 $CH_{3}CH_{2}COOH + CO_{2}$ (c)

 $CH_{3}CH_{2}COOH + HCOOH$ (d)

Identify the product D in the following series of reaction 4.

$$CH_{3}COOH \xrightarrow{\text{LIAIH}_{4}} A \xrightarrow{H^{+}} B \xrightarrow{Br_{2}} C \xrightarrow{alc.} KOH$$
[CBSE PMT 1998]

- (a) Methane (b) Alcohol
- (c) Acetylene (d) Benzaldehyde

The correct order towards bond length is

5.

6.

9.

10.

11.

**CLICK HERE** 

[CPMT 1996]

[AIIMS 1997]

(a)  $C - C < C = C < C \equiv C$  (b)  $C \equiv C < C = C < C - C$ 

(c) 
$$C = C < C \equiv C < C - C$$
 (d)  $C = C < C - C < C \equiv C$ 

- In the molecule  $CH \equiv C CH = CH_2$ , the hybridisation of C-C bond is [Orissa JEE 2005]
  - (a)  $sp^2 sp$ (b)  $sp^3 - sp^3$
  - (c)  $sp^2 sp^2$ (d)  $sp^3 - sp$
- 7. The product formed when acetylene is passed through red hot tube [BHU 1989; RPMT 2003] is
  - (a) Benzene (b) Cyclohexane
  - (c) Neoprene (d) Ethane

8. Acetylenic hydrogens are acidic because

#### [CBSE PMT 1989; Pb. PMT 1999]

[RPMT 1997]

- Sigma electron density of C-H bond in acetylene is nearer to (a) carbon, which has 50% s-character
- (b) Acetylene has only one hydrogen on each carbon
- Acetylene contains least number of hydrogens among the (c) possible hydrocarbons having two carbons
- (d) Acetylene belongs to the class of alkynes with molecular formula  $C_n H_{2n-2}$
- Which is the most suitable reagent among the following to distinguish compound (iii) from rest of the compounds
  - $CH_3 C \equiv C CH_3$ (i)
  - (ii)  $CH_3 CH_2 CH_2 CH_3$
  - (iii)  $CH_3 CH_2 C \equiv CH$
  - (iv)  $CH_3 CH = CH_2$ [CBSE PMT 1989]
  - (a) Bromine in carbon tetrachloride
  - Bromine in acetic acid (b)
  - (c) Alkaline  $KMnO_4$
  - (d) Ammoniacal silver nitrate reagent
  - A hydrocarbon of formula  $C_6H_{10}$  absorbs only one molecule of  $H_2$  upon catalytic hydrogenation. Upon ozonolysis, the hydrocarbon yields

$$H H H O = C - CH_2 -$$

The hydrocarbon is

- (a) Cyclohexane (b) Benzene
- (c) Cyclohexene (d) Cyclobutane
- Poisonous gas 'Lewissite' is obtained by the reaction of

(a) 
$$CH \equiv CH$$
 and  $AsCl_3$ 

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[MP PMT 1986]

[MP PMT 2003]

|     | (b) $CH_2 = CH_2$ and $AsCl_3$                                                                           |
|-----|----------------------------------------------------------------------------------------------------------|
|     | (c) $CH \equiv CH$ and $S_2Cl_2$                                                                         |
|     | (d) $CH_2 = CH_2$ and $NOCl$                                                                             |
| 12. | Products of the following reaction                                                                       |
| 12. | (1) $O_3$                                                                                                |
|     | $CH_3C \equiv C CH_2CH_3 \xrightarrow{(2) Hydrolysis} \dots$ are                                         |
|     | [CBSE PMT 2005]                                                                                          |
|     | (a) $CH_3CHO + CH_3CH_2CHO$                                                                              |
|     | (b) $CH_3COOH + CH_3CH_2CHO$                                                                             |
|     | (c) $CH_3COOH + HOOCCH_2CH_3$                                                                            |
|     | (d) $CH_3COOH + CO_2$                                                                                    |
| 13. | By coaltar distillation, which is not obtained                                                           |
|     | [SCRA 1990; MP PMT 1986]                                                                                 |
|     | (a) Light oil (b) Middle oil                                                                             |
| 14. | (c) Heavy oil (d) Mobil oil<br>Hydrocarbon containing following bond is most reactive                    |
|     | [AllMS 1987]                                                                                             |
|     | (a) $C \equiv C$ (b) $C = C$                                                                             |
|     | (c) $C - C$ (d) All of these                                                                             |
| 15. | The shapes of methane, ethene and ethyne molecules are, respectively                                     |
|     | (a) Tetrahedral, planar and linear                                                                       |
|     | (b) Tetrahedral, linear and planar                                                                       |
|     | (c) Pyramidal, planar and linear                                                                         |
|     | (d) Tetrahedral, pyramidal and planar                                                                    |
| 16. | To synthesize the unsymmetrical alkyne<br>$CH_3 - C \equiv C - CH_2 - CH_3$ the reagents needed would be |
|     | (a) Ethene, iodoethane, iodomethane and potassium hydroxide                                              |
|     | (b) Acetaldehyde, 1-bromopropane and conc. $H_2SO_4$                                                     |
|     | (c) 1, 2-dichloroethane, 1-propanol and alcoholic potassium                                              |
|     | hydroxide                                                                                                |
|     | (d) Ethyne, iodomethane, iodoethane and sodamide                                                         |
| 17. | When propyne is treated with dilute $H_2SO_4$ and $HgSO_4$ , the major product is [Kurukshetra CEE 2002] |
|     | major product is [Kurukshetra CEE 2002]<br>(a) Propanal                                                  |
|     | (b) Propanol                                                                                             |
|     | (c) Propyl hydrogen sulphate                                                                             |
|     | (d) Propanone                                                                                            |
| 8.  | Which of the following will be the final product when $C_2H_2$ reacts with <i>HCl</i>                    |
|     | [DPMT 1984; AFMC 1982; Bihar MEE 1982]                                                                   |
|     | CH CH <sub>3</sub>                                                                                       |
|     | $ \begin{array}{c cccc} (a) &    & (b) &   \\ CHCl & CHCl_2 \end{array} $                                |
|     | CHCl                                                                                                     |
|     | (c)    (d) None of these                                                                                 |
|     | <i>CHCl</i> What is the end product of the following sequences of operations                             |
| 10  | what is the end product of the following sequences of operations                                         |
| 19. | $CaC_2 \xrightarrow{H_2O} A \xrightarrow{\text{dil}.H_2SO_4} B \xrightarrow{Ni} C$                       |
| 19. | $CaC_2 \xrightarrow{H_2O} A \xrightarrow{\operatorname{dil}.H_2SO_4} B \xrightarrow{Ni}_{H_2} C$         |
| 19. | [CPMT 1978; MP PMT 1996]                                                                                 |
| 19. | (a) Methyl alcohol (b) Acetaldehyde                                                                      |
| 19. | [CPMT 1978; MP PMT 1996]                                                                                 |

|             | The reagent is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | [CBSE PMT 1989; MP PET 1995]                                                                                               |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|             | (a) <i>Na</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | (b) $HCl$ and $H_2O$                                                                                                       |
|             | (c) $KOH \text{ in } C_2H_5OH$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | (d) <i>Zn</i>                                                                                                              |
| 21.         | Acetylene can be prepared from                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | • •                                                                                                                        |
|             | (a) Potassium fumarate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (b) Calcium carbide                                                                                                        |
|             | (c) Ethylene bromide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | (-)                                                                                                                        |
| 22.         | Acetylene is obtained by the elec                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                            |
|             | (a) Sodium succinate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | (b) Potassium fumarate                                                                                                     |
|             | (c) Both (a) and (b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | (d) None of these                                                                                                          |
| 23.         | The compound $C_3H_4$ has a treaction with                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | triple bond, which is indicated by its<br>[MP PMT 1999]                                                                    |
|             | <ul><li>(a) Bromine water</li><li>(c) Fehling solution</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul><li>(b) Bayer's reagent</li><li>(d) Ammonical silver nitrate</li></ul>                                                 |
| 24.         | $CH \equiv CH \xrightarrow{H_2O/Hg^{2+}} X \xrightarrow{H_2SO_4} X$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | $\xrightarrow{LiA H_4} Y \xrightarrow{P_4/Br_2} Z \text{ Here } Z \text{ is}$                                              |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | [JIPMER 2002]                                                                                                              |
|             | (a) Ethylene bromide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | (b) Ethanol                                                                                                                |
|             | (c) Ethyl bromide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | (d) Ethylidene bromide                                                                                                     |
| 25.         | $CH \equiv CH \xrightarrow{Ni(CN)_2} X$ . H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Here $X$ in the reaction                                                                                                   |
|             | Pressure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                            |
|             | (a) Benzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | [JIPMER 2002]<br>(b) Ethane                                                                                                |
|             | <ul><li>(a) Benzene</li><li>(c) Cycloctatetraene</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | (d) Cyclohexane                                                                                                            |
| 26.         | A salt producing hydrocarbon at                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                            |
| 20.         | A salt producing hydrocarbon a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | [KCET (Engg.) 2002]                                                                                                        |
|             | (a) Ethane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | (b) Methane                                                                                                                |
|             | (c) Ethene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | (d) Ethyne                                                                                                                 |
| 27.         | An unknown compound $A$ has                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | a molecular formula $C_4H_6$ . When                                                                                        |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <i>Br</i> <sub>2</sub> a new substance <i>B</i> with formula<br>s a white precipitate with ammoniacal<br>[MP PET/PMT 1998] |
|             | (a) Butyne-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (b) Butyne-2                                                                                                               |
|             | (c) Butene-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (d) Butene-2                                                                                                               |
| 28.         | ()                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | with sodium with the elimination of [BHU 1983]                                                                             |
|             | (a) $CH_4$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | (b) $C_2 H_6$                                                                                                              |
|             | (c) $C_2 H_4$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | (d) $C_2 H_2$                                                                                                              |
| <b>19</b> . | Acetylene gives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | [CPMT 1985]                                                                                                                |
|             | (a) White precipitate with $Ag$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                            |
|             | (a) while precipitate with $Mg$<br>$Cu_2Cl_2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | sivo <sub>3</sub> and red precipitate with                                                                                 |
|             | (b) White precipitate with $Cu$<br>$AgNO_3$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | $\iota_2 C l_2 $ and red precipitate with                                                                                  |
|             | <ul><li>(c) White precipitate with both</li><li>(d) Red precipitate with both t</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |
| 30.         | The bond length between $sp^3$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <sup>3</sup> hybridised carbon atom and other                                                                              |
|             | carbon atom is minimum in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | [CBSE PMT 1996; Pb. PMT 1999]                                                                                              |
|             | (a) Propane<br>(c) Propene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | (b) Butane<br>(d) Propyne                                                                                                  |
| 31.         | <ul> <li>(c) Propene</li> <li>The C - H bond length is minim</li> <li>(a) sp - s overlapping (as in all</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | num in the bond formed by                                                                                                  |
|             | (b) $sp^2 - s$ overlapping (as in all (b) $sp^2 - s$ overlapping (as in all (b) $sp^2 - s$ (b) $sp^2 - s$ (c) $sp^2 - sp^2 - s$ (c) $sp^2 - sp^2 -$ | • ·                                                                                                                        |
|             | (c) $sp^3 - s$ overlapping (as if (d) None of these                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | in alkanes)                                                                                                                |
| 32.         | Which of the $C - C$ bond is stro                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ongest                                                                                                                     |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                            |

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| (a) | Formed by | $sp^3$ | $-sp^3$ | hybridised carbon atoms (as in alkanes) |  |
|-----|-----------|--------|---------|-----------------------------------------|--|
|-----|-----------|--------|---------|-----------------------------------------|--|

- (b) Formed by  $sp^2 sp^2$  hybridised carbon atoms (as in alkenes)
- (c) Formed by sp sp hybridised carbon atoms (as in alkynes)

(d) All are equal

33.

38.

39.

40.

- Which of the following pairs has the same bond angle
  - (a) Ethane and ethylene (b) Ethylene and acetylene
  - (c) Ethylene and benzene (d) Acetylene and benzene

- (a)  $CH_3 CH_2 C CH_3$
- (b)  $CH_3 CH_2 CH_2 CHO$
- (c)  $CH_3 CH_2 CHO + HCHO$
- (d)  $CH_3CH_2COOH + HCOOH$
- **35.** A compound is treated with  $NaNH_2$  to give sodium salt. Identify the compound [AFMC 1998]

(a) 
$$C_2H_2$$
 (b)  $C_6H_6$   
(c)  $C_2H_6$  (d)  $C_2H_4$ 

- **36.** A gas decolourises bromine in  $CCl_4$  and forms a precipitate with ammoniacal silver nitrate. The gas is [EAMCET 1998]
  - (a)  $C_2 H_2$  (b)  $C_2 H_4$
  - (c)  $C_2H_6$  (d)  $CH_4$
- **37.** Among the following compounds which have more than one type of hybridisation for carbon atom
  - (i)  $CH_3CH_2CH_2CH_3$ (ii)  $CH_3 - CH = CH - CH_3$ (iii)  $CH_2 = CH - C \equiv CH$ (iv)  $H - C \equiv C - H$ [EAMCET 1998] (a) (ii) and (iii) (b) (ii) (c) (iii) and (iv) (d) (iv) The homologue of ethyne is [EAMCET 1998] (a)  $C_2H_4$ (b)  $C_2 H_6$ (c)  $C_3H_8$ (d)  $C_3 H_4$ When acetylene reacts with HCl in the presence of  $HgCl_2$ , the product is [MNR 1985; MP PET 1996; UPSEAT 2000] (a) Methyl chloride (b) Dichloroethane (c) Vinyl chloride (d) Ethylidine chloride When propyne reacts with aqueous  $H_2SO_4$  in the presence of  $HgSO_4$ , the major product is [IIT-JEE 1983; AFMC 1991; KCET 1993]
    - (a) Propanal(b) Propyl hydrogen sulphate(c) Acetone(d) Propanol

[CPMT 1999, 2002]

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- **41.** Propyne on polymerisation gives
  - (a) Mesitylene(b) Benzene(c) Ethyl benzene(d) Propyl be
  - (c) Ethyl benzene (d) Propyl benzene When treated with ammoniacal cuprous chloride, which one among
- 42. When treated with ammoniacal cuprous chloride, which one among the following forms copper derivative [CBSE PMT 1989; MP PMT 1993]
  - (a)  $C_2 H_6$  (b)  $C_2 H_4$
  - (c)  $C_2 H_2$  (d)  $C_6 H_6$

 $CH \equiv CH$  to  $C_6H_6$ [CPMT 1999] (a)  $AlCl_3$ (b)  $HgSO_4$ (c)  $NbCl_3$ (d) HCl  $KMnO_4$  will oxidise acetylene to [CPMT 1999] 44. (a) Ethylene glycol (b) Ethyl alcohol (c) Oxalic acid (d) Acetic acid Ethyne on reaction with dil.  $H_2SO_4$  and Hg(II) gives 45. (a) Ethanol (b) Ethanal Methoxymethane (c) Ethyl hydrogen sulphate (d) Which of the following is used to distinguish ethylene and acetylene[MP PET 20 46. CPMT 1977; NCERT 1973] (a) Alkaline  $KMnO_4$ (b) Bromine water Ammoniacal cuprous chloride (c)

Which of the following catalyst is used in the polymerisation of

(d) Conc.  $H_2SO_4$ 

43.

- 47. The distinguishing test for triple bond containing acidic hydrogen is
  - (a)  $Ag(NH_3)_2^+$  (b)  $Br_2$  in  $CCl_4$
  - (c) Alkaline  $KMnO_4$  (d)  $AlCl_3$
- **48.** If acetylene is passed through an electric arc in the atmosphere of nitrogen, the compound formed is
- [RPMT 1999] (a) HCN (b) Pyrrole (c) Pyrazole (d) Pyridine 49. Ozonolysis of acetylene gives [RPMT 1999] (a) Glycol (b) Glyoxal,formic acid (c) Formaldehyde (d) None The bond length between the hybridised carbon atom and other 50. [Pb. PMT 2000] carbon atom is minimum in (b) Propyne (a) Butane (c) Propene (d) Propane
- 51. The reaction of propene with HOCl proceeds via the addition of [IIT-JEE (Sec. 2014)]
  - (a)  $H^+$  in the first step
  - (b)  $Cl^+$  in the first step
  - (c)  $OH^-$  in the first step
  - (d)  $Cl^+$  and  $OH^-$  in a single step
- **52.** Acetylene reacts with ammonical  $AgNO_3$  forming
  - [MH CET 1999; CPMT 1984, 86; MP PMT 1997]

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- (a) Silver acetylene (b) Silver acetate (c) Metal silver (d) Silver mirror 53. Ethylidine dichloride can be prepared by the reaction of *HCl* and (a)  $C_2H_4$  (b)  $C_2H_2$ (c)  $C_2H_5$  (d) All of these
- 54. Which of the following order of reagent is chosen to prepare 1, 3-butadiene from  $C_2H_2$  [RPET 2000]
  - (a)  $CuCl/NH_4Cl$  and  $H_2/Pd(BaSO_4)$

- (b)  $NH_4Cl/CuCl$  and  $H_2/Pd(BaSO_4)$
- (c)  $H_2 / Pd(BaSO_4)$  and  $CuCl / NH_4Cl$
- (d)  $H_2 / Pd(BaSO_4)$  and  $NH_4Cl/CuCl$

55. Benzene is the polymer of

- (a) Methane (b) Ethane
- (c) Ethylene (d) Ethyne
- **56.**  $\begin{array}{c} CH \\ \parallel \\ CH \end{array}$  reacts with acetic acid in presence of Hg to give CH
  - [BHU 2005](a)  $\begin{array}{c}
    CH_{3} \\
    \Box \\
    CH(CH_{3}COO)_{2}
    \end{array}$ (b)  $\begin{array}{c}
    CH(CH_{3}COO)_{2} \\
    \Box \\
    CH(CH_{3}COO)_{2}
    \end{array}$ (c)  $\begin{array}{c}
    CH_{3} \\
    \Box \\
    CH_{2}(CH_{3}COO)
    \end{array}$ (d) None of these

[RPET 1999; Bihar MEE 1999]

- Acetylene is prepared industrially by passing electric discharge through graphite electrodes in the atmosphere of [CPMT 1985]
  - (a) Air (b)  $N_2$
  - (c)  $H_2$  (d)  $CO_2$
- **58.** When acetylene is passed into dilute sulphuric acid containing  $Hg^{2+}$  ions, the product formed is
  - [DPMT 1996; Roorkee 1995; BHU 1998; KCET 1999; MP PET 1985, 86; DCE 1999; DPMT 1999, 2002; CPMT 1975, 82, 83, 90; MP PMT 1994, 97; CBSE PMT 1999; AIIMS 2002; CBSE PMT 1999;
  - (a) Acetone (b) Acetic acid
  - (c) Acetaldehyde (d) Formaldehyde

59

60.

- Which of the following has acidic hydrogen [IIT-JEE 1985, 89; CPMT 1986; Bihar MEE 1997; RPET 1999; AFMC 1999]
- (a) Ethyne (b) Ethene (c) Ethane (d) Benzene
- Xylenes on oxidation with acidic  $KMnO_4$  gives
- [JIPMER 2000] (a) Terphthalic acid (b) Phthalic acid
- (c) Isophthalic acid (d) All of these
- **61.** The structure of the product(Z) in the reactions given below  $HC \equiv CH \xrightarrow{NaNH_2, CH_3 COCH_3} X \xrightarrow{Hg^{2+}, H_3O^+}_{H_2O} X \text{ is}$

[Roorkee 2000]

$$\begin{array}{c} O\\ (a) \quad CH_{3} - CH_{2} - CH_{2} - CH_{2}OH \\ CH_{3}\\ (b) \quad CH_{3} - C - CH - CH_{2}OH \\ O\\ CH_{3}\\ (c) \quad CH_{3} - C - CH - CH_{3}\\ O\\ OH \\ (d) \quad CH_{3} - CHOH - CH - CHOH \\ \end{array}$$

62. Carbon-carbon bond length is minimum in [CBSE PMT 1988, 91; MNR 1984; CPMT 1989; RPMT 1997; Pb. PMT 2001]

- (a) Ethane (b) Ethene
- (c) Ethyne (d) Benzene

(e) Ethanol

**63.** Triple bond of ethyne is made of **or** Cylindrical shape of an alkyne is due to

#### [EAMCET 1978; NCERT 1979; CBSE PMT 1997; Manipal MEE 1995; Bihar MEE 1996]

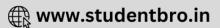
- (a) Three  $\sigma$  bonds
- (b) Three  $\pi$  bonds
- (c) Two  $\sigma$  and one  $\pi$  bond
- (d) Two  $\pi$  and one  $\sigma$  bond
- 64. An organic compound has a triple bond and not double bond. It can be tested by [MP PMT 2000, 03]
  - (a) Bromine water
  - (b) Bayer's reagent
  - (c) Fehling solution
  - (d) Ammonical silver nitrate
- 65. Which of these will not react with acetylene
  - [AIEEE 2002; DCE 2002]
  - (a) *NaOH* (b) Ammonical *AgNO*<sub>3</sub>
- (c) Na (d) HCl66. What is the product when acetylene reacts with hypochlorous acid[RPMT 2002;
  - (a)  $CH_3COCl$  (b)  $ClCH_2CHO$
  - (c)  $Cl_2CHCHO$  (d) ClCHCOOH
- **67.** The alkene  $C_6H_{10}$  producing  $OHC (CH_2)_4 CHO$  on ozonolysis is [Roorkee 1999]
- (a) Hexene-1(b) Hexene-3(c) Cyclohexene(d) 1-methylcyclohexene-1
- 68. The number of moles of proton which can be easily given by butyne-1(1 mole) is [MP PMT 2000]
  (a) 1
  (b) 2
  (c) 3
  (d) 6
- **69.** Which will undergo reaction with ammoniacal  $AgNO_3$

[DPMT 1996]

- (a)  $\begin{array}{c} CH_3 \\ CH_2 \end{array} > CH CH_2 CH = CH CH_3 \end{array}$
- (b)  $CH_3 CH = CH C \equiv CH$
- (c)  $CH_3 CH_2 CH = CH CH_2 CH_3$
- (d)  $CH_2 = CH CH_2 CH_3$
- (e) None

70. Acetylene gas when passed through the 20%  $H_2SO_4$  at  $80^{\,o}C$  gives acetaldehyde. The catalyst required for this conversion is

- (a) Anhydrous  $AlCl_3$  (b)  $HgSO_4$ (c) Pd (d) Pt
- 71. Which of the following reactions will yield 2, 2-dibromopropane [MNR 1993; UP
  - (a)  $HC \equiv CH + 2HBr \rightarrow$
  - (b)  $CH_3C \equiv CH + 2HBr \rightarrow$
  - (c)  $CH_3CH = CH_2 + HBr \rightarrow$
  - (d)  $CH_3CH = CHBr + HBr \rightarrow$
- **72.** Which of the following does not give white precipitate with ammoniacal  $AgNO_3$



(a) 
$$CH \equiv CH$$
  
(b)  $CH_3 - C \equiv CH$   
(c)  $CH_3 - C \equiv C - CH_3$   
(d)  $CH_2 - C \equiv CH$   
 $Cl$ 

- 73.  $\begin{array}{c} CH & & \\ ||| & \xrightarrow{O_3 / NaOH} X \xrightarrow{Zn / CH_3 COOH} Y 'Y \text{ is } [AllMS 1988] \\ CH & & \\ CH_2OH \end{array}$ 
  - (a) | (b)  $CH_3CH_2OH$  (c)  $CH_3CH_2OH$
  - (c)  $CH_3COOH$  (d)  $CH_3OH$

74.

75.

77.

78.

| Which is represent | ted by the formula $C_n H_{2n-2}$        |
|--------------------|------------------------------------------|
|                    | [CPMT 1975, 76; EAMCET 1979; MP PET 2003 |
| (a) Alkane         | (b) Alkyne                               |
| (c) Alkene         | (d) None of these                        |

What is the major product of the following reaction  $CH_3C \equiv C - CH_2 - CH_3 \xrightarrow{1 \text{ mole of } Cl_2}$ 

[Kerala (Med.) 2003] (a)  $\begin{array}{c}
CI\\
CH_{3}\\
CH_{3}\\
CH_{2}\\
CH_{2}\\
CH_{3}\\
CH_{3}\\$ 

(d) 
$$CH_{3} - Cl_{-} Cl_{-} CH_{2}CH_{3}$$
  
 $Cl_{-} Cl_{-} CH_{2}CH_{3}$ 

- **76.** A compound  $C_5H_8$  which give white ppt. with ammonical  $AgNO_3$  A give  $(CH_3)_2CHCOOH$  with hot alcoholic *KOH* then compound is [RPMT 2002] (a)  $CH_3CH_2 - CH_2 - CH = CH_2$ 
  - (b)  $CH_3 CH_2 C \equiv CH$ (c)  $(CH_3)_2 CH - C \equiv CH$ (d)  $CH_2 = CH - CH_2 - CH = CH_2$ 1, 2-dibromoethane when heated with alcoholic potash gives[Kerala PMT 200 (a) Ethane (b) Acetylene (c) Ethylene (d) Methane (e) None of these Which of the following is not a member of homologous series (a) Ethene (b) 1-butene (c) 2-butene (d) 2-butyne
- **79.** The compound formed as a result of potassium permanganate oxidation of ethylbenzene is
  - [MP PET/PMT 1998] (a) Benzoic acid (b) Benzyl alcohol (c) Benzophenone (d) Acetophenone
- 80.What is the product when 2-butyne is treated with liquid  $NH_3$  in<br/>presence of lithium[Orissa JEE 2003](a) *n*-butane(b) *cis*-2-butene
  - (c) *trans*-2-butene (d) 1-butene
- 81. Distinction in pentene-1 and pentyne-1 is done by

|                          | (a) $[Ag(NH_3)_2]^+$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (b)                                                                                                                         | Conc. $H_2SO_4$                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          | (c) <i>HCl</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (d)                                                                                                                         | $Br_2$                                                                                                                                                                                                                                                                                                                                                  |
| 82.                      | A mixture of ethane, ethene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                             | 2                                                                                                                                                                                                                                                                                                                                                       |
|                          | ammoniacal $AgNO_3$ solution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                         |
|                          | are                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                             | [CPMT 1990]                                                                                                                                                                                                                                                                                                                                             |
|                          | (a) Ethane and ethene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (b)                                                                                                                         | ,                                                                                                                                                                                                                                                                                                                                                       |
|                          | (c) Ethene and ethyne                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                             | Ethane only                                                                                                                                                                                                                                                                                                                                             |
| 83.                      | In its reaction with silver nitrate a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | acetyl                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                         |
|                          | (a) Oxidising property                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ( <b>b</b> )                                                                                                                | [MP PET 1999]<br>Reducing property                                                                                                                                                                                                                                                                                                                      |
|                          | (c) Basic property                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                             | Acidic property                                                                                                                                                                                                                                                                                                                                         |
| 84.                      | Simplest alkyne is represented by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | • •                                                                                                                         | [CPMT 1974]                                                                                                                                                                                                                                                                                                                                             |
| -                        | (a) <i>CH</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                             | CH <sub>2</sub>                                                                                                                                                                                                                                                                                                                                         |
|                          | (c) $C_2H_2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | (d)                                                                                                                         | $C_2H_4$                                                                                                                                                                                                                                                                                                                                                |
| 85.                      | Which of the following bonds is r                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | nost a                                                                                                                      | acidic                                                                                                                                                                                                                                                                                                                                                  |
|                          | (a) = $C - H$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                             | -C - H                                                                                                                                                                                                                                                                                                                                                  |
|                          | (c) $\equiv C - H$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | • •                                                                                                                         | All are equally acidic                                                                                                                                                                                                                                                                                                                                  |
| 86.                      | The hybridisation in methane, eth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                         |
|                          | (a) sp, sp and sp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (b)                                                                                                                         | sp sp, sp                                                                                                                                                                                                                                                                                                                                               |
|                          | (c) <i>sp, sp</i> and <i>sp</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | • •                                                                                                                         | sp, sp, sp                                                                                                                                                                                                                                                                                                                                              |
| 87.                      | Number of acidic hydrogen atoms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | s in b                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                         |
|                          | (a) 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (b)                                                                                                                         | [MP PET 1986]                                                                                                                                                                                                                                                                                                                                           |
|                          | (c) 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (d)                                                                                                                         | 4                                                                                                                                                                                                                                                                                                                                                       |
| 88.                      | Which of the following shows line                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | • •                                                                                                                         | •                                                                                                                                                                                                                                                                                                                                                       |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                         |
|                          | (a) Ethane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | (b)                                                                                                                         | Ethene                                                                                                                                                                                                                                                                                                                                                  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                             | Ethene $CCl_4$                                                                                                                                                                                                                                                                                                                                          |
| 89.                      | (a) Ethane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | (d)                                                                                                                         | CCl <sub>4</sub>                                                                                                                                                                                                                                                                                                                                        |
|                          | <ul><li>(a) Ethane</li><li>(c) Acetylene</li><li>Calcium carbide on reacting with</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (d)<br>wate                                                                                                                 | <i>CCl</i> <sub>4</sub><br>r gives<br>11; MP PMT 1993, 94; RPMT 2002;                                                                                                                                                                                                                                                                                   |
|                          | <ul><li>(a) Ethane</li><li>(c) Acetylene</li><li>Calcium carbide on reacting with</li><li>[CBSE PA</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | (d)<br>wate<br><b>NT 199</b>                                                                                                | CCl <sub>4</sub><br>r gives<br>n; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]                                                                                                                                                                                                                                                                            |
|                          | <ul> <li>(a) Ethane</li> <li>(c) Acetylene</li> <li>Calcium carbide on reacting with [CBSE PA</li> <li>(a) Methane</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | (d)<br>wate<br><b>AT 199</b><br>(b)                                                                                         | CCl <sub>4</sub><br>r gives<br>11; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane                                                                                                                                                                                                                                                                 |
| 89.                      | <ul> <li>(a) Ethane</li> <li>(c) Acetylene</li> <li>Calcium carbide on reacting with [CBSE PA</li> <li>(a) Methane</li> <li>(c) Ethene</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (d)<br>wate<br><b>AT 199</b><br>(b)<br>(d)                                                                                  | CCl <sub>4</sub><br>r gives<br>DI; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene                                                                                                                                                                                                                                                    |
|                          | <ul> <li>(a) Ethane</li> <li>(c) Acetylene</li> <li>Calcium carbide on reacting with [CBSE PA</li> <li>(a) Methane</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | (d)<br>wate<br><b>AT 199</b><br>(b)<br>(d)                                                                                  | $CCl_4$<br>r gives<br><b>b</b> ; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene<br>nce of $Ba(CN)_2$ as catalyst                                                                                                                                                                                                                     |
| 89.                      | <ul> <li>(a) Ethane</li> <li>(c) Acetylene</li> <li>Calcium carbide on reacting with [CBSE PA</li> <li>(a) Methane</li> <li>(c) Ethene</li> <li>Addition of <i>HCN</i> to ethyne in the second secon</li></ul> | (d)<br>wate<br><b>AT 199</b><br>(b)<br>(d)<br>preset                                                                        | CCl <sub>4</sub><br>r gives<br>DI; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene                                                                                                                                                                                                                                                    |
| 89.                      | <ul> <li>(a) Ethane</li> <li>(c) Acetylene</li> <li>Calcium carbide on reacting with [CBSE PA</li> <li>(a) Methane</li> <li>(c) Ethene</li> <li>Addition of <i>HCN</i> to ethyne in gives</li> <li>(a) 1, 1-dicyano ethane</li> <li>(c) Vinyl cyanide</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | (d)<br>wate<br><b>AT 199</b><br>(b)<br>(d)<br>preset<br>(b)<br>(d)                                                          | $CCl_4$<br>r gives<br>b; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene<br>nce of $Ba(CN)_2$ as catalyst<br>[AFMC 1991]<br>Ethyl cyanide<br>Divinyl cyanide                                                                                                                                                                          |
| 89.                      | <ul> <li>(a) Ethane</li> <li>(c) Acetylene</li> <li>Calcium carbide on reacting with [CBSE PA</li> <li>(a) Methane</li> <li>(c) Ethene</li> <li>Addition of <i>HCN</i> to ethyne in gives</li> <li>(a) 1, 1-dicyano ethane</li> <li>(c) Vinyl cyanide</li> <li>Which compound will react</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | (d)<br>wate<br><b>AT 199</b><br>(b)<br>(d)<br>preset<br>(b)<br>(d)                                                          | $CCl_4$<br>r gives<br>b; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene<br>nce of $Ba(CN)_2$ as catalyst<br>[AFMC 1991]<br>Ethyl cyanide<br>Divinyl cyanide                                                                                                                                                                          |
| 89.<br>90.               | <ul> <li>(a) Ethane</li> <li>(c) Acetylene</li> <li>Calcium carbide on reacting with [CBSE PA</li> <li>(a) Methane</li> <li>(c) Ethene</li> <li>Addition of <i>HCN</i> to ethyne in gives</li> <li>(a) 1, 1-dicyano ethane</li> <li>(c) Vinyl cyanide</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | (d)<br>wate<br><b>AT 199</b><br>(b)<br>(d)<br>preset<br>(b)<br>(d)                                                          | $CCl_4$<br>r gives<br>b; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene<br>nce of $Ba(CN)_2$ as catalyst<br>[AFMC 1991]<br>Ethyl cyanide<br>Divinyl cyanide                                                                                                                                                                          |
| 89.<br>90.               | (a) Ethane<br>(c) Acetylene<br>Calcium carbide on reacting with<br>[CBSE PA<br>(a) Methane<br>(c) Ethene<br>Addition of <i>HCN</i> to ethyne in p<br>gives<br>(a) 1, 1-dicyano ethane<br>(c) Vinyl cyanide<br>Which compound will react<br>$Ag(NH_3)_2^+OH^-$<br>(a) $CH_2 = CH_2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | (d)<br>wate<br>(T 199<br>(d)<br>preser<br>(b)<br>(d)<br>with<br>(b)                                                         | $CCl_4$<br>r gives<br>b; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene<br>nce of $Ba(CN)_2$ as catalyst<br>[AFMC 1991]<br>Ethyl cyanide<br>Divinyl cyanide<br>o an aqueous solution of<br>[DPMT 2000]<br>$CH_3 - CH_3$                                                                                                              |
| 89.<br>90.<br>91.        | <ul> <li>(a) Ethane</li> <li>(c) Acetylene</li> <li>Calcium carbide on reacting with [CBSE PA</li> <li>(a) Methane</li> <li>(c) Ethene</li> <li>Addition of <i>HCN</i> to ethyne in pives</li> <li>(a) 1, 1-dicyano ethane</li> <li>(c) Vinyl cyanide</li> <li>Which compound will react Ag(NH<sub>3</sub>)<sup>+</sup><sub>2</sub>OH<sup>-</sup></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | (d)<br>wate<br>(T 199<br>(d)<br>preser<br>(b)<br>(d)<br>with<br>(b)                                                         | $CCl_4$<br>r gives<br>b; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene<br>nce of $Ba(CN)_2$ as catalyst<br>[AFMC 1991]<br>Ethyl cyanide<br>Divinyl cyanide<br>o an aqueous solution of<br>[DPMT 2000]<br>$CH_3 - CH_3$                                                                                                              |
| 89.<br>90.<br>91.        | (a) Ethane<br>(c) Acetylene<br>Calcium carbide on reacting with<br>[CBSE PA<br>(a) Methane<br>(c) Ethene<br>Addition of <i>HCN</i> to ethyne in p<br>gives<br>(a) 1, 1-dicyano ethane<br>(c) Vinyl cyanide<br>Which compound will react<br>$Ag(NH_3)_2^+OH^-$<br>(a) $CH_2 = CH_2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | (d)<br>wate<br><b>XT 199</b><br>(b)<br>(d)<br>with<br>(b)<br>(d)                                                            | $CCl_4$<br>r gives<br>p; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene<br>nce of $Ba(CN)_2$ as catalyst<br>[AFMC 1991]<br>Ethyl cyanide<br>Divinyl cyanide<br>an aqueous solution of<br>[DPMT 2000]<br>$CH_3 - CH_3$<br>$CH_3 - C \equiv C - CH_3$                                                                                  |
| 89.<br>90.<br>91.        | (a) Ethane<br>(c) Acetylene<br>Calcium carbide on reacting with<br>[CBSE PA<br>(a) Methane<br>(c) Ethene<br>Addition of <i>HCN</i> to ethyne in p<br>gives<br>(a) 1, 1-dicyano ethane<br>(c) Vinyl cyanide<br>Which compound will react<br>$Ag(NH_3)_2^+OH^-$<br>(a) $CH_2 = CH_2$<br>(c) $CH_3CH_2C \equiv CH$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | (d)<br>wate<br>(T 199<br>(b)<br>(d)<br>with<br>(b)<br>(d)<br>(d)<br>gas w                                                   | $CCl_4$<br>r gives<br>p; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene<br>nce of $Ba(CN)_2$ as catalyst<br>[AFMC 1991]<br>Ethyl cyanide<br>Divinyl cyanide<br>an aqueous solution of<br>[DPMT 2000]<br>$CH_3 - CH_3$<br>$CH_3 - C \equiv C - CH_3$                                                                                  |
| 89.<br>90.<br>91.        | (a) Ethane<br>(c) Acetylene<br>Calcium carbide on reacting with<br>[CBSE PA<br>(a) Methane<br>(c) Ethene<br>Addition of <i>HCN</i> to ethyne in p<br>gives<br>(a) 1, 1-dicyano ethane<br>(c) Vinyl cyanide<br>Which compound will react<br>$Ag(NH_3)_2^+OH^-$<br>(a) $CH_2 = CH_2$<br>(c) $CH_3CH_2C \equiv CH$<br>Which of the following give $H_2$ g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | (d)<br>wate<br><b>AT 199</b><br>(b)<br>(d)<br>with<br>(b)<br>(d)<br>(d)<br>gas w<br>(b)                                     | $CCl_4$<br>r gives<br>b; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene<br>nce of $Ba(CN)_2$ as catalyst<br>[AFMC 1991]<br>Ethyl cyanide<br>Divinyl cyanide<br>o an aqueous solution of<br>[DPMT 2000]<br>$CH_3 - CH_3$<br>$CH_3 - C \equiv C - CH_3$<br>ith $Na$ [RPMT 2002]                                                        |
| 89.<br>90.<br>91.<br>92. | (a) Ethane<br>(c) Acetylene<br>Calcium carbide on reacting with<br>[CBSE PA<br>(a) Methane<br>(c) Ethene<br>Addition of <i>HCN</i> to ethyne in re-<br>gives<br>(a) 1, 1-dicyano ethane<br>(c) Vinyl cyanide<br>Which compound will react<br>$Ag(NH_3)_2^+OH^-$<br>(a) $CH_2 = CH_2$<br>(c) $CH_3CH_2C = CH$<br>Which of the following give $H_2$ as<br>(a) $CIP_4^{PMT}$ 2002]<br>(c) $C_2H_4$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | (d)<br>wate<br><b>AT 199</b><br>(b)<br>(d)<br>with<br>(b)<br>(d)<br>gas w<br>(b)<br>(d)                                     | $CCl_4$<br>r gives<br>b; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene<br>nce of $Ba(CN)_2$ as catalyst<br>[AFMC 1991]<br>Ethyl cyanide<br>Divinyl cyanide<br>o an aqueous solution of<br>[DPMT 2000]<br>$CH_3 - CH_3$<br>$CH_3 - C \equiv C - CH_3$<br>ith $Na$ [RPMT 2002]<br>$C_2H_6$<br>$C_2H_2$                                |
| 89.<br>90.<br>91.<br>92. | (a) Ethane<br>(c) Acetylene<br>Calcium carbide on reacting with<br>[CBSE PA<br>(a) Methane<br>(c) Ethene<br>Addition of <i>HCN</i> to ethyne in f<br>gives<br>(a) 1, 1-dicyano ethane<br>(c) Vinyl cyanide<br>Which compound will react<br>$Ag(NH_3)_2^+OH^-$<br>(a) $CH_2 = CH_2$<br>(c) $CH_3CH_2C = CH$<br>Which of the following give $H_2$ g<br>(a) $C[PPMT 2002]$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | (d)<br>wate<br><b>AT 199</b><br>(b)<br>(d)<br>with<br>(b)<br>(d)<br>gas w<br>(b)<br>(d)                                     | $CCl_4$<br>r gives<br>p; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene<br>nce of $Ba(CN)_2$ as catalyst<br>[AFMC 1991]<br>Ethyl cyanide<br>Divinyl cyanide<br>o an aqueous solution of<br>[DPMT 2000]<br>$CH_3 - CH_3$<br>$CH_3 - C \equiv C - CH_3$<br>ith $Na$ [RPMT 2002]<br>$C_2H_6$<br>$C_2H_2$<br>roduct in above reaction is |
| 89.<br>90.<br>91.<br>92. | (a) Ethane<br>(c) Acetylene<br>Calcium carbide on reacting with<br>[CBSE PA<br>(a) Methane<br>(c) Ethene<br>Addition of <i>HCN</i> to ethyne in re-<br>gives<br>(a) 1, 1-dicyano ethane<br>(c) Vinyl cyanide<br>Which compound will react<br>$Ag(NH_3)_2^+OH^-$<br>(a) $CH_2 = CH_2$<br>(c) $CH_3CH_2C = CH$<br>Which of the following give $H_2$ as<br>(a) $CIP_4^{PMT}$ 2002]<br>(c) $C_2H_4$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | (d)<br>wate<br><b>NT 199</b><br>(b)<br>(d)<br>with<br>(b)<br>(d)<br>(d)<br>(d)<br>(gas w<br>(b)<br>(d)<br>(d)<br>(c)<br>(c) | $CCl_4$<br>r gives<br>b; MP PMT 1993, 94; RPMT 2002;<br>J & K 2005]<br>Ethane<br>Acetylene<br>nce of $Ba(CN)_2$ as catalyst<br>[AFMC 1991]<br>Ethyl cyanide<br>Divinyl cyanide<br>o an aqueous solution of<br>[DPMT 2000]<br>$CH_3 - CH_3$<br>$CH_3 - CH_3$<br>$CH_3 - C \equiv C - CH_3$<br>ith $Na$ [RPMT 2002]<br>$C_2H_6$<br>$C_2H_2$               |

- (c) Both (a) and (b) (d)  $CH_3CHO + HCHO$
- **94.** The number of  $\pi$  bonds in the product formed by passing acetylene through dilute sulphuric acid containing mercuric sulphate is **[EAMCET 1997]** 
  - (a) Zero (b) One
  - (c) Two (d) Three

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[CPMT 1996]



| 95.  | Which of the following is weakly acidic                                                                                |             | (e) $Be_2C$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------|------------------------------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | (a) $CH_2 = CH_2$ (b) $C_6H_6$                                                                                         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|      | (c) $CH_3 - C \equiv CH$ (d) $CH_3 - C \equiv C - CH_3$                                                                |             | Aromatic hydrocarbon                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 96.  | Which of the following reactions is shown by alkynes [AMU 1984; RPMT :                                                 | 2000] 1.    | The function of anhydrous $AlCl_3$ in the Friedel-Craft's reaction is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| ~=   | (a) Addition     (b) Substitution       (c) Polymerization     (d) All of these                                        |             | to<br>[MNR 1986, 1995; Roorkee 1999; BHU 2001;<br>CPMT 2002; MPPET 2001]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 97.  | Shortest C-C bond length is present in[BVP :(a) $CH_3 - CH_2 - CH_3$ (b) $CH_3CH_2CH_2CH_3$                            | 2004]       | <ul> <li>(a) Absorb water</li> <li>(b) Absorb <i>HCl</i></li> <li>(c) To produce electrophile</li> <li>(d) To produce nucleophile</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|      | (c) $CH_2 = CH - CH = CH_2$ (d) $CH \equiv C - C \equiv CH$                                                            | 2.          | Benzene reacts with $CH_3COCl$ in the presence of $AlCl_3$ to give[                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 98.  | Acetylene can be obtained by the reaction [MH CET :                                                                    | 2004]       | (a) $C_6H_5Cl$ (b) $C_6H_5COCl$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|      | (a) $HCOOK \xrightarrow{\text{electrolysis}} \rightarrow$                                                              |             | (c) $C_6H_5CH_3$ (d) $C_6H_5COCH_3$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|      | (b) $CHI_3 + 6Ag + CHI_3 \xrightarrow{\Delta}$                                                                         | 3.          | Acylation process is preferred than direct alkylation because (by the Friedel-Craft's reaction)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|      | (c) $CH_3CH_2OH \xrightarrow{Conc. H_2SO_4} \rightarrow 443^{\circ}C$                                                  |             | <ul> <li>(a) In alkylation, a poisonous gas is evolved</li> <li>(b) In alkylation, large amount of heat is evolved</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|      | (d) $Be_2C + H_2O \rightarrow$                                                                                         |             | (c) In alkylation, polyalkylated product is formed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 99.  | Which of the following used for the conversion of 2-hexyne         trans-2-hexane       [IIT JEE (Screening) :         |             | (d) Alkylation is very costly<br>Benzene cannot undergo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|      | (a) $H_2/Pd/BaSO_4$ (b) $H_2, PtO_2$                                                                                   |             | (a) Substitution (b) Addition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|      | (c) $NaBH_4$ (d) $Li - NH_3 / C_2 H_5 OH$                                                                              |             | (c) Elimination (d) Oxidation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 00.  | In which of the following, the bond length between hybrid<br>carbon atom and other carbon atom is minimum<br>[MH CET : |             | Coaltar is main source of[DPMT 1984](a) Aromatic compounds(b) Aliphatic compounds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|      | (a) Propyne (b) Propene                                                                                                | 2003]       | (c) Cycloalkanes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|      | (c) Butane (d) Propane                                                                                                 |             | (d) Heterocyclic compounds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 01.  | What happens when a mixture of acetylene an hydrogen is pa<br>over heated Lindlar's catalyst                           | assed 6.    | Which of the following is not formed by the ozonolysis of <i>o</i> -xylene         (a) Glyoxal       (b) Ethyl glyoxal         (c) Directly by the base of the b |
|      | [Kerala PMT 2004; AIIMS                                                                                                | 1987]<br>7. | (c) Dimethyl glyoxal (d) Methyl glyoxal<br>The number of $\sigma$ and $\pi$ bonds in a molecule of benzene is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|      | <ul><li>(a) Ethane and water are formed</li><li>(b) Ethylene is formed</li></ul>                                       | 7.          | [MP PMT/PET 1988; BHU 1995; CPMT 1997]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|      | <ul><li>(b) Ethylene is formed</li><li>(c) Acetylene and ethane are formed</li></ul>                                   |             | (a) $6\sigma$ and $9\pi$ (b) $9\sigma$ and $3\pi$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|      | (d) None of these                                                                                                      |             | (c) $12\sigma$ and $3\pi$ (d) $6\sigma$ and $6\pi$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 02.  | In acetylene molecule, the two carbon atoms are linked by                                                              | 8.          | The ratio of $\sigma$ and $\pi$ bonds in benzene is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|      | [KCET :                                                                                                                | 2004]       | [CPMT 1991; BHU 1995]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|      | (a) One sigma bond and two pi bonds                                                                                    |             | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|      | <ul><li>(b) Two sigma bonds and one pi bond</li><li>(c) Three sigma bonds</li></ul>                                    | 9.          | Carbon atoms in benzene molecule is inclined at an angle of<br>[BHU 1985]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|      | (d) Three pi bonds                                                                                                     |             | (a) $120^{\circ}$ (b) $180^{\circ}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 103. | Which reacts with ammoniacal $AgNO_3$                                                                                  |             | (c) $109^{\circ}28'$ (d) $60^{\circ}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|      | [Orissa JEE :                                                                                                          | 2005] 10.   | When benzene is treated with excess of $\ensuremath{\mathit{Cl}}_2$ in the presence of $\ensuremath{\mathit{I}}_2$ , the end product is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|      | (a) Propyne (b) 2-butyne                                                                                               |             | (a) Monochlorobenzene (b) Trichlorobenzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|      | (c) 1,3-butadiene (d) Pentene<br>HaSO = CH - MaBr = P/Br                                                               | _           | (c) Hexachlorobenzene (d) Benzene hexachloride                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 104. | $CH \equiv CH \xrightarrow{HgSO_4} \xrightarrow{CH_3MgBr} \xrightarrow{P/Br_2} \xrightarrow{P/Br_2}$ $H_2O$ [DPMT:     | 11.         | Chemical name of the insecticide gammexene is<br>[CPMT 1981; MP PET 1995; MP PMT 1996;<br>CBSE PMT 1999; MP PET 1999]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|      | (a) $CH_3CH(Br)CH_3$ (b) $CH_3CH_2CH_2Br$                                                                              | -           | (a) DDT(b) Benzene hexachloride(c) Chloral(d) Hexachloroethane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|      | (c) $CH_2 = CH - Br$ (d) $BrCH = CH - CH_3$                                                                            | 12.         | Gammexane is obtained from benzene when it reacts with<br>(a) $Br$ in bright cuplicit (in the abcong of a catalyst)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 05.  | Carbide, which react with water to give propyne is                                                                     |             | (a) $Br_2$ in bright sunlight (in the absence of a catalyst)<br>(b) $Cl$ is bright sunlight (in the absence of a catalyst)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|      | [Kerala CET :                                                                                                          | 2005]       | (b) $Cl_2$ in bright sunlight (in the absence of a catalyst)<br>(c) $CH$ $CL$ in the maximum of a bulkness $ALCL$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|      | (a) $CaC_2$ (b) $SiC$                                                                                                  |             | (c) $CH_3Cl$ in the presence of anhydrous $AlCl_3$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|      | (c) $Mg_2C_3$ (d) $Al_4C_3$                                                                                            |             | (d) $COCl_2$ in the presence of anhydrous $AlCl_3$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



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in the presence of  $AlCl_3$  to give[DPMT 198

Point out the wrong statement in relation to the structure of (c) Kekule (d) Wohler 13. benzene The centric structure of benzene was proposed by 26. (a) It forms only one monosubstitution product [CPMT 1982, 83, 89] The C - C bond distance in benzene is uniformly 1.397 Å(b) (a) Dewar (b) Ladenberg It is a resonance hybrid of a number of canonical forms (c) Kekule (d) Armstrong and Baeyer (c) (d) It has three delocalised  $\pi$  - molecular orbitals The bond order of individual carbon-carbon bonds in benzene is[11T-JEE 1981; M 27. Which equation represents an example of Friedel-Craft's reaction[MNR 1993; CPMT 1996]One 14. (b) Two (a)  $C_6H_6 + C_2H_5Cl \xrightarrow{AlCl_3} C_6H_5C_2H_5 + HCl$ (d) One and two, alternately (c) Between one and two 28. Six carbon atoms of benzene are of (b)  $C_2H_5OH + HCl \xrightarrow{ZnCl_2} C_2H_5Cl + H_2O$ (a) One type (b) Two types (c)  $C_6H_5Cl + CH_3COCl \xrightarrow{AlCl_3} C_6H_5COCH_3 + Cl_2$ (c) Three types (d) Six types On heating a mixture of sodium benzoate and sodalime, the 29. (d)  $C_2H_5Br + Mg \xrightarrow{Ether} C_2H_5Mgr$ following is obtained [CPMT 1990; AIIMS 1996; MP PET 1999; AFMC 1999] The most stable carbonium ion among the following is 15. [JIPMER 2002; AFMC 2002] (a) Toluene (b) Phenol (c) Benzene (d) Benzoic acid (a)  $C_6H_5CHC_6H_5$  (b)  $C_6H_5CH_2$ Benzene on treatment with a mixture of conc. HNO<sub>3</sub> and conc. 30. (d)  $C_6H_5CH_2\overset{+}{C}H_2$ (c)  $CH_3CH_2$  $H_2SO_4$  at  $100^{\circ}C$  gives The reaction of toluene with chlorine in presence of ferric chloride 16. (a) Nitrobenzene (b) *m*-dinitrobenzene gives predominantly [IIT-JEE 1986; DCE 2000] (c) *p*-dinitrobenzene (d) *o*-dinitrobenzene (a) Benzoyl chloride (b) *m*-chlorotoluene What is the end product which is obtained on the nitration of 31. (d) o- and p-chlorotoluenes (c) Benzyl chloride [MP PMT/PET 1988] toluene The product formed when toluene is heated in light with  $\ Cl_2$  and 17. (b) *p*-nitrotoluene (a) o-nitrotoluene in absence of halogen carrier is (c) 2, 4-dinitrotoluene (d) 2, 4, 6-trinitrotoluene (a) Benzotrichloride (b) Gammexene Which of the following processes is reversible 32. (c) Chlorobenzene (d) None of these (a) Halogenation (b) Sulphonation 18. Attacking or reactive or electrophilic species in nitration of benzene (c) Nitration (d) None is or In the nitration of benzene with concentrated The attacking (electrophilic) species in sulphonation of benzene is[RPMT 1997; G 33.  $H\!NO_3$  and  $H_2SO_4$  the attack on ring is made by (a)  $SO_2$ (b)  $SO_3$ [CBSE PMT 1994; MP PET 1996, 2000; Pb. PMT 1998; (d)  $HSO_3^-$ BHU 2001; BVP 2004; DCE 2003] (c)  $SO_4^{2-}$ (a)  $NO_2^-$ (b)  $NO_{2}^{+}$ Which xylene is most easily sulphonated 34. (a) Ortho (b) Para (c)  $NO_3^-$ (d)  $NO_2$  $(d) \quad \text{All at the same rate} \\$ (c) Meta Which of the following reactions takes place when a mixture of 19. Toluene on oxidation with dilute  $HNO_3$  and alkaline  $KMnO_4$ [CPMT 1985] 35. concentrated  $HNO_3$  and  $H_2SO_4$  reacts on benzene at 350Kgives [DPMT 1981] (a) Sulphonation (b) Nitration (a) Benzaldehyde (b) Phenol (c) Hydrogenation (d) Dehydration (c) Nitrotoluene (d) Benzoic acid Nitration of benzene by nitric acid and sulphuric acid is 20. Benzene vapour mixed with air when passed over  $V_2O_5$  catalyst at 36. [MNR 1989; CPMT 1990; BCECE 2005] (a) Electrophilic substitution (b) Electrophilic addition 775K gives (c) Nucleophilic substitution (d) Free radical substitution [AFMC 1991; CPMT 2001; MP PMT 2003] Necessary conditions for halogenation are [CPMT 1976] 21. (a) Glyoxal (b) Oxalic acid (a) Cold and dark (c) Maleic anhydride (d) Fumaric acid (b) Presence of halogen carrier 37. Most common reactions of benzene (aromatic hydrocarbon) and its (c) Both (a) and (b) derivatives are (d) None [DPMT 1984; MP PMT 1989; AFMC 1997; BHU 1996, 98]  $C_6H_6 + CH_3Cl \xrightarrow{\text{anhydrous}} C_6H_5CH_3 + HCl$ (a) Electrophilic addition reactions 22. AlCh Electrophilic substitution reactions (b) is an example of [NCERT 1979; CPMT 1974, 85, 90; Nucleophilic addition reactions (c) Bihar CEE 1995; BHU 1979, 2001; MP PET 1995; Nucleophilic substitution reactions (d) MP PMT 1995; KCET 1993; EAMCET 1998; AIIMS 1998; 38. Which is most readily nitrated [Roorkee 1992] CBSE PMT 2000; AFMC 2000; JIPMER 2000] (a) Benzene (b) Phenol (a) Friedel-Craft's reaction (b) Kolbe's synthesis (c) Aniline (d) Nitrobenzene (c) Wurtz reaction (d) Grignard reaction o, p-directing groups are mostly 39 23. The reaction of benzene with chlorine in the presence of iron gives (a) Activating groups (b) Deactivating groups (a) Benzene hexachloride (b) Chlorobenzene (c) Neutral groups (d) None of these (d) Benzoyl chloride (c) Benzvl chloride Which among the following is the strongest o, p-directing group Benzene was discovered by 40. [NCERT 1981] 24. (a) OH (b) *Cl* (a) Ramsay (b) Dalton (c) Faradav (d) Priestley (c)  $C_6 H_5$ (d) *Br* The correct structure of benzene was proposed by 25. 41. The compound that is most reactive towards electrophilic nitration [CPMT 1972] (a) Faraday (b) Davy [IIT-JEE 1985; AIIMS 1998; MP PET/PMT 1998]

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|     | (a) Toluene (b) Benzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             | [BIT 19                                                                                                                            | 991]        |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------|-------------|
|     | (c) Benzoic acid (d) Nitrobenzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             | (a) They have a ring structure of carbon atoms                                                                                     | - 1         |
| 42. | Amongst the following, the compound that can be most readily                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             | (b) They have a relatively high percentage of hydrogen                                                                             |             |
|     | sulphonated is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             | (c) They have a relatively high percentage of carbon                                                                               |             |
|     | [IIT-JEE 1982; MADT Bihar 1995; KCET 2005]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             | (d) They resist reaction with oxygen of air                                                                                        |             |
|     | (a) Benzene (b) Nitrobenzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 55.         | Among the following compound which one is planar in shape                                                                          |             |
| 40  | (c) Toluene (d) Chlorobenzene<br>Which of the following would be least reactive towards bromine                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             | (a) Methane (b) Acetylene                                                                                                          |             |
| 43. | (a) Nitrobenzene (b) Phenol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             | (c) Benzene (d) Isobutane                                                                                                          |             |
|     | (c) Anisole (d) Chlorobenzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 56.         | Among the following statements on the nitration of aroma                                                                           | atic        |
| 44. | Amongst the following, the compound that is nitrated with difficulty                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             | compounds, the false one is [IIT-JEE 19                                                                                            | 97]         |
|     | is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             | (a) The rate of nitration of benzene is almost the same as that hexadeuterobenzene                                                 | of          |
|     | (a) Benzene(b) Nitrobenzene(c) Toluene(d) Phenol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             | (b) The rate of nitration of toluene is greater than that of benzer                                                                |             |
| 45. | (c) Toluene (d) Phenol<br>Select the true statement about benzene from amongst the following                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             | (c) The rate of nitration of benzene is greater than that<br>ICBSE PMT 1992<br>hexadeuterobenzene                                  | of          |
| 43. | (a) Because of unsaturation benzene easily undergoes addition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                                                                                                                                    |             |
|     | reactions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             | (d) Nitration is an electrophilic substitution reaction                                                                            |             |
|     | (b) There are two types of $C - C$ bonds in benzene molecule                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 57.         | Methyl group attached to benzene can be oxidised to carboxyl gro                                                                   | •           |
|     | (c) There is a cyclic delocalisation of $\pi$ electrons in benzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             | by reacting with [KCET 19                                                                                                          | 93]         |
|     | (d) Monosubstitution of benzene group gives three isomeric                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             | (a) $Fe_2O_3$ (b) $AgNO_3$                                                                                                         |             |
| -   | substances                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             | (c) $KMnO_4$ (d) $Cr_2O_3$                                                                                                         |             |
| 46. | Anhydrous $AlCl_3$ is used in the Friedel-Craft's reaction because it                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             | CH <sub>3</sub>                                                                                                                    |             |
|     | is [CBSE PMT 1991]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |                                                                                                                                    |             |
|     | (a) Electron rich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 58.         | How is ON is widely used [MP PET 20]                                                                                               | 02]         |
|     | <ul><li>(b) Soluble in ether</li><li>(c) Insoluble to chloride and aluminium ions</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>J</b> 0. |                                                                                                                                    | <b>0-</b> ] |
|     | <ul><li>(c) Insoluble to chloride and aluminium ions</li><li>(d) Electron deficient</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             | NO <sub>2</sub>                                                                                                                    |             |
| 47. | (i) Chlorobenzene and (ii) benzene hexachloride are obtained from                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                                                                                                                    |             |
|     | benzene by the reaction of chlorine, in the presence of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             | (a) Insecticide (b) Drug<br>(c) Explosive (d) Dye                                                                                  |             |
|     | (a) (i) Direct sunlight and (ii) anhydrous $AlCl_3$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 59.         | The compound 'A' when treated with $HNO_3$ (in presence                                                                            | of          |
|     | (b) (i) Sodium hydroxide and (ii) sulphuric acid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.5.        | $H_2SO_4$ ) gives compound 'B' which is then reduced with Sn a                                                                     |             |
|     | (c) (i) Ultraviolet light and (ii) anhydrous <i>FeCl</i> <sub>3</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             | $H_2^{-50}$ ( $H_2^{-50}$ ) gives compound b which is then reduced with $Sh$ a $HCl$ to aniline. The compound 'A' is [MP PET 2002] | ma          |
|     | (d) (i) Anhydrous AlCl <sub>3</sub> and (ii) direct sunlight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             | (a) Toulene (b) Benzene                                                                                                            |             |
| 40  | (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1)  (1) |             | (d) Acetamide                                                                                                                      |             |
| 48. | In Friedel Craft's alkylation, besides $AlCl_3$ the other reactants are [AFN ()) $C_1$ $H_1$ $C_2$ $H_2$ $C_3$ $C_4$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 60.         | Which is formed when benzene is heated with chlorine in t                                                                          | the         |
|     | (a) $C_6H_6 + CH_3Cl$ (b) $C_6H_6 + CH_4$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             | presence of sunlight                                                                                                               |             |
|     | (c) $C_6H_6 + NH_3$ (d) $C_6H_6 + CH_3COCl$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             | [CPMT 2000; KCET (Med.) 2000; MP PMT 19<br>MP PET 2002 AIIMS 199                                                                   |             |
| 49. | Nitration of benzene is a [RPMT 1999]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             | (a) $C_6H_5CCl_3$ (b) $C_6H_5CHCl_2$                                                                                               | 55]         |
|     | (a) Electrophilic displacement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                                                                                                                                    |             |
|     | (b) Electrophilic addition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -           | (c) $C_6H_5CH_2Cl_2$ (d) $C_6H_6Cl_6$                                                                                              |             |
|     | (c) Nucleophilic addition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 61.         | The compound used as an explosive is                                                                                               | 1           |
| 50  | (d) Nucleophilic displacement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             | [Kerala (Engg.) 2002; MP PET 2002; MP PMT 199<br>(a) 2,4, 6-tribromoaniline (b) 1,3, 5-trinitrobenzene                             | 93]         |
| 50. | Benzene shows [RPMT 1999]<br>(a) Substitution (b) Addition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             | (a) 2,4, 6-tribromoaniline (b) 1,3, 5-trinitrobenzene<br>(c) 2,4, 6-trichlorotoluene (d) 1,3, 5-trichlorobenzene                   |             |
|     | (a) Substitution (b) Addition<br>(c) Oxidation (d) All of these                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             | (e) 2,4, 6-trinitrotoluene                                                                                                         |             |
| 51. | Benzene can be obtained in the reaction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 62.         | Adding of $Cl_2$ to benzene in the presence of $AlCl_3$ is an example                                                              | nle         |
| 2   | [RPET 2000; Bihar MEE 1997]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             | of [Bihar MEE 1996]                                                                                                                | r           |
|     | (a) Ethene + 1, 3-butadiene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             | (a) Addition (b) Halogenation                                                                                                      |             |
|     | (b) Trimerisation of ethyne                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             | (c) Substitution (d) Elimination                                                                                                   |             |
|     | (c) Reduction of <i>PhCHO</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             | (e) None of these                                                                                                                  |             |
|     | (d) All of these                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 63.         | What happens when naphthalene balls are put inside kerosene                                                                        |             |
| 52. | Thiophene and benzene are separated by [RPET 2000]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             | (a) Precipitates (b) Dissolves upon heating                                                                                        |             |
|     | (a) Sulphonation of thiophene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             | (c) Dissolves easily (d) Does not dissolve                                                                                         |             |
|     | (b) Sulphonation of benzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             | (e) None of these                                                                                                                  |             |
|     | (c) Nitration of thiophene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 64.         | Three fused benzene rings are found in                                                                                             |             |
|     | (d) Nitration of benzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             | [Kerala (Engg.) 20                                                                                                                 | 02]         |
| 53. | Which of the following is a hydrocarbon [AFMC 1992]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             | (a) Naphthalene (b) Anthracene                                                                                                     |             |
|     | (a) Urea (b) Benzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -           | (c) Phenanthroline (d) Triphenyl methane                                                                                           |             |
|     | (c) Ammonium cyanate (d) Phenol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 65.         | Product obtained after nitration of nitrobenzene is                                                                                | 071         |
|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             | [RPMT 19                                                                                                                           | 97          |
| 54. | Aromatic compounds burn with sooty flame because                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             | (a) TNT (b) 1, 3-dinitrobenzene                                                                                                    |             |

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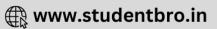
| 66.        | (c) Picric acid<br>After ozonolysis of benzene (not l                                                                                                                                                                                   |                                                           | 1, 4-dinitrobenzene<br>olysis), the product is                                                                                                                                                  |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            |                                                                                                                                                                                                                                         | <i>j</i>                                                  | [RPMT 1997; CPMT 1997]                                                                                                                                                                          |
|            | (a) Benzene triozonide                                                                                                                                                                                                                  | • •                                                       | Glyoxal                                                                                                                                                                                         |
|            | (c) Ethanediol                                                                                                                                                                                                                          |                                                           | All of them                                                                                                                                                                                     |
| 67.        | Which acid will not form hydroca                                                                                                                                                                                                        |                                                           | [CPMT 1997]<br>Isothallic acid                                                                                                                                                                  |
|            | (a) Cinnamic acid<br>(c) Salicylic acid                                                                                                                                                                                                 | • •                                                       | Picric acid                                                                                                                                                                                     |
| 68.        | Catalytic dehydrogenation of                                                                                                                                                                                                            | · · /                                                     |                                                                                                                                                                                                 |
|            | $Cr_2O_3/Al_2O_3$ at 750 K gives                                                                                                                                                                                                        |                                                           | [Roorkee 1999]                                                                                                                                                                                  |
|            | (a) iso-heptane                                                                                                                                                                                                                         | (b)                                                       | 1-heptene                                                                                                                                                                                       |
|            | (c) toluene                                                                                                                                                                                                                             | • •                                                       | 2, 3-dimethylpentene-1                                                                                                                                                                          |
| 69.        | $C_6H_6 \xrightarrow{HNO_3} X \xrightarrow{Cl_2} Y$<br>$H_2SO_4 \xrightarrow{FeCl_3} Y$                                                                                                                                                 |                                                           |                                                                                                                                                                                                 |
| • ).       | $H_2SO_4$ FeCl <sub>3</sub>                                                                                                                                                                                                             | • • • • •                                                 |                                                                                                                                                                                                 |
|            |                                                                                                                                                                                                                                         | (1)                                                       | [AIIMS 1999]                                                                                                                                                                                    |
|            | <ul><li>(a) 1-nitrochloro benzene</li><li>(c) 4-nitrochlorobenzene</li></ul>                                                                                                                                                            | (D)<br>(d)                                                | 3-nitrochlorobenzene                                                                                                                                                                            |
| 70.        | Which of the following has lowest                                                                                                                                                                                                       | • •                                                       |                                                                                                                                                                                                 |
| ,          | (a) Olefins                                                                                                                                                                                                                             | (b)                                                       |                                                                                                                                                                                                 |
|            | (c) Aromatic hydrocarbons                                                                                                                                                                                                               | (d)                                                       | Branched chain paraffins                                                                                                                                                                        |
| 71.        | In which of the following, the                                                                                                                                                                                                          | bonc                                                      |                                                                                                                                                                                                 |
|            | carbon atom is equal                                                                                                                                                                                                                    | (1)                                                       | [CPMT 1997]                                                                                                                                                                                     |
|            | (a) 2-butene<br>(c) 1-butene                                                                                                                                                                                                            |                                                           | Benzene<br>1-propyne                                                                                                                                                                            |
| 72.        | Benzene is prepared in laborator                                                                                                                                                                                                        |                                                           |                                                                                                                                                                                                 |
|            | compounds                                                                                                                                                                                                                               |                                                           | [MP PMT 1996]                                                                                                                                                                                   |
|            | (a) $C_6 N_5 N_2 Cl$                                                                                                                                                                                                                    | (b)                                                       | $C_6H_5OH$                                                                                                                                                                                      |
|            | (c) $C_6H_5COONa$                                                                                                                                                                                                                       | (d)                                                       | $C_6H_5SO_3H$                                                                                                                                                                                   |
| 73.        | Which of the following is not used                                                                                                                                                                                                      |                                                           |                                                                                                                                                                                                 |
| 10         |                                                                                                                                                                                                                                         |                                                           | [KCET 2000]                                                                                                                                                                                     |
|            |                                                                                                                                                                                                                                         |                                                           | Bromobenzene                                                                                                                                                                                    |
| = 4        | (c) Benzene                                                                                                                                                                                                                             | • •                                                       | Chlorobenzene                                                                                                                                                                                   |
| 74.        | In chlorination of benzene, the rea                                                                                                                                                                                                     | activ                                                     | [MP PET 2000]                                                                                                                                                                                   |
|            | (a) $Cl^+$                                                                                                                                                                                                                              | (b)                                                       | Cl <sup>-</sup>                                                                                                                                                                                 |
|            |                                                                                                                                                                                                                                         |                                                           |                                                                                                                                                                                                 |
|            | (c) <i>Cl</i> <sub>2</sub>                                                                                                                                                                                                              |                                                           | $Cl_2^{-}$                                                                                                                                                                                      |
| 75.        | Which of following having delocal                                                                                                                                                                                                       | ised                                                      | electron [BCECE 2005]                                                                                                                                                                           |
|            | (a) Benzene                                                                                                                                                                                                                             | (b)                                                       | Cyclohexane                                                                                                                                                                                     |
|            | (c) CH                                                                                                                                                                                                                                  | • •                                                       | CH.                                                                                                                                                                                             |
| 76.        | Benzene molecule is                                                                                                                                                                                                                     |                                                           | [MP PET 2001; Pb. PMT 2004]                                                                                                                                                                     |
|            | (a) Tetrahedral                                                                                                                                                                                                                         | (b)                                                       | Planar                                                                                                                                                                                          |
|            | (c) Pyramidal                                                                                                                                                                                                                           | (d)                                                       | Trigonal                                                                                                                                                                                        |
| 77.        | Pyridine is less basic than triethyl                                                                                                                                                                                                    | amm                                                       | [AllMS 2005]                                                                                                                                                                                    |
|            | (a) Pyridine has aromatic charac                                                                                                                                                                                                        | ter                                                       | [                                                                                                                                                                                               |
|            | (b) Nitrogen in pyridine is $sp^2$                                                                                                                                                                                                      | hybi                                                      | ridized                                                                                                                                                                                         |
|            | (c) Pyridine is a cyclic system                                                                                                                                                                                                         | <u> </u>                                                  |                                                                                                                                                                                                 |
|            |                                                                                                                                                                                                                                         |                                                           |                                                                                                                                                                                                 |
|            | (d) In pyridine, lone pair of nitro                                                                                                                                                                                                     | ogen                                                      | is delocalized                                                                                                                                                                                  |
| 78.        | Electrophile in the case of chlorin                                                                                                                                                                                                     |                                                           | of benzene in the presence of                                                                                                                                                                   |
| 78.        |                                                                                                                                                                                                                                         |                                                           |                                                                                                                                                                                                 |
| 78.        | Electrophile in the case of chlorin                                                                                                                                                                                                     | ation                                                     | of benzene in the presence of                                                                                                                                                                   |
| 78.        | Electrophile in the case of chlorin $FeCl_3$ is                                                                                                                                                                                         | ation<br>(b)                                              | of benzene in the presence of<br>[CBSE PMT 1996]                                                                                                                                                |
| 78.<br>79. | Electrophile in the case of chlorin $FeCl_3$ is<br>(a) $Cl^+$                                                                                                                                                                           | ation<br>(b)<br>(d)                                       | of benzene in the presence of [CBSE PMT 1996] $Cl^ FeCl_3$                                                                                                                                      |
| -          | Electrophile in the case of chlorin $FeCl_3$ is<br>(a) $Cl^+$<br>(c) $Cl$<br>Which one of the following we monochlorination                                                                                                             | ation<br>(b)<br>(d)                                       | of benzene in the presence of [CBSE PMT 1996] $Cl^ FeCl_3$ ndergo meta substitution on [AllMS 1991]                                                                                             |
| -          | Electrophile in the case of chlorin $FeCl_3$ is<br>(a) $Cl^+$<br>(c) $Cl$<br>Which one of the following we monochlorination<br>(a) Ethoxy ethane                                                                                        | (b)<br>(d)<br>ill u<br>(b)                                | of benzene in the presence of<br>[CBSE PMT 1996]<br>$Cl^-$<br>$FeCl_3$<br>ndergo meta substitution on<br>[AllMS 1991]<br>Chlorobenzene                                                          |
| 79.        | Electrophile in the case of chlorin $FeCl_3$ is<br>(a) $Cl^+$<br>(c) $Cl$<br>Which one of the following we monochlorination<br>(a) Ethoxy ethane<br>(c) Ethyl benzoate                                                                  | (b)<br>(d)<br>ill u<br>(b)<br>(d)                         | of benzene in the presence of [CBSE PMT 1996]<br>$Cl^-$<br>$FeCl_3$<br>ndergo meta substitution on [A11MS 1991]<br>Chlorobenzene<br>Phenol                                                      |
| -          | Electrophile in the case of chlorin $FeCl_3$ is<br>(a) $Cl^+$<br>(c) $Cl$<br>Which one of the following we monochlorination<br>(a) Ethoxy ethane<br>(c) Ethyl benzoate<br>Nitration of toluene takes place at                           | (b)<br>(d)<br>ill u<br>(b)<br>(d)                         | cl <sup>-</sup><br>FeCl <sub>3</sub><br>Chlorobenzene<br>Phenol<br>[NCERT 1990]                                                                                                                 |
| 79.        | Electrophile in the case of chlorin $FeCl_3$ is<br>(a) $Cl^+$<br>(c) $Cl$<br>Which one of the following we monochlorination<br>(a) Ethoxy ethane<br>(c) Ethyl benzoate<br>Nitration of toluene takes place at<br>(a) <i>o</i> -position | (b)<br>(d)<br>ill u<br>(b)<br>(d)<br>:<br>(b)             | of benzene in the presence of<br>[CBSE PMT 1996]                                                                                                                                                |
| 79.        | Electrophile in the case of chlorin $FeCl_3$ is<br>(a) $Cl^+$<br>(c) $Cl$<br>Which one of the following we monochlorination<br>(a) Ethoxy ethane<br>(c) Ethyl benzoate<br>Nitration of toluene takes place at                           | (b)<br>(d)<br>ill u<br>(b)<br>(d)<br>:<br>(b)<br>(d)<br>: | cl <sup>-</sup><br>FeCl <sub>3</sub><br>ndergo meta substitution on<br>[AIIMS 1991]<br>Chlorobenzene<br>Phenol<br>[NCERT 1990]<br><i>m</i> -position<br>Both <i>o</i> - and <i>p</i> -positions |

|     | (a) $-NH_2$                                      | (b)                  | -OH                         |                         |
|-----|--------------------------------------------------|----------------------|-----------------------------|-------------------------|
|     | (c) $-X$ (halogens)                              | (d)                  | -СНО                        |                         |
| 82. | Benzene can react with                           |                      |                             | [UPSEAT 2003]           |
|     | (a) $Br_2$ water                                 | (b)                  | $HNO_3$                     |                         |
|     | (c) $H_2O$                                       | (d)                  | $CH_3OH$                    |                         |
| 83. | The compound 'A' having formula                  | $C_8$                | $H_{10}$ (aromatic          | e) which gives 1        |
|     | mononitro substitute and 3 nitros                |                      |                             |                         |
|     | (a) <i>m</i> -Xylene                             | • •                  | <i>p</i> -Xylene            |                         |
| •   |                                                  |                      | Ethyl benzene               |                         |
| 84. | Catalytic hydrogenation of benzen                |                      |                             | [AIIMS 1996]            |
|     |                                                  | (b)<br>(d)           | Cyclohexane<br>Toluene      |                         |
| 85. | Benzene is obtained from                         | (4)                  | londene                     | [CPMT 1996]             |
|     | (a) Coaltar                                      | (b)                  | Plant                       |                         |
|     |                                                  | (d)                  | Charcoal                    |                         |
| 86. | The 'middle oil' fraction of coaltar             | disti                | llation contains            |                         |
|     | (a) Benzene                                      | ( <b>b</b> )         | Anthracene                  | [MP PET 2001]           |
|     |                                                  | · /                  | Xylene                      |                         |
| 87. | Lindane can be obtained by reaction              |                      | •                           |                         |
|     |                                                  |                      |                             | [DCE 2000]              |
|     | (a) $CH_3Cl$ /anhy. $AlCl_3$                     | (b)                  | $Cl_2$ /sunlight            |                         |
|     | (c) $C_2H_5I$ /anhy. $AlCl_3$                    | (d)                  | CH <sub>3</sub> COCl/       | AlCl <sub>3</sub>       |
| 88. | Which of the following oil is obta               | ined                 | from benzene                | after fractional        |
|     | distillation of coal tar                         | <i>(</i> <b>1</b> ). |                             | [BHU 2004]              |
|     | · · · -                                          |                      | Heavy oil<br>Anthracene oil | I                       |
| 80  |                                                  |                      |                             |                         |
| 89. | Hydrocarbon $C_6H_6$ decolourise                 |                      |                             | gives ppt. with         |
|     | ammonical $AgNO_3$ Hydrocarbor                   | i can                | be                          | [MD DET acc 4]          |
|     | (a) 1, 3, 5 Cyclohexatriene                      | (b)                  | 1, 5 Hexadiyne              | [MP PET 2004]           |
|     |                                                  | (d)                  | None                        |                         |
| 90. | Decreasing order of C-C bond leng                | gth is               | [JEE Orissa 2004            | 4]                      |
|     | (a) $C_2H_4$                                     | (b)                  | $C_2H_2$                    |                         |
|     | (c) $C_6 H_6$                                    | (d)                  | $C_2H_6$                    |                         |
|     | (a) $1V > 111 > 1 > 11$                          | (b)                  | 1 > 11 > 1V > 111           |                         |
|     | (c) $11 > 1 > 1V > 111$                          | (d)                  | IV > 1 > III > II           |                         |
| 91. | Benzene can be obtained by heat                  |                      |                             | acid with X or          |
|     | phenol with <i>Y. X</i> and <i>Y</i> are respect | ively                |                             | [KCET 2004]             |
|     | (a) Zinc dust and soda lime                      |                      |                             | [                       |
|     | (b) Soda lime and zinc dust                      |                      |                             |                         |
|     | (c) Zinc dust and sodium hydrox                  | ide                  |                             |                         |
|     | (d) Soda lime and copper                         |                      | 1011                        |                         |
| 92. | Order of reactivity of $C_2H_6, C_2H_6$          | $H_4$                | and $C_2H_2$ is             | 1                       |
|     |                                                  | (1)                  | $C \to C$                   | [MH CET 2004]           |
|     | (a) $C_2H_6 > C_2H_4 > C_2H_2$                   |                      |                             |                         |
|     | (c) $C_2H_2 > C_2H_4 > C_2H_6$                   |                      |                             | reactive                |
| 93. | Which of the following yield both                | alkan                | ne and alkene               |                         |
|     | (a) Kolbe's reaction                             | ( <b>b</b> )         | Williamson's s              | [AFMC 2004]<br>vnthesis |
|     |                                                  |                      | Sandmeyer rea               | -                       |
| 94. | Aromatisation of <i>n</i> -heptane by            |                      | -                           |                         |
|     |                                                  |                      | 2004]                       | 5 2 5'                  |
|     | , .                                              | (b)                  | Toluene                     |                         |
|     |                                                  | (d)                  | Heptylene                   |                         |
| 95. | Amongst the following the most b                 | asic o               | compound is                 | [AIEEE 2005]            |
|     |                                                  |                      |                             | LAIGEE 20051            |

[AIEEE 2005]

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|     | (a) Benzylamine              | (b) Aniline                |             |
|-----|------------------------------|----------------------------|-------------|
|     | (c) Acetanilide              | (d) <i>p</i> -nitroaniline |             |
| 96. | When toluene is treated with | $KMnO_4$ , what is produce | ed          |
|     |                              |                            | [AFMC 2005] |
|     | (a) Benzene                  | (b) Chlorobenzene          |             |

- (c) Benzaldehyde (d) Benzoic acid
- In presence of light & heat toluene chlorinated & react with aqueous 97. NaOH to give

[Kerala CET 2005]

[MP PMT 2003]

[CPMT 1985; MP PET 1997;

[MP PET 1994]

7.

8.

- (a) o-Cresol (b) p-Cresol
- (c) Mixture of o- Cresol & p-Cresol
- (d) Benzoic acid
- (e) 1, 3, 5 trihydroxy toluene

# Critical Thinking

### **Objective Questions**

- In the case homologous series of alkanes, which one of the following 1. statements is incorrect []IPMER 2000]
  - (a) The members of the series are isomers of each other
  - (b) The members of the series have similar chemical properties
  - The members of the series (c) have the general formula  $C_n H_{2n+2}$ , where *n* is an integer
  - (d) The difference between any two successive members of the series corresponds to 14 unit of relative atomic mass
- 2. How many primary, secondary, tertiary and quaternary carbons are present in the following hydrocarbon

- The octane number of a sample of petrol is 40. It means that its 3. knocking property is equal to the mixture of
  - (a) 40% *n*-heptane + 60% *iso*-octane
  - (b) 40% petrol + 60% *iso*-octane
  - (c) 60% *n*-heptane + 40% *iso*-octane
  - (d) 60% petrol + 40% *iso*-octane
- Formation of 2-butene as major product by dehydration of 2-butanol 4 is according to [MP PMT 1995]
  - (a) Markownikoff rule (b) Saytzeff rule
  - (d) Anti-Markownikoff rule (c) Peroxide effect

5. 
$$CH_3C \equiv CCH_3 \xrightarrow{(i)X}_{(i)H_2O/Zn} CH_3 - C - C - CH_3$$

X in the above reaction is

Roorkee Qualifying 1998; DPMT 2001] (a)  $HNO_3$ (b) *O*<sub>2</sub>

- (c)  $O_2$ (d)  $KMnO_4$
- Which of the following is Friedel-Craft's reaction 6.

(a) 
$$C_6H_6 + FeCl_3 + Cl_2 \rightarrow C_6H_5Cl$$

(b) 
$$C_6H_5CHO + CH_3CHO + KOH \rightarrow C_6H_5CH = CH - CHO$$
  
O

(c)  $C_6H_6 + CH_3COCl + AlCl_3 \rightarrow C_6H_5 - \overset{\parallel}{C} - CH_3$ 

(d)  $C_6H_5OH + CHCl_2 + KOH \longrightarrow$  Salicylaldehyde

Condition for maximum yield of  $C_2H_5Cl$  is

(a)  $C_2H_6$  (excess) +  $Cl_2 \xrightarrow{UV \text{ Light}}$ 

[DCE 2003]

(b) 
$$C_2H_6 + Cl_2 \xrightarrow{\text{Dark}}_{\text{Room temp.}}$$

(c) 
$$C_2H_{\epsilon} + Cl_2$$
 (excess)  $\xrightarrow{UV \text{ Light}}$ 

(d) 
$$C_2 H_6 + C l_2 - \frac{UV \text{ Light}}{VV \text{ Light}}$$

When ethyl alcohol is heated with red phosphorus and HI, then which of the following is formed [Kurukshetra CEE 1998]

(a) 
$$C_2H_6$$
 (b)  $CH_4$   
(c)  $C_3H_8$  (d)  $C_2H_4$ 

9. In the Fischer-Tropsch synthesis of petrol..... and ..... are used as the raw materials [KCET 1998] (a)  $H_2:CO$ (b)  $CH_4$ :  $H_2$ 

(c) 
$$CH_4$$
;  $CH_3OH$  (d)  $CH_3OH$ ;  $CO$ 

- Which one of the following reactions is most suitable for the 10 preparation of *n*-propyl benzene [MP PET/PMT 1998] (a) Friedel-Craft's reaction (b) Wurtz reaction
  - (c) Wurtz-Fittig reaction (d) Grignard reaction
- Propane cannot be prepared from which reaction 11.

(a) 
$$CH_3 - CH = CH_2 \xrightarrow{B_2H_6} OH^-$$
  
(b)  $CH_3CH_2CH_2I \xrightarrow{HI} P$ 

(c) 
$$CH_3CH_2CH_2Cl \xrightarrow{Na}$$

12 The reaction

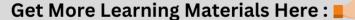
$$CH_{3}CH = CH_{2} \xrightarrow[H^{+}]{} CH_{3} - CH - CH_{3}$$
 is known

 $CH_{2}$ 

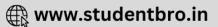
13. The compound  $CH_3 - C = CH - CH_3$  on reaction with  $NaIO_4$  in the presence of  $KMnO_4$  gives [CBSE PMT 2003]

- (a)  $CH_3CHO + CO_2$
- (b)  $CH_3COCH_3$
- (c)  $CH_3COCH_3 + CH_3COOH$
- (d)  $CH_3COCH_3 + CH_3CHO$
- In the reaction : 14.  $HC \equiv CH + 2AgNO_3 \xrightarrow{NH_4OH} X + 2NH_4NO_3 + 2H_2O$ 'X is (b)  $Ag_2C_2$ (a)  $Ag_2C$ (c) AgC(d) AgOH Naphthalene is a/an [AFMC 2004] 15. (a) lonic solid (d) Covalent solid (c) Metallic solid (d) Molecular solid 16.

Which of the following is not aromatic [Pb. CET 2000]



C



|            | (a)Benzene(b)Naphthalene(c)Pyridine(d)1,3,5 heptatriene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| 17.        | Acetylene reacts with $HCN$ in the presence of $Ba(CN)_2$ to yield<br>(a) 1, 1-dicyanoethane (b) 1, 2-dicyanoethane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 27.               |
| 18.        | (c) Vinyl cyanide (d) None of these<br>Write the products of the addition reaction $C = C + XY \rightarrow$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |
| 10.        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |
|            | (a) $\bigvee C \subset C $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 28.               |
|            | $()  C = C \qquad ()  \mathbf{y}  C  C  \mathbf{y}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                   |
|            | (c) $\stackrel{ }{C} = C -$ (d) $X - \stackrel{ }{C} - \stackrel{ }{C} - X$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 29.               |
|            | Y<br>X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |
|            | (e) $\begin{array}{c} X \\ C \\ C \\ C \\ C \end{array}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |
|            | $(e)  \begin{array}{c} c - c \\   \\ \end{array}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30.               |
| 19.        | Formation of polyethylene from calcium carbide takes place as follows                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 000               |
|            | $CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 31.               |
|            | $C_2H_2 + H_2 \rightarrow C_2H_4$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |
|            | $n(C_2H_4) \rightarrow (-CH_2 - CH_2 -)_n$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |
|            | The amount of polyethylene obtained from 64.1 kg $\ CaC_2$ is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 32.               |
|            | [A11MS 1997]<br>(a) 7 kg (b) 14 kg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 32.               |
|            | (c) 21 <i>kg</i> (d) 28 <i>kg</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |
| 20.        | Nitrobenzene can be prepared from benzene by using a mixture of conc. $HNO_3$ and conc. $H_2SO_4$ . In the nitrating mixture,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 33.               |
|            | $HNO_3$ acts as a [IIT-JEE 1997]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |
|            | (a) Base (b) Acid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |
| 21.        | (c) Reducing agent (d) Catalyst<br>A group which deactivates the benzene ring towards electrophilic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 34.               |
|            | substitution but which directs the incoming group principally to the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |
|            | a and prositions is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                   |
|            | <i>o</i> - and <i>p</i> -positions is<br>[Pb. PMT 1998]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 35.               |
|            | , .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 35.               |
|            | $ \begin{array}{c} \text{[Pb. PMT 1998]} \\ \text{(a)} & -NH_2 \\ \text{(c)} & -NO_2 \\ \end{array} \begin{array}{c} \text{(b)} & -Cl \\ \text{(d)} & -C_2H_5 \\ \end{array} \end{array} $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |
| 22.        | (a) $-NH_2$ (b) $-Cl$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 35.<br>36.        |
| 22.        | $[Pb. PMT 1998]$ (a) $-NH_2$ (b) $-Cl$ (c) $-NO_2$ (d) $-C_2H_5$ Which order is correct for the decreasing reactivity to ring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |
| 22.        | $[Pb. PMT 1998]$ (a) $-NH_2$ (b) $-Cl$<br>(c) $-NO_2$ (d) $-C_2H_5$<br>Which order is correct for the decreasing reactivity to ring<br>monobromination of the following compounds<br>$C_6H_5CH_3$ , $C_6H_5COOH$ , $C_6H_6$ $C_6H_5NO_2$<br>I II III IV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |
| 22.        | $[Pb. PMT 1998]$ (a) $-NH_2$ (b) $-Cl$ (c) $-NO_2$ (d) $-C_2H_5$ Which order is correct for the decreasing reactivity to ring monobromination of the following compounds $C_6H_5CH_3, C_6H_5COOH, C_6H_6 C_6H_5NO_2$ I II III IV (a) $I > II > III > IV$ (b) $I > III > II > IV$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |
| 22.<br>23. | $[Pb. PMT 1998]$ (a) $-NH_2$ (b) $-Cl$<br>(c) $-NO_2$ (d) $-C_2H_5$<br>Which order is correct for the decreasing reactivity to ring<br>monobromination of the following compounds<br>$C_6H_5CH_3$ , $C_6H_5COOH$ , $C_6H_6$ $C_6H_5NO_2$<br>I II III IV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 36.               |
|            | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 36.               |
|            | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 36.               |
|            | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 36.               |
| 23.        | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 36.<br>37.        |
|            | $[Pb. PMT 1998]$ (a) $-NH_2$ (b) $-Cl$ (c) $-NO_2$ (d) $-C_2H_5$ Which order is correct for the decreasing reactivity to ring monobromination of the following compounds $C_6H_5CH_3,  C_6H_5COOH,  C_6H_6  C_6H_5NO_2$ I II II III IV (a) $I > II > III > IV$ (b) $I > III > II > IV$ (c) $II > III > IV > I$ (d) $III > I > II > IV$ (e) $I > III > II > IV$ (f) $I > III > II > IV$ (g) $I > III > II > IV$ (h) $I > II > II > IV$ (h) $I > III > II > IV$ (h) $I > II > II > IV$ (h) $I > I > I > II > IV$ (h) $I > I > II > IV$ (h) $I > I > I > II > IV$ (h) $I > I > I > II > IV$ (h) $I > I > II > IV$ (h) $I > I > I > II > IV$ (h) $I > I > I > II > IV$ (h) $I > I > I > II > IV$ (h) $I > I > I > II > IV$ (h) $I > I > I > II > IV$ (h) $I > I > I > II > IV$ (h) $I > I > I > I > II > IV$ (h) $I > I > I > I > II > IV$ (h) $I > I > I > I > II > IV$ (h) $I > I > I > I > II > IV$ (h) $I > I > I > I > II > IV$ (h) $I > I > I > I > II > IV$ (h) $I > I > I > I > II > IV$ (h) $I > I > I > I > II > IV$ (h) $I > I > I > I > II > II > II > IV$ (h) $I > I > I > I > I > II > IV$ (h) $I > I > I > I > I > II > II > IV$ (h) $I > I > I > I > II > II > II > II > I$                                                                                                                                                                                                                                                                                                                                                                                                                              | 36.<br>37.        |
| 23.        | $ [Pb. PMT 1998] \label{eq:posterior} \begin{tabular}{lllllllllllllllllllllllllllllllllll$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 36.<br>37.        |
| 23.<br>24. | $ [Pb. PMT 1998] \\ (a) -NH_2 (b) -Cl \\ (c) -NO_2 (d) -C_2H_5 \\ Which order is correct for the decreasing reactivity to ring monobromination of the following compounds \\ C_6H_5CH_3, C_6H_5COOH, C_6H_6 C_6H_5NO_2 \\ I II III IV \\ (a) I > II > III > IV \\ (b) I > III > II > IV \\ (c) II > III > IV > I (d) III > I > II > IV \\ Benzene is obtained by [DPMT 2002] \\ (a) Substitution of three acetylene molecules \\ (b) Addition of three C_2H_2 molecules \\ (c) Polymerisation of three C_2H_2 molecules \\ (d) Condensation of three C_2H_2 molecules \\ (d) Both (a) and (b) \\ (d) Both (a) Both $ | 36.<br>37.<br>38. |
| 23.        | $ [Pb. PMT 1998] \label{eq:posterior} \begin{tabular}{lllllllllllllllllllllllllllllllllll$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 36.<br>37.        |
| 23.<br>24. | $[Pb. PMT 1998]$ (a) $-NH_2$ (b) $-Cl$ (c) $-NO_2$ (d) $-C_2H_5$ Which order is correct for the decreasing reactivity to ring monobromination of the following compounds $C_6H_5CH_3,  C_6H_5COOH,  C_6H_6  C_6H_5NO_2$ I II III IV (a) $I > II > III > IV$ (b) $I > III > II > IV$ (c) $II > III > III > IV$ (d) $III > II > II > IV$ Benzene is obtained by [DPMT 2002] (a) Substitution of three acetylene molecules (b) Addition of three $C_2H_2$ molecules (c) Polymerisation of three $C_2H_2$ molecules (d) Condensation of three $C_2H_2$ molecules (c) $H_2SO_4$ (d) Both (a) and (b) $CaC_2 + H_2O \rightarrow A - \frac{H_2SO_4/H_gSO_4}{H_2SO_4/H_gSO_4} \rightarrow B$ . Identify A and B in the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 36.<br>37.<br>38. |
| 23.<br>24. | $[Pb. PMT 1998]$ (a) $-NH_2$ (b) $-Cl$ (c) $-NO_2$ (d) $-C_2H_5$ Which order is correct for the decreasing reactivity to ring monobromination of the following compounds $C_6H_5CH_3,  C_6H_5COOH,  C_6H_6  C_6H_5NO_2$ I II III IV (a) $I > II > III > IV$ (b) $I > III > II > IV$ (c) $II > III > III > IV$ (d) $III > I > II > IV$ Benzene is obtained by [DPMT 2002] (a) Substitution of three acetylene molecules (b) Addition of three $C_2H_2$ molecules (c) Polymerisation of three $C_2H_2$ molecules (d) Condensation of three $C_2H_2$ molecules (d) Condensation of three $C_2H_2$ molecules (d) Condensation of three $C_2H_2$ molecules (c) $H_2SO_4$ (d) Both (a) and (b) $CaC_2 + H_2O \rightarrow A \xrightarrow{H_2SO_4/HgSO_4} B$ . Identify A and B in the given reaction [CPMT 2000; BVP 2004]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 36.<br>37.<br>38. |
| 23.<br>24. | $[Pb. PMT 1998]$ (a) $-NH_2$ (b) $-Cl$ (c) $-NO_2$ (d) $-C_2H_5$ Which order is correct for the decreasing reactivity to ring monobromination of the following compounds $C_6H_5CH_3,  C_6H_5COOH,  C_6H_6  C_6H_5NO_2$ I II III IV (a) $I > II > III > IV$ (b) $I > III > II > IV$ (c) $II > III > III > IV$ (d) $III > I > II > IV$ (e) $I > III > III > IV$ (f) $I > III > II > IV$ (g) $I > III > II > II > II$ (g) $I > III > II > II > II$ (g) $I > III > II > II > II$ (g) $I > III > III > II > II > IV$ (h) $I > II > II > II > IV$ (c) $II > III > IV > I$ (d) $III > I > II > IV$ Benzene is obtained by (DPMT 2002] (a) Substitution of three $C_2H_2$ molecules (b) Addition of three $C_2H_2$ molecules (c) Polymerisation of three $C_2H_2$ molecules (d) Condensation of three $C_2H_2$ molecules (d) Condensation of three $C_2H_2$ molecules (e) $KMNO_4$ (f) $K_2Cr_2O_7$ (g) $H_2SO_4$ (g) $H_2SO_4 + H_2SO_4 + H_2SO_4 + B$ . Identify $A$ and $B$ in the given reaction (CPMT 2000; BVP 2004] (a) $C_2H_2$ and $CH_3CHO$ (b) $CH_4$ and $HCOOH$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 36.<br>37.<br>38. |

|              | (a) $C_2 H_2$ (b) $C_2 H_2$                                                                               |                               |
|--------------|-----------------------------------------------------------------------------------------------------------|-------------------------------|
|              | (c) $C_{[U]}$ (d) $C_4 H$                                                                                 | 0                             |
| 27.          | What is formed when calcium carbide react we have $C_2D_2$ (b) $CaD_2$                                    |                               |
|              | (a) $C_2 D_2$ (b) $C d D$<br>(c) $C_1 Kerala (Med.) 2002$ ] (d) $C D_2$                                   | 2                             |
| -9           |                                                                                                           |                               |
| 28.          | The addition of <i>HBr</i> is easiest with                                                                | [MP PMT 2000]                 |
|              | 2                                                                                                         | H = CHCl                      |
| 20           | (c) $CH_3 - CH = CH_2$ (d) (CH                                                                            | $_{3})_{2}C = CH_{2}$         |
| 2 <b>9</b> . | Identify the species X in the reaction :<br>Propene + $O(\text{conc. acidic } KMnO_4) \rightarrow \Sigma$ | X + Formic acid               |
|              | (a) Acetone (b) Aceta                                                                                     |                               |
|              | (c) Isopropanol (d) Acetic                                                                                |                               |
| 30.          | In benzene 1, 3 position is called                                                                        |                               |
|              | (a) Meta (b) Para<br>(c) Ortho (d) Odd                                                                    | position                      |
| 31.          | Which of the following is formed as a resul                                                               | t of biological oxidation     |
|              | of benzene in the body of the dog                                                                         | [Manipal MEE 1995]            |
|              | (a) Acrylic acid (b) Cinna                                                                                | • • •                         |
|              |                                                                                                           | nic acid                      |
| 32.          | When acetylene is reacted with <i>HBr</i> , we get                                                        | CPMT 1979; JIPMER 2002]       |
|              | (a) Methyl bromide (b) Ethyl                                                                              | bromide                       |
| 33.          | (c) Ethylene bromide (d) Ethyli<br>The only <i>o</i> , <i>p</i> -directing group which is deacti          | dene bromide                  |
| 55.          | (a) $-NH_2$ (b) $-OH$                                                                                     |                               |
|              |                                                                                                           | (alkyl groups)                |
| 34.          | Which kind of isomerism will butene-2 show                                                                |                               |
|              | (a) Geometrical (b) Optic                                                                                 |                               |
| 35.          | (c) Position (d) None<br>In presence of light toluene on reaction with                                    |                               |
|              |                                                                                                           | [RPET 1999]                   |
|              | (a) Benzoyl chloride (b) Ortho<br>(c) Para chloro toluene (d) Benzy                                       | o chlorotoluene<br>1 chloride |
| 36.          | If ethylene, carbon monoxide and wate                                                                     | r is heated at high           |
|              | temperature, which of the following is forme                                                              | ]<br>[A11MS 2000]             |
|              | (a) $C_4 H_8 O_2$ (b) $C_2 H_8 O_2$                                                                       |                               |
|              |                                                                                                           | = CH - COOH                   |
| 37.          | Compound $C_6 H_{12}$ is an                                                                               | [AMU 1983]                    |
|              | (a) Aliphatic saturated compound                                                                          |                               |
|              | (b) Alicyclic compound                                                                                    |                               |
|              | <ul><li>(c) Aromatic compound</li><li>(d) Heterocyclic compound</li></ul>                                 |                               |
| 38.          | Identify $Z$ in the following series                                                                      |                               |
|              | $CH_2 = CH_2 \xrightarrow{HBr} X \xrightarrow{Hydrolysis} Y -$                                            | $Na_2CO_3 \rightarrow Z$      |
|              |                                                                                                           | [AIIMS 1983; RPMT 1999]       |
|              | (a) $C_2H_5I$ (b) $C_2H$                                                                                  | •                             |
|              | (c) $CHI_3$ (d) $CHI_3$                                                                                   | CHO                           |
| <b>39</b> .  | <i>n</i> -pentane and iso pentane can be distinguish                                                      | ed by                         |
|              |                                                                                                           | [BVP 2004]                    |
|              | (a) $Br_2$ (b) $O_3$                                                                                      | 0                             |
|              | (c) conc. $H_2SO_4$ (d) $KM_4$                                                                            |                               |
| 40.          | $CH \equiv CH + HBr \rightarrow X, \text{ product } X \text{ is}$                                         | [Pb. CET 2003]                |
|              | (a) Ethylene bromide (b) Vinyl                                                                            | bronnide                      |

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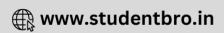
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|                | (c) Brome           | o ethan | e (d) Ethyledine bromide                                                                               | 18.      | Assertion           | : | Ethene on treating with $Br_2$ in presence of $NaCl$ forms $CH_2ClCH_2Br$ and $CH_2Br - CH_2 - Br$ .                                                             |
|----------------|---------------------|---------|--------------------------------------------------------------------------------------------------------|----------|---------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                | R                   | As      | sertion & Reason                                                                                       |          | Reason              | : | This addition involves the formation of free radicals.                                                                                                           |
|                |                     |         | For AIIMS Aspirants                                                                                    | 19.      | Assertion           | : | Straight chain alkanes have very low octane number.                                                                                                              |
| 1.             | Assertion           | :       | 1-Butene on reaction with $HBr$ in the presence of a peroxide produces 1-bromo-butane.                 |          | Reason              | : | Quality of gasoline is measured in terms of octane number.                                                                                                       |
|                | Reason              | :       | It involves the free radical mechanism.<br>[IIT-JEE (Screening) 2000]                                  | 20.      | Assertion           | : | Corey-House reaction can be used to prepare both symmetrical and unsymmetrical alkanes.                                                                          |
| 2.             | Assertion           | :       | Addition of $Br_2$ to 1-butene gives two optical isomers.                                              |          | Reason              | : | The reaction involves the interaction between<br>lithium dialkyl copper with an alkyl halide both<br>of which may contain even or odd number of<br>carbon atoms. |
| _              | Reason              | :       | The product contains one asymmetric carbon.[ <b>IIT 199</b>                                            | -        | A                   |   |                                                                                                                                                                  |
| 3.             | Assertion<br>Reason | :       | Cyclobutane is less stable than cyclopentane<br>Presence of bent bonds causes "loss of orbital         | 21.      | Assertion           | : | All the hydrogen atoms in $CH_2 = C = CH_2$<br>lie in one plane.                                                                                                 |
|                | Assertion           |         | overlap". [AllMS 1996]                                                                                 |          | Reason              | : | All the carbon atoms in it are $sp^2$ hybridized.                                                                                                                |
| 4.             | Reason              | :       | Pyrrole is an aromatic heterocyclic compound.<br>It has a cyclic, delocalised $6\pi$ electrons.        | 22.      | Assertion           | : | Propene reacts with <i>HBr</i> in presence of benzoyl peroxide to yield 2-bromopropane.                                                                          |
| 5.             | Assertion           | :       | [A11MS 1995] $CH_4$ does not react with $Cl_2$ in dark.                                                |          | Reason              | : | In presence of peroxide, the addition of <i>HBr</i> to propene follows ionic mechanism.                                                                          |
|                | Reason              | :       | Chlorination of $CH_4$ takes place in sunlight. [AIIMS                                                 | 20028    | Assertion           | : | Acetylene reacts with sodamide to evolve $H_2$                                                                                                                   |
| 6.             | Assertion           | :       | Alkyl benzene is not prepared by Friedel-Crafts alkylation of benzene.                                 | -0-      |                     |   | gas.                                                                                                                                                             |
|                | Reason              |         | Alkyl halides are less reactive than acyl halides. [AllM                                               | IS 2003] | Reason<br>Assertion | : | Acetylene is a weaker acid than ammonia.<br>Aryl halides are less reactive towards substitution                                                                  |
| 7.             | Assertion           | :       | 2-Bromobutane on reaction with sodium ethoxide<br>in ethanol gives 1-butene as a major product. [AIIMS | -        | Reason              | • | of halogen atom.<br>Halogens are $o, p$ – directing in nature.                                                                                                   |
|                | Reason              | :       | 1-Butene is more stable than 2-butene.                                                                 |          | Assertion           | • | Benzene is a solvent for the Friedel Craft's                                                                                                                     |
| 8.             | Assertion           | :       | Styrene on reaction with <i>HBr</i> gives 2-bromo-2-                                                   | 25.      | Assertion           | • | alkylation of bromobenzene.                                                                                                                                      |
|                | Reason              | :       | phenyl-ethane.<br>Benzyl radical is more stable than alkyl radical.[AIIMS                              | S 2004]  | Reason              | : | Friedel Craft's reaction is used to introduced on alkyl or acyl group in benzene nucleus.                                                                        |
| <del>9</del> . | Assertion           | :       | Melting point of <i>n</i> -butane is higher than propane.                                              | 26.      | Assertion           | : | Benzene removes a butter stain from a table cloth.                                                                                                               |
|                | Reason              | :       | It is called oscillation effect.                                                                       |          | Reason              | : | Butter has an affinity towards benzene.                                                                                                                          |
| 10.            | Assertion           | :       | lodination of alkanes is reversible.                                                                   | 27.      | Assertion           | : | Nitration of toluene is easier than benzene.                                                                                                                     |
|                | Reason              | :       | lodination is carried out in presence of iodic acid.                                                   | - 0      | Reason              | : | The methyl group in toluene is electron-releasing.                                                                                                               |
| 11.            | Assertion           | :       | Isobutane on oxidation with $KMnO_4$ gives tert-<br>butyl alcohol.                                     | 28.      | Assertion           | : | Benzene forms benzene sulphonic acid with fuming $H_2SO_4$ at high temperature.                                                                                  |
|                | Reason              | :       | Oxidising agents have no effect on alkanes.                                                            |          | Reason              | : | The attacking species is $SO_3$ .                                                                                                                                |
| 12.            | Assertion           | :       | Halogenation of alkanes is catalysed by tetraethyl<br>lead.                                            | 29.      | Assertion<br>Reason | : | Activating groups are electron donors.<br>Nitroso group is activating group.                                                                                     |
|                | Reason              | :       | Halogenation proceeds through free radical mechanism.                                                  | 30.      | Assertion           | : | Benzene reacts with $CH_3COCl$ to give                                                                                                                           |
| 13.            | Assertion           | :       | Neopentane forms only one monosubstituted compound.                                                    |          | Reason              | : | chlorobenzene.<br>Chlorination is an electrophilic substitution                                                                                                  |
|                | Reason              | :       | Neopentane has high bond energy.                                                                       |          |                     |   | reaction.                                                                                                                                                        |
| 14.            | Assertion           | :       | Freezing point of neopentane is more than <i>n</i> -pentane.                                           | 31.      | Assertion           | : | Conjugated polyenes containing odd number of carbon atoms is known as annulenes.                                                                                 |
|                | Reason              | :       | Increase in Van der Waals forces increases<br>freezing point.                                          |          | Reason              | : | General formula of annulenes is $(CH = CH)_n$<br>where $n = 2,3,4$ etc.                                                                                          |
| 15.            | Assertion           | :       | Knocking lowers the efficiency of the engine.                                                          | 32.      | Assertion           | : | Tropylium cation is aromatic in nature                                                                                                                           |
|                | Reason              | :       | Fuel with minimum knocking property is preferred.                                                      | بەن.     | Assertion           | • |                                                                                                                                                                  |
| 16.            | Assertion           | :       | The presence of $Ag^+$ enhances the solubility of alkenes in water.                                    |          | Reason              | : | The only property that determines its aromatic                                                                                                                   |
|                | Reason              | :       | Alkenes are weakly polar in nature.                                                                    |          |                     |   | behaviour is its planar structure.                                                                                                                               |
| 17.            | Assertion           | :       | 2-Butanol on heating with $H_2SO_4$ gives 1-                                                           | 33.      | Assertion           | : | [10] Annulene is not aromatic though it contains Huckel number of $\pi$ -electrons.                                                                              |
|                | Reason              | :       | butene and 2-butene.<br>Dehydration of 2-butanol follows saytzeff rule.                                |          | Reason              | : | Steric interaction between internal hydrogens makes it non-planar.                                                                                               |

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| 34. | Assertion           | :      | Rates of nitration of benzene and hexadeuterobenzene are different.                                      |
|-----|---------------------|--------|----------------------------------------------------------------------------------------------------------|
| 35. | Reason<br>Assertion | :<br>: | C-H bond is stronger than $C-D$ bond<br>Cyclolpentadienyl anion is much more stable<br>than allyl anion. |
|     | Reason              | :      | Cyclopentadienyl anion is aromatic in character.                                                         |

4-4

Answers

Alkane

| 1   | d | 2   | а | 3   | а | 4   | а | 5   | b  |
|-----|---|-----|---|-----|---|-----|---|-----|----|
| 6   | c | 7   | b | 8   | a | 9   | d | 10  | c  |
| 11  | d | 12  | а | 13  | С | 14  | d | 15  | b  |
| 16  | a | 17  | b | 18  | d | 19  | b | 20  | b  |
| 21  | b | 22  | b | 23  | a | 24  | b | 25  | a  |
| 26  | d | 27  | c | 28  | c | 29  | d | 30  | c  |
| 31  | a | 32  | а | 33  | d | 34  | а | 35  | a  |
| 36  | а | 37  | d | 38  | a | 39  | d | 40  | c  |
| 41  | b | 42  | d | 43  | d | 44  | а | 45  | b  |
| 46  | d | 47  | c | 48  | d | 49  | а | 50  | c  |
| 51  | d | 52  | а | 53  | a | 54  | c | 55  | a  |
| 56  | d | 57  | b | 58  | d | 59  | b | 60  | a  |
| 61  | b | 62  | a | 63  | b | 64  | c | 65  | c  |
| 66  | b | 67  | С | 68  | b | 69  | d | 70  | c  |
| 71  | b | 72  | a | 73  | с | 74  | c | 75  | b  |
| 76  | с | 77  | с | 78  | с | 79  | а | 80  | c  |
| 81  | C | 82  | а | 83  | d | 84  | а | 85  | b  |
| 86  | a | 87  | a | 88  | d | 89  | a | 90  | a  |
| 91  | а | 92  | b | 93  | C | 94  | а | 95  | C  |
| 96  | b | 97  | а | 98  | d | 99  | а | 100 | d  |
| 101 | C | 102 | а | 103 | а | 104 | b | 105 | d  |
| 106 | b | 107 | d | 108 | C | 109 | d | 110 | b  |
| 111 | a | 112 | b | 113 | d | 114 | b | 115 | d  |
| 116 | d | 117 | d | 118 | C | 119 | C | 120 | C  |
| 121 | C | 122 | b | 123 | a | 124 | d | 125 | C  |
| 126 | a | 127 | a | 128 | b | 129 | b | 130 | C  |
| 131 | a | 132 | а | 133 | а | 134 | b | 135 | b  |
| 136 | C | 137 | а | 138 | С | 139 | а | 140 | c  |
| 141 | a | 142 | b | 143 | a | 144 | C | 145 | b  |
| 146 | c | 147 | d | 148 | c | 149 | d | 150 | b  |
| 151 | a | 152 | c | 153 | a | 154 | b | 155 | ab |
| 156 | c | 157 | b | 158 | a | 159 | a | 160 | c  |
| 161 | е | 162 | C | 163 | a | 164 | c | 165 | b  |
| 166 | d | 167 | d | 168 | c | 169 | C | 170 | c  |

| 171 | a      | 172 | d   | 173 | b   | 174 | b  | 175 | c |  |
|-----|--------|-----|-----|-----|-----|-----|----|-----|---|--|
|     | Alkene |     |     |     |     |     |    |     |   |  |
| 1   | c      | 2   | b   | 3   | а   | 4   | b  | 5   | а |  |
| 6   | d      | 7   | a   | 8   | d   | 9   | b  | 10  | d |  |
| 11  | d      | 12  | a   | 13  | a   | 14  | с  | 15  | b |  |
| 16  | a      | 17  | d   | 18  | d   | 19  | b  | 20  | с |  |
| 21  | b      | 22  | d   | 23  | c   | 24  | b  | 25  | с |  |
| 26  | a      | 27  | b   | 28  | d   | 29  | d  | 30  | d |  |
| 31  | с      | 32  | d   | 33  | с   | 34  | a  | 35  | c |  |
| 36  | с      | 37  | a   | 38  | b   | 39  | ac | 40  | b |  |
| 41  | c      | 42  | a   | 43  | c   | 44  | c  | 45  | a |  |
| 46  | с      | 47  | d   | 48  | d   | 49  | а  | 50  | с |  |
| 51  | а      | 52  | d   | 53  | с   | 54  | а  | 55  | b |  |
| 56  | c      | 57  | d   | 58  | а   | 59  | d  | 60  | b |  |
| 61  | c      | 62  | a   | 63  | b   | 64  | b  | 65  | b |  |
| 66  | d      | 67  | c   | 68  | а   | 69  | с  | 70  | с |  |
| 71  | c      | 72  | c   | 73  | c   | 74  | d  | 75  | C |  |
| 76  | d      | 77  | a   | 78  | d   | 79  | С  | 80  | b |  |
| 81  | c      | 82  | d   | 83  | c   | 84  | a  | 85  | C |  |
| 86  | c      | 87  | b   | 88  | a   | 89  | С  | 90  | C |  |
| 91  | b      | 92  | c   | 93  | b   | 94  | b  | 95  | b |  |
| 96  | b      | 97  | a   | 98  | b   | 99  | b  | 100 | b |  |
| 101 | b      | 102 | c   | 103 | с   | 104 | b  | 105 | b |  |
| 106 | а      | 107 | c   | 108 | а   | 109 | а  | 110 | C |  |
| 111 | C      | 112 | a   | 113 | a   | 114 | b  | 115 | d |  |
| 116 | d      | 117 | а   | 118 | а   | 119 | а  | 120 | b |  |
| 121 | b      | 122 | C   | 123 | C   | 124 | b  | 125 | c |  |
| 126 | C      | 127 | b   | 128 | b   | 129 | а  | 130 | а |  |
| 131 | C      | 132 | b,d | 133 | а   | 134 | b  | 135 | С |  |
| 136 | C      | 137 | C   | 138 | b   | 139 | a  | 140 | d |  |
| 141 | b      | 142 | C   | 143 | d   | 144 | a  | 145 | d |  |
| 146 | а      | 147 | d   | 148 | abc | 149 | а  | 150 | а |  |
| 151 | а      | 152 | b   | 153 | C   | 154 | b  | 155 | а |  |
| 156 | C      | 157 | b   | 158 | d   | 159 | b  | 160 | C |  |
| 161 | d      | 162 | b   | 163 | b   | 164 | а  | 165 | a |  |
| 166 | a      | 167 | b   | 168 | C   | 169 | b  | 170 | b |  |
| 171 | а      | 172 | C   | 173 | C   | 174 | а  |     |   |  |
|     |        |     |     |     |     |     |    |     |   |  |

|    | Alkyne |    |   |    |   |    |   |    |   |  |
|----|--------|----|---|----|---|----|---|----|---|--|
|    |        |    |   |    |   |    |   |    |   |  |
| 1  | C      | 2  | С | 3  | C | 4  | C | 5  | b |  |
| 6  | а      | 7  | а | 8  | а | 9  | d | 10 | C |  |
| 11 | a      | 12 | C | 13 | d | 14 | a | 15 | a |  |



| 16  | d | 17  | d | 18  | b | 19  | C | 20  | C |
|-----|---|-----|---|-----|---|-----|---|-----|---|
| 21  | d | 22  | b | 23  | d | 24  | C | 25  | C |
| 26  | d | 27  | а | 28  | d | 29  | а | 30  | d |
| 31  | а | 32  | С | 33  | C | 34  | а | 35  | а |
| 36  | а | 37  | C | 38  | d | 39  | C | 40  | C |
| 41  | а | 42  | C | 43  | а | 44  | C | 45  | b |
| 46  | C | 47  | а | 48  | а | 49  | b | 50  | b |
| 51  | d | 52  | а | 53  | b | 54  | а | 55  | d |
| 56  | а | 57  | C | 58  | C | 59  | а | 60  | d |
| 61  | C | 62  | C | 63  | d | 64  | d | 65  | a |
| 66  | C | 67  | C | 68  | а | 69  | b | 70  | b |
| 71  | b | 72  | C | 73  | a | 74  | b | 75  | d |
| 76  | C | 77  | b | 78  | d | 79  | а | 80  | C |
| 81  | а | 82  | а | 83  | d | 84  | C | 85  | C |
| 86  | а | 87  | С | 88  | C | 89  | d | 90  | C |
| 91  | C | 92  | d | 93  | C | 94  | b | 95  | d |
| 96  | d | 97  | d | 98  | b | 99  | d | 100 | a |
| 101 | b | 102 | a | 103 | a | 104 | a | 105 | C |

### Aromatic hydrocarbon

| 1  | C | 2  | d | 3  | C | 4  | C | 5  | a |
|----|---|----|---|----|---|----|---|----|---|
| 6  | b | 7  | C | 8  | b | 9  | a | 10 | C |
| 11 | b | 12 | b | 13 | а | 14 | а | 15 | а |
| 16 | d | 17 | а | 18 | b | 19 | b | 20 | а |
| 21 | C | 22 | а | 23 | b | 24 | C | 25 | С |
| 26 | d | 27 | C | 28 | a | 29 | C | 30 | b |
| 31 | d | 32 | b | 33 | b | 34 | C | 35 | d |
| 36 | C | 37 | b | 38 | b | 39 | а | 40 | а |
| 41 | а | 42 | C | 43 | а | 44 | b | 45 | C |
| 46 | d | 47 | d | 48 | а | 49 | а | 50 | d |
| 51 | b | 52 | b | 53 | b | 54 | C | 55 | C |
| 56 | C | 57 | С | 58 | С | 59 | b | 60 | d |
| 61 | е | 62 | C | 63 | C | 64 | b | 65 | b |
| 66 | а | 67 | d | 68 | C | 69 | b | 70 | C |
| 71 | b | 72 | C | 73 | а | 74 | а | 75 | а |
| 76 | b | 77 | d | 78 | а | 79 | C | 80 | d |
| 81 | d | 82 | b | 83 | b | 84 | b | 85 | a |
| 86 | C | 87 | b | 88 | a | 89 | d | 90 | a |
| 91 | b | 92 | C | 93 | a | 94 | b | 95 | a |
| 96 | d | 97 | d |    |   |    |   |    |   |

#### **Critical Thinking Questions**

| 1  | a | 2  | а | 3  | с | 4  | b | 5  | C |
|----|---|----|---|----|---|----|---|----|---|
| 6  | c | 7  | а | 8  | а | 9  | а | 10 | c |
| 11 | а | 12 | b | 13 | d | 14 | b | 15 | d |

| 16 | d | 17 | с | 18 | а | 19 | d | 20 | а |
|----|---|----|---|----|---|----|---|----|---|
| 21 | b | 22 | b | 23 | C | 24 | b | 25 | а |
| 26 | а | 27 | а | 28 | d | 29 | d | 30 | а |
| 31 | b | 32 | d | 33 | C | 34 | a | 35 | d |
| 36 | b | 37 | b | 38 | C | 39 | d | 40 | b |

### Assertion and Reason

|    | - |    |   |    |   |    |   | -  |   |
|----|---|----|---|----|---|----|---|----|---|
| 1  | a | 2  | a | 3  | C | 4  | a | 5  | b |
| 6  | b | 7  | d | 8  | b | 9  | b | 10 | b |
| 11 | b | 12 | е | 13 | C | 14 | b | 15 | b |
| 16 | b | 17 | a | 18 | c | 19 | b | 20 | a |
| 21 | d | 22 | d | 23 | C | 24 | b | 25 | е |
| 26 | b | 27 | а | 28 | е | 29 | C | 30 | е |
| 31 | е | 32 | C | 33 | a | 34 | b | 35 | a |

# S Answers and Solutions

#### Alkane

- **i.** (d)  $C_7 H_{16} (C_n H_{2n+2})$
- **3.** (a) According to wurtz reaction.  $2CH_3CH_2CH_2Br + 2Na \xrightarrow{\text{ether}}$

 $CH_3(CH_2)_4 CH_3 + 2NaBr$ 

5. (b)  $2CH_3COONa + 2H_2O \xrightarrow{\text{Electolysis}}$ Sodium acetate

$$CH_3 - CH_3 + 2CO_2 + 2NaOH + H_2$$

6. (c) 
$$Pb(C_2H_5)_4 \xrightarrow{\text{heat}} Pb + 4CH_3CH_2$$
  
Ethylradical

$$CH_2 - CH_2 + Pb \longrightarrow CH_2 = CH_2 + PbBr_2$$
  
Ethene Lead bromide  
Br Br

As leaded gasoline burns, lead metal gets deposited in the engine which is removed by adding ethylene dibromide. The lead bromide is volatile and is carried off with the exhaust gases from the engine

9. (d) 
$$C_2H_5I + 2Na + IC_2H_5 \xrightarrow{\text{Dry}} C_2H_5 - C_2H_5 + 2NaI$$
  
Ether Butane

10. (c) 
$$(CH_3)_3 CH \xrightarrow{KMnO_4} (CH_3)_3 C - OH$$
  
tertiary butylalcohol

**13.** (c) 
$$RCl + 2Na + RCl \xrightarrow{Dry} 2NaCl + R - R$$
  
Ether Alkane



