

Introduction of Halogen containing compounds

1.	How many structural isomers are possible for a compound with molecular formula C_3H_7Cl [MH CET 2001]
	(a) 2 (b) 5
	(c) 7 (d) 9
2.	In CH_3CH_2Br , % of Br is [DPMT 1996]
	(a) 80 (b) 75
	(c) 70 (d) 7
3.	Gem- dibromide is [RPMT 2000]
	(a) $CH_3CH(Br)OH(Br)CH_3$ (b) $CH_3CBr_2CH_3$
	(c) $CH_2(Br)CH_2CH_2$ (d) CH_2BrCH_2Br
4.	Ethylidene dibromide is
	(a) $CH_3 - CH_2 - Br$ (b) $Br - CH_2 - CH_2 - Br$
	(c) $CH_3 - CHBr_2$ (d) $CH_2 = CBr_2$
5.	Benzylidene chloride is
Ū	(a) $C_6H_5CH_2Cl$ (b) $C_6H_5CHCl_2$
	(c) $C_6H_4ClCH_2Cl$ (d) $C_6H_5CCl_3$
(
6.	Which of the following halide is 2° (a) Isopropyl chloride (b) Isobutyl chloride
7.	(c) <i>n</i> -propyl chloride (d) <i>n</i> -butyl chloride Haloforms are trihalogen derivatives of [CPMT 1985]
/•	(a) Ethane (b) Methane
	(c) Propane (d) Benzene
8.	Benzene hexachloride is
	(a) 1, 2, 3, 4, 5, 6-hexachlorocyclohexane
	(b) 1, 1, 1, 6, 6, 6-hexachlorocyclohexane
	(c) 1, 6-phenyl-1, 6-chlorohexane
	(d) 1, 1-phenyl-6, 6-chlorohexane
9.	Number of π – bonds present in <i>B.H.C.</i> (Benzenehexachloride) are[RPMT 1999]
	(a) 6 (b) Zero
	(c) 3 (d) 12
10.	The general formula for alkyl halides is
	(a) $C_n H_{2n+1} X$ (b) $C_n H_{2n+2} X$
	(c) $C_n H_{n+1} X$ (d) $C_n H_{2n} X$
11.	Which of the following is a primary halide [DCE 2004]
	(a) Isopropyl iodide (b) Secondary butyl iodide
	(c) Tertiary butyl bromide (d) Neo hexyl chloride
12.	Full name of DDT is [KCET 1993]
	(a) 1, 1, 1-trichloro-2, 2- <i>bis</i> (<i>p</i> -chlorophenyl) ethane
	(b) 1, 1-dichloro-2, 2-diphenyl trimethylethane(c) 1, 1-dichloro-2, 2-diphenyl trichloroethane
	(d) None of these

The compound which contains all the four $1^{\circ}, 2^{\circ}, 3^{\circ}$ and 13.

[J & K 2005]

- 4^{*o*} carbon atoms is
- (a) 2, 3-dimethyl pentane

- (b) 3-chloro-2, 3-dimethylpentane
- (c) 2, 3, 4-trimethylpentane
- (d) 3, 3-dimethylpentane

Preparation of Halogen containing compounds

_		J J F F F F F F F F F F
1.	The following reaction is kn	lown as
	$C_2H_5OH + SOCl_2$ — Pyridine	$\rightarrow C_2 H_5 Cl + SO_2 + HCl$
	2 5 2	[AIIMS 2002]
	(a) Kharasch effect	[]
	(b) Darzen's procedure	
	(c) Williamson's synthesis	3
	(d) Hunsdiecker synthesis	reaction
2.		t of the reaction between 2-
	methyl propene with <i>HBr</i>	[RPMT 2002]
	(a) 1-bromo butane	
	(b) 1-bromo-2 methyl prop	bane
	(c) 2-bromo butane	
0	(d) 2-bromo-2 methyl prop Halogenation of alkanes is	
3.	(a) A reductive process	[KCET 2002]
		(d) An indothermal process
	+	(a) fill indottion ind process
4.	$N \equiv NBF_4$	
	$ \xrightarrow{\Lambda} A $	
	\checkmark	
	In the above process produc	ct A is [Kerala (Engg.) 2002]
	(a) Fluorobenzene	(b) Benzene
	(c) 1, 4-difluorobenzene	(d) 1, 3-difluorobenzene
5.	Silver acetate + $Br_2 - \frac{CS_2}{CS_2}$	→. The main product of this
Ū	reaction is	[Kurukshetra CET 2002]
	(a) $CH_3 - Br$	(b) CH ₃ COI
	(c) <i>CH</i> ₃ <i>COOH</i>	(d) None of these
	(c) ch ₃ coon	<i>Cl</i>
		L Ci
6.	Diazonium salts $+ Cu_2Cl_2$ -	$+HCl \rightarrow \bigcirc$, the reaction
	$2ia20intain bands + Ca_2Ca_2$	

is known as	[Kerala (Med.) 2002]
(a) Chlorination	(b) Sandmeyer's reaction
(c) Perkin reaction	(d) Substitution reaction

- When ethyl alcohol (C_2H_5OH) reacts with thionyl 7. chloride, in the presence of pyridine, the product obtained is
 - (a) $CH_3CH_2Cl + HCl$
 - (b) $C_2H_5Cl + HCl + SO_2$
 - (c) $CH_3CH_2Cl + H_2O + SO_2$
 - (d) $CH_3CH_2Cl + HCl + SO_2$

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[AIIMS; CBSE PMT 2001]

- 8. Preparation of alkyl halides in laboratory is least preferred by [DPMT 2000]
 - (a) Treatment of alcohols
 - (b) Addition of hydrogen halides to alkenes
 - (c) Halide exchange
 - (d) Direct halogenation of alkanes
- Which of the following organic compounds will give a 9. mixture of 1-chlorobutane and 2-chlorobutane on chlorination [CPMT 2001] \sim ~ * *

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

 CH_3
 H

- (b) $HC \equiv C C = CH_2$
- (c) $CH_2 = CH CH = CH_2$
- (d) $CH_2 = CH CH_2 CH_3$
- The chlorobenzene is generally obtained from a 10. corresponding diazonium salt by reacting it with
 - [MP PMT 2000]

(a) Cu_2Cl_2 (b) CuSO

- (d) $Cu(NH_3)_4^{2+}$ (c) Cu
- Decreasing order of reactivity of HX in the reaction 11. $ROH + HX \rightarrow RX + H_2O$
 - [RPET 2000; AIIMS 1983; MP PET 1996]
 - (a) HI > HBr > HCl > HF (b) HBr > HCl > HI > HF
 - (c) HCl > HBr > HI > HF (d) HF > HBr > HCl > HI
- 12. The product of the following reaction :

13.

- $CH_2 = CH CCl_3 + HBr$ [RPET 2000]
- (a) $CH_3 CH(Br) CCl_3$ (b) $CH_2(Br) CH_2 CCl_3$
- (c) $BrCH_2 CHCl CHCl_2$ (d) $CH_3 CH_2 CCl_3$
- Chlorobenzene is prepared commercially by [JIPMER 2000; CPMT 1976; Pb. CET 2002]
- (a) Raschig process (b) Wurtz Fitting reaction
- (c) Friedel-Craft's reaction (d) Grignard reaction
- In methyl alcohol solution, bromine reacts with ethylene 14. to yield BrCH2CH2OCH3 in addition to 1, 2dibromoethane because [Pb. PMT 1998]
 - (a) The ion formed initially may react with Br^{-} or CH_3OH
 - (b) The methyl alcohol solvates the bromine
 - (c) The reaction follows Markownikoff's rule
 - (d) This is a free-radical mechanism
- $C_3H_8 + Cl_2 \xrightarrow{\text{Light}} C_3H_7Cl + HCl$ is an example of 15. which of the following types of reactions
 - [AFMC 1997; CPMT 1999]
 - (a) Substitution (b) Elimination
 - (c) Addition (d) Rearrangement
- Which of the following would be produced when acetylene 16. reacts with HCl [MH CET 1999] (a) CH_3CH_2Cl (b) CH_3CHCl_2
 - (c) CHCl = CHCl(d) $CH_2 = CHCl$
- $R OH + HX \rightarrow R X + H_2O$ 17.

In the above reaction, the reactivity of different alcohols is [CPMT 1997]

- (a) Tertiary > Secondary > Primary (b) Tertiary < Secondary < Primary
- (c) Tertiary < Secondary > Primary
- (d) Secondary < Primary < Tertiary

 $C_6H_6 + Cl_2 \xrightarrow{UV \text{ Light}}$ Product. In above reaction 18. product is [CPMT 1997] (a) CCl_3CHO (b) $C_6H_6Cl_6$ (c) $C_6 H_{12} C l_6$ (d) $C_6 H_9 C l_2$

- Benzene reacts with chlorine to form benzene 19. hexachloride in presence of [MP PET 1999] (a) Nickel (b) $AlCl_3$
 - (c) Bright sunlight (d) Zinc
- The final product obtained by distilling ethyl alcohol with 20. the excess of chlorine and $Ca(OH)_2$ is [MP PET 1996]
 - (b) CCl₃CHO (a) CH_3CHO (c) $CHCl_3$ (d) $(CH_3)_2 O$
 - When ethyl alcohol and KI reacted in presence of
- 21. Na_2CO_3 , yellow crystals of..... are formed [AFMC 1989] (a) CHI_3 (b) CH_3I
 - (c) CH_2I_2 (d) $C_2 H_5 I$
- In preparation of CHCl₃ from ethanol and bleaching 22. powder, the latter provides [BHU 1986] (a) $Ca(OH)_2$ (b) *Cl*₂ (c) Both (a) and (b) (d) None of these
- Which one of the following processes does not occur 23. during formation of $CHCl_3$ from C_2H_5OH and bleaching powder
 - [DPMT 1984]
 - (a) Hydrolysis (b) Oxidation (c) Reduction (d) Chlorination
- Which of the following is obtained when chloral is boiled 24. with NaOH [CBSE PMT 1991; RPMT 1999] (a) CH_3Cl (b) $CHCl_3$
 - (d) None of these (c) CCl_4
- Chloroform can be obtained from [MNR 1986] 25. (a) Methanol (b) Methanal
- (c) Propanol-1 (d) Propanol-2 Chlorine reacts with ethanol to give 26.

[MP PMT 1989; CPMT 1997; KCET 1998; JIPMER 1999] (a) Ethyl chloride (b) Chloroform

- (d) Chloral (c) Acetaldehyde
- On heating diethyl ether with conc. HI, 2 moles of which 27. of the following is formed [IIT-J]

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- (a) Ethanol
- (b) Iodoform (c) Ethyl iodide (d) Methyl iodide
- 28. Lucas reagent is [MP PMT 1996; MP PET 1992, 95; CPMT 1986, 89; AIIMS 1980; Kurukshetra CEE 2002]
 - (a) Concentrated HCl + anhydrous $ZnCl_2$
 - (b) Dilute HCl + hydrated $ZnCl_2$

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- (c) Concentrated HNO_3 + anhydrous $ZnCl_2$
- (d) Concentrated HCl + anhydrous $MgCl_2$
- Which compound does not form iodoform with alkali and 29. iodine [IIT-JEE 1985]

	(a) Acetone (b) Et	thanol
	-	opropyl alcohol
30.	Which compound gives yellow ppt.	
	(a) 2-hydroxy propane (b) A	[IIT-JEE 1984] cetophenone
		cetamide
31.	Acetone reacts with I_2 in presence	
0	2 F	[MP PMT 1992]
	(a) $C_2 H_5 I$ (b) C	$C_2H_4I_2$
	(c) CHI_3 (d) C	$2H_3I$
32.	Ethanol is converted into ethyl chlo	ride by reacting with
		PMT 1990; BHU 1997]
	(a) Cl_2 (b) S	-
	(c) <i>HCl</i> (d) <i>N</i>	
33.	C_6H_5Cl prepared by aniline with	[111-JEE 1984]
	(a) HCl (b) Cu_2Cl_2	
		NCI
	(c) Cl_2 in presence of anhydrous	
	(d) HNO_2 and then heated with C	
34.	The starting substance for the prepa	5
	(a) <i>CH</i> ₃ <i>OH</i> (b) <i>C</i>	[CPMT 1975] <i>C</i> ₂ <i>H</i> ₅ <i>OH</i>
		$(H_3)_2 CO$
35.		
55.	magnesium with	[CPMT 1973, 83, 84]
	(a) Methyl amine (b) D	iethyl ether
	-	thyl alcohol
36.	Which of the following is resp reaction	onsible for iodoform
		MT 1980; RPMT 1997]
		lethanol
	(c) Acetic acid (d) Et	
37.	When a solution of sodium chlo alcohol is electrolysed, it forms	oride containing ethyl
	(a) Ethyl alcohol (b) Cl	hloral
	• •	cetaldehyde
38.	0 1	
	from an alcohol	[CPMT 1989, 94]
	(a) $HCl + ZnCl_2$ (b) N	
	(c) PCl_5 (d) S	OCl ₃
39.	Ethyl benzoate reacts with PCl_5 to g	give [KCET 2003]
	(a) $C_2H_5Cl + C_6H_5COCl + POCl_3$	$_3 + HCl$
	(b) $C_2H_5Cl + C_6H_5COCl + POCl_3$	
	(c) $CH_3COCl + C_6H_5COCl + POC$	Cl_3
	(d) $C_2H_5Cl + C_6H_5COOH + POCh$	l ₃
40.		-
•	toluene giv.es the product	r in the original
		; MH CET 1999, 2002]
		5-dichloro toluene
41.	(c) <i>p</i> -chloro toluene (d) Be When chlorine is passed throug	enzyl chloride gh warm benzene in
4-1	presence of the sunlight, the produc	ct obtained is[KCET 2003
	(a) Benzotrichloride (b) Cl	hlorobenzene

(a) Benzotrichloride (b) Chlorobenzene

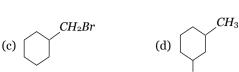
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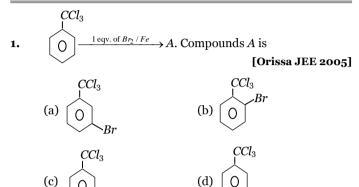
		(c) Gammexane (d	d) DDT
	42.	Which of the following acid	
		presence of peroxide to give an	
I			[MP PET 2003]
			b) HCl
		• • • • • • • • • • • • • • • • • • • •	d) <i>HI</i>
	43 .	-	-
1			b) Propyl bromide
•			d) None of the above
	44.	The catalyst used in Raschig's	-
		(a) $LiAlH_4$ (1	b) Copper chloride
		(c) Sunlight (d	d) Ethanol/ <i>Na</i>
1	45.	The compound formed on h	eating chlorobenzene with
	10	chloral in the presence of conc	
		-	[AIEEE 2004]
J		(a) Freon (l	b) DDT
		(c) Gammexene (c	d) Hexachloroethane
	46.	Acetone is mixed with bleaching	ng powder to give
			[AFMC 2004]
			b) Acetaldehyde
			d) Phosgene
	47.		ing compounds gives
I		trichloromethane on distilling	
			KCET 2004; EAMCET 1986]
			b) Phenol
r	40		d) Methanol
Ì	48.	The product formed on reac	E 2004; DPMT 1978; AIIMS 1991]
-			b) CCl_3CHO
		5	5
ı		5 5	d) CH_3CHO
	49.	Ethylene reacts with bromine	
I			b) Ethylene dibromide
			d) 1-bromo propane
	50.	Best method of preparing alky	l chloride is [MH CET 2004]
1		(a) $ROH + SOCl_2 \longrightarrow$	
		(b) $ROH + PCl_5 \longrightarrow$	
		(c) $ROH + PCl_3 \longrightarrow$	
		5	
9		(d) $ROH + HCl \xrightarrow{\text{anhy. } ZnCl_2} \rightarrow$	
J	51.	<i>DDT</i> is prepared by reacting ch	
			[BHU 1998, 2005]
		(a) CCl_4 (1	b) $CCl_3 - CHO$
1		(c) $CHCl_3$ (c)	d) Ethane
1	52.	Which compound needs chlora	al in its synthesis
			[Pb. PET 2003]
			b) Gammexane
			d) Michler's Ketone
	53.	To get <i>DDT</i> , chlorobenzene ha	
		following compounds in the sulphuric acid	[KCET (Engg/Med.) 2001]
,			b) Dichloroacetone
			d) Trichloroacetaldehyde
I	54.	What will be the product in the	-
		CH ₂	-
		NBS	[BHU 2005]
1 003]		B	_ 01
.091		\downarrow CH_3	CH_3
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Properties of Halogen containing compounds

(b)



2. Ethyl bromide can be converted into ethyl alcohol by [KCET 1989]

- (a) Heating with dilute hydrochloric acid and zinc
- (b) Boiling with an alcoholic solution of *KOH*
- (c) The action of moist silver oxide
- (d) Refluxing methanol
- **3.** Reaction of ethyl chloride with sodium leads to

[NCERT 1984]

(a) Ethane (b) Propane

(c) *n*-butane (d) *n*-pentane

- 4. Treatment of ammonia with excess of ethyl chloride will yield [AIIMS 1992]
 - (a) Diethyl amine
 - (b) Ethane
 - (c) Tetraethyl ammonium chloride
 - (d) Methyl amine

5. $2CHCl_3 + O_2 \xrightarrow{X} 2COCl_2 + 2HCl$

In the above reaction, X stands for

- (a) An oxidant (b) A reductant
- (c) Light and air (d) None of these
- **6.** Phosgene is the common name for

[DPMT 1983; CPMT 1993; MP PMT 1994;

- Kurukshetra CEE 1998; RPMT 2000, 02]
- (a) CO_2 and PH_3 (b) Phosphoryl chloride
- (c) Carbonyl chloride (d) Carbon tetrachloride
- 7. When chloroform is treated with amine and *KOH*, we get [CPMT 1979]
 - (a) Rose odour smell
 - (b) Sour almond like smell
 - (c) Offensive odour
 - (d) Sour oil of winter green like smell

- **8.** A mixture of two organic chlorine compounds was treated with sodium metal in ether solution. Isobutane was obtained as a product. The two chlorine compounds are[**KCET 198**]
 - (a) Methyl chloride and propyl chloride
 - (b) Methyl chloride and ethyl chloride
 - (c) Isopropyl chloride and methyl chloride
 - (d) Isopropyl chloride and ethyl chloride
 - Alkyl halides can be converted into Grignard reagents by
 - [KCET 1989]
 - (a) Boiling them with *Mg* ribbon in alcoholic solution
 - (b) Warming them with magnesium powder in dry ether
 - (c) Refluxing them with $MgCl_2$ solution
 - (d) Warming them with M_gCl_2
- 10. Which is not present in Grignard reagent

[CBSE PMT 1991]

[KCET 1986]

- (a) Methyl group (b) Magnesium
- (c) Halogen (d) –*COOH* group
- The reactivity of ethyl chloride is
 - (a) More or less equal to that of benzyl chloride
 - (b) More than that of benzyl chloride
 - (c) More or less equal to that of chlorobenzene
 - (d) Less than that of chlorobenzene
- 12. The reactivity of halogen atom is minimum in[KCET 1985]
 - (a) Propyl chloride (b) Propyl iodide
 - (c) Isopropyl chloride (d) Isopropyl bromide
- 13. Chlorobenzene is

9.

11.

- (a) Less reactive than benzyl chloride
- (b) More reactive than ethyl bromide
- (c) Nearly as reactive as methyl chloride
- (d) More reactive than isopropyl chloride
- 14.The reactivities of methyl chloride, propyl chloride and
chlorobenzene are in the order[KCET 1988]
 - (a) Methyl chloride > propyl chloride > chlorobenzene
 - (b) Propyl chloride > methyl chloride > chlorobenzene
 - (c) Methyl chloride > chlorobenzene > propyl chloride
 - (d) Chlorobenzene > propyl chloride > methyl chloride

(b) CHCl₃

15. Which of the following compound will make precipitate most readily with AgNO₃ [CPMT 1992]

[CPMT 1985] (a) CCl₃CHO

- (c) $C_6H_5CH_2Cl$ (d) CHI_3
- 16. Carbylamine is liberated when..... is heated with chloroform and alcoholic potash [KCET 1992]
 (a) An aldehyde (b) A primary amine
 - (c) A secondary amine (d) A phenol
- 17. Salicylic acid can be prepared using Reimer-Tiemann's reaction by treating phenol with [KCET 1989]
 - (a) Methyl chloride in the presence of anhydrous aluminium chloride
 - (b) Carbon dioxide under pressure in sodium hydroxide solution
 - (c) Carbon tetrachloride and concentrated sodium hydroxide
 - (d) Sodium nitrite and a few drops of concentrated sulphuric acid



18.	Grignard reagent is prepared by the reaction between [CBSE PMT 1994; DPMT 1996; Pb. PMT 1999; MH CET 1999]		(c) Hoffmann-Saytzeff product(d) Markownikoff product	
	(a) Zinc and alkyl halide	29.	Ethylene difluoride on hydrolysis gives	
	(b) Magnesium and alkyl halide		(a) Glycol(b) Fluo(c) Difluoroethanol(d) Freo	roethanol
	(c) Magnesium and alkane	30.	Benzyl chloride when oxidised by $pb(A)$	
	(d) Magnesium and aromatic hydrocarbon	30.	benzyreinoride witch oxidised by pb(i	[MP PM]
19.	Reaction of <i>t</i> -butyl bromide with sodium methoxide produces [CBSE PMT 1994]		(a) Benzoic acid (b) Benz	aldehyde
	(a) Isobutane (b) Isobutylene		(c) Benzene (d) None	-
	(c) Sodium <i>t</i> -butoxide (d) <i>t</i> -butyl methyl ether	31.	Which of the following statements a	
20.	War gas is formed from [BHU 1995]		false	
	(a) PH_3 (b) C_2H_2			Manipal MEI
	(c) Zinc phosphate (d) Chloropicrin		(a) It is a colourless, sweet-smelling h(b) It is almost insoluble in water	iquia
21.	What happens when CCl_4 is treated with $AgNO_3$		(c) It is highly inflammable	
	[EAMCET 1987; CBSE PMT 1988; MP PET 2000]		(d) It can be used as an inhalational a	maesthetic ag
	(a) NO_2 will be evolved	32.	CCl_4 cannot give precipitate with Ag	
	(b) A white ppt. of <i>AgCl</i> will be formed	0		[CPM]
	(c) CCl_4 will dissolve in $AgNO_3$		(a) Formation of complex with <i>AgNO</i>	-
	(d) Nothing will happen		(b) Evolution of Cl_2 gas	5
22.	If we use pyrene (CCl_4) in the Riemer-Tiemann reaction		(c) Chloride ion is not formed	
	in place of chloroform, the product formed is			
	[CBSE PMT 1989; MP PMT 1990; MH CET 1999]		(d) $A_g NO_3$ does not give silver ion	
	(a) Salicylaldehyde (b) Phenolphthalein	33.	On heating $CHCl_3$ with aq. NaOH, th	
	(c) Salicylic acid (d) Cyclohexanol $C = U = C + KCN(r_{ex}) \rightarrow V + V$		[CPMT 1971, 78; BHU 19	
23.	$C_6H_5CH_2Cl + KCN(aq.) \to X + Y$			PMER (Med.)
	Compounds X and Y are $[BHU 1979]$		(a) CH_3COONa (b) HCC	
	(a) $C_6H_6 + KCl$ (b) $C_6H_5CH_2CN + KCl$		(c) Sodium oxalate (d) CH_3	
	(c) $C_6H_5CH_3 + KCl$ (d) None of these	34 .	Ethyl bromide reacts with lead-sodiun	
24.	The bad smelling substance formed by the action of alcoholic caustic potash on chloroform and aniline is		(a) Tetraethyl lead (b) Tetra	aethyl bromid
	[MP PMT 1971, 92, 2001; CPMT 1971, 86; AFMC 2002;		-	e of the above
	RPMT 1999]	35.	Iodoform heated with <i>Ag</i> powder to fe	
	(a) Phenyl isocyanide (b) Nitrobenzene	00	(a) Acetylene (b) Ethy	
~-	(c) Phenyl cyanide (d) Phenyl isocyanate		(c) Methane (d) Etha	ine
25.	Ethylidene chloride on treatment with aqueous <i>KOH</i> gives	36.	Ethyl bromide reacts with silver nitrite	e to form
	[MP PMT 1986]			1985; IIT-JEI
	(a) Ethylene glycol (b) Acetaldehyde		(a) Nitroethane	
_	(c) Formaldehyde (d) None		(b) Nitroethane and ethyl nitrite(c) Ethyl nitrite	
26.	Reaction		(d) Ethane	
	$C_2H_5I + C_5H_{11}I + 2Na \rightarrow C_2H_5 - C_5H_{11} + 2NaI$ is	37.	Which of the following reactions leads	s to the forma
	called [MP PMT 1992]	0/-	chloritone	[RPMT
	(a) Hoffmann's reaction		(a) $CHCl_3 + CH_3COCH_3$ (b) CCl_3	₄ + Acetone
	(b) Dow's reaction		(c) $CHCl_3 + KOH$ (d) CHC	$Cl_3 + HNO_3$
	(c) Wurtz's reaction	38.	$CH_3 - CH_2 - CH_2Br + KOH (alc.) \rightarrow I$	
	(d) Riemer-Tiemann's reaction	J 01	above reaction is	
27.	In presence of $AlCl_3$, benzene and <i>n</i> -propyl bromide		(a) $CH_3 - CH = CH_2$ (b) CH_3	-
	react in Friedal-Craft's reaction to form [MP PMT 1991]		(c) (a) and (b) both (d) None (b) $(a) = a + b + b + b + b + b + b + b + b + b +$	
	(a) <i>n</i> -propyl benzene (b) 1 a dinormal propyl benzene	00		e of these
	(b) 1, 2-dinormal propyl benzene(c) 1, 4-dinormal propyl benzene	39.	$A + CCl_4 + KOH \rightarrow$ Salicylic acid	r
	(d) Isopropyl benzene		'A' in above reaction is	[RPMT
28.	The dehydrobromination of 2-bromobutane gives		OH No	02
	$CH_3CH = CHCH_3$. The product is			
	(a) Hofmann product		(a) (b) (O)	J
	(b) Saytzeff product		\sim	

(b) Benzaldehyde (d) None ing statements about chloroform is [Manipal MEE 1995] sweet-smelling liquid uble in water ımable an inhalational anaesthetic agent ecipitate with $A_g NO_3$ due to [CPMT 1979] nplex with AgNO3 gas ot formed give silver ion ith aq. *NaOH*, the product is 1971, 78; BHU 1997; EAMCET 1998; JIPMER (Med.) 2002] (b) HCOONa (d) CH_3OH with lead-sodium alloy to form [MP PMT/PET 1988; MP PET 1997] (b) Tetraethyl bromide (d) None of the above Ag powder to form [DPMT 1985] (b) Ethylene (d) Ethane with silver nitrite to form [DPMT 1985; IIT-JEE 1991] ethyl nitrite g reactions leads to the formation of [RPMT 2003] CH_3 (b) CCl_4 + Acetone (d) $CHCl_3 + HNO_3$ $+ KOH (alc.) \rightarrow Product Product in$ [RPMT 2003] (b) $CH_3 - CH_2 - CH_3$ 2 (d) None of these

[MP PMT 1989]

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[RPMT 2003]

40. Identify X and Y in the following sequence $C_2H_5Br \xrightarrow{X} \text{product} \xrightarrow{Y} C_3H_7NH_2$

[Orissa JEE 2005]

- (a) $X = KCN, Y = LiAlH_4$
- (b) $X = KCN, Y = H_3O^+$
- (c) $X = CH_3Cl, Y = AlCl_3 / HCl$

(d) $X = CH_3 NH_2, Y = HNO_2$

41. 1-chlorobutane reacts with alcoholic *KOH* to form

				[IIT-JI	EE 1991; AFM	C 1998]
	(a) 1-bu	tene		(b) 2-b	utane	
	(c) 1-bu	tanol		(d) 2-b	utanol	
42.	Which	of	the	following	reactions	gives
	$H_2C = C$	C = C =	CH_{2}	Roor	kee Qualifyin	g 1998]

(a)
$$CH_2Br - CBr = CH_2 - \frac{Zn / Ch_3OH}{2}$$

- (b) $HC \equiv C CH_2 COOH \xrightarrow{Aq.K_2CO_3} \rightarrow$
- (c) $CH_2Br C \equiv C CH_2Br \xrightarrow{Z_n}_{\text{Heat}}$
- (d) $2CH_2 = CH CH_2I \longrightarrow$
- **43.** When ethyl amine is heated with chloroform and alcoholic *KOH*, a compound with offensive smell is obtained. This compound is **[CPMT 1983, 84; RPMT 2002]**
 - (a) A secondary amine (b) An isocyanide
 - (c) A cyanide (d) An acid
- 44. Chlorobenzene on fusing with solid NaOH gives[DPMT 1981; CPMT 1990]
 - (a) Benzene (b) Benzoic acid
 - (c) Phenol (d) Benzene chloride
- **45.** DDT can be prepared by reacting chlorobenzene (in the presence of conc. H_2SO_4) with

(a) Cl_2 in ultraviolet light (b) Chloroform

- (c) Trichloroacetone (d) Chloral hydrate
- 46. When phenol reacts with CHCl₃ and KOH, the product obtained would be [RPMT 1997]
 (a) Salicylaldehyde
 (b) *p*-hydroxy benzaldehyde
 - (c) Both (a) and (b) (d) Chloretone
- **47.** Ethyl chloride on heating with silver cyanide forms a compound *X*. The functional isomer of *X* is

[EAMCET 1997; KCET 2005]

(a)
$$C_2 H_5 NC$$
 (b) $C_2 H_5 CN$

(c)
$$H_3C - NH - CH_3$$
 (d) $C_2H_5NH_2$

- **48.** Which of the following statements is incorrect[**CPMT 1977**] (a) C_2H_5Br reacts with alco. *KOH* to form C_2H_5OH
 - (b) C_2H_5Br when treated with metallic sodium gives ethane
 - (c) C_2H_5Br when treated with sodium ethoxide forms diethyl ether

(d) C_2H_5Br with AgCN forms ethyl isocyanide

- 49. When chloroform is exposed to air and sunlight, it gives [NCERT 1984; CPMT 1978, 87; CBSE PMT 1990; EAMCET 1993; MNR 1994; MP PET 1997, 2000; BHU 2001; AFMC 2002]
 - (a) Carbon tetrachloride(b) Carbonyl chloride(c) Mustard gas(d) Lewsite
- 50. An organic halide is shaken with aqueous NaOH followed by the addition of dil. HNO₃ and silver nitrate solution gave white ppt. The substance can be[JIPMER 1997]
 (a) C₂H₂(CH₂)Br (b) C₂H₂CH₂Cl

(c)
$$C_6H_5Cl$$
 (d) None of these

- **51.** A compound *A* has a molecular formula C_2Cl_3OH . It reduces Fehling solution and on oxidation gives a monocarboxylic acid (*B*). A is obtained by action of chlorine on ethyl alcohol. *A* is
 - [CBSE PMT 1994; MP PET 1997; KCET 2005]
 - (a) Chloral (b) *CHCl*₃
 - (c) CH_3Cl (d) Chloroacetic acid
- **52.** Following equation illustrates

$$C_6H_5Cl + 2NaOH \xrightarrow{200-250^\circ C} C_6H_5OH + NaCl + H_2O$$

[Bihar CEE 1995]

	(a) Dow's process (b)) Kolbe's process
	(c) Carbylamine test (d) Haloform reaction
53 .	One of the following that o	annot undergo dehydro-
	halogenation is	[J & K 2005]
	(a) Iso-propyl bromide (b)) Ethanol
	(c) Ethyl bromide (d) None of these
54 .	A compound X on reaction with	th chloroform and NaOH
	gives a compound with a very u	npleasant odour. <i>X</i> is
		[MP PMT 1999]

(a)
$$C_6 H_5 CONH_2$$
 (b) $C_6 H_5 NH_2$

(c)
$$C_6H_5CH_2NHCH_3$$
 (d) $C_6H_5NHCH_3$

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+
$$C_2H_5I \xrightarrow[Anhydrous(C_2H_5OH)]{} Product$$

In the above reaction product is

(a)
$$C_6H_5OC_2H_5$$
 (b) $C_2H_5OC_2H_5$

(c)
$$C_6 H_5 O C_6 H_5$$
 (d) $C_6 H_5 I$

56.
$$C_2H_5Cl + KCN \longrightarrow X \xrightarrow{\text{Hydrolysis}} Y$$
. 'X' and 'Y' are

[MP PET 1995]

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- (a) C_2H_6 and C_2H_5CN
- (b) C_2H_5CN and C_2H_6
- (c) C_2H_5CN and $C_2H_5CH_2NH_2$
- (d) C_2H_5CN and C_2H_5COOH

57. Iodoform is formed on warming *I*₂ and *NaOH* with [MP PET 1995; DCE 1999; RPET 1999; RPMT 2002]

(a) C_2H_5OH (b) CH_3OH

	(c) $HCOOH$ (d) C_6H_6		(d)
58.	Which of the following reacts with phenol to give	70.	Alk
	salicylaldehyde after hydrolysis [MP PMT 1995]		()
	(a) Dichloromethane(b) Trichloromethane(c) Methyl chloride(d) None of these		(a) (c)
59.	Dehydrohalogenation in monohaloalkanes produces	71.	In
0,74	(a) A single bond (b) A double bond	/1•	CH
	(c) A triple bond (d) Fragmentation		The
60.	When chloroform is treated with conc. HNO_3 it gives		(a)
	[CPMT 1986; MP PMT 1989; AFMC 1998, 99; EAMCET 1991; BHU 1999]		(c)
	(a) $CHCl_2NO_2$ (b) CCl_3NO_2	72.	Alk
	(c) $CHCl_2HO_2$ (d) None of these		res
61.	A sample of chloroform being used as anaesthetic is tested		(a)
01.	by [AIIMS 1980; CPMT 1983]		(c)
	(a) Fehling solution	7 3 .	Wł
	(b) Ammoniacal Cu_2Cl_2		pro
	(c) $AgNO_3$ solution		(a)
	(d) $AgNO_3$ solution after boiling with alcoholic KOH		(c)
	solution	74.	By
62.	Dehydrohalogenation of an alkyl halide is [MP PMT 1996] (a) An addition reaction (b) A substitution reaction		cor
	(a) An addition reaction(b) A substitution reaction(c) An elimination reaction(d) An oxidation reaction		(a)
63.	Reaction of aqueous sodium hydroxide on (i) ethyl	7 5 .	(c) Ch
	bromide and (ii) chlorobenzene gives	/ J•	(a)
	(a) (i) Ethene and (ii) <i>o</i> -chlorophenol		(c)
	(b) (i) Ethyl alcohol and (ii) <i>o</i>-chlorophenol(c) (i) Ethyl alcohol and (ii) phenol	76.	Wł
	(d) (i) Ethyl alcohol and (ii) no reaction		C_2
64.	2-bromopentane is heated with potassium ethoxide in		(a)
	ethanol. The major product obtained is [CBSE PMT 1998](a) Pentene-1(b) cis pentene-2		(b)
	(c) <i>trans</i> pentene-2 (d) 2-ethoxypentane		(c)
65.	What is the product formed in the following reaction		(c) (d)
	$C_6H_5OH + CCl_4 \xrightarrow{(1) NaOH} $ [KCET 1998]	77.	Ary
	(a) p -hydroxybenzoic acid (b) o -hydroxybenzoic acid	//*	nu
	(c) Benzaldehyde (d) Salicylaldehyde		(a)
66.	When chloroform is treated with excess oxygen it forms		(b)
	[MH CET 1999] (a) COCl ₂ + HCl		(c)
	-		(d)
	(b) $COCl_2 + Cl_2 + H_2$	78.	Me
	(c) $COCl_2 + Cl_2 + H_2O$,	
	(d) No product will be formed		(a)
67.	Which isomer of cyclohexane hexachloride is a very strong insecticide[MP PET 2003]	79 .	(c) Chl
	(a) α (b) β	/ 9•	wit
	(c) γ (d) δ		(a)
68.	Haloalkane in the presence of alcoholic <i>KOH</i> undergoes	_	(c)
	[KCET (Engg/Med.) 2002]	80.	2,
	(a) Elimination (b) Polymerisation		pro (a)
	(c) Dimerisation (d) Substitution		(c)
69.	The set of compounds in which the reactivity of halogen atom in the ascending order is [KCET (Engg.) 2002]	81.	The
	(a) Vinyl chloride, chlorethane, chlorobenzene		due

- (a) Vinyl chloride, chlorethane, chlorobenzene
- (b) Vinyl chloride, chlorobenzene, chloroethane
- (c) Chloroethane, chlorobenzene, vinyl chloride

1) Chlorobenzene, vinvl chloride chloroethane lkyl halides react with Mg in dry ether to form [DPMT 2000; MP PET 2001] a) Magnesium halide (b) Grignard's reagent) Alkene (d) Alkvne the following sequence of reactions $H_3CH_2CH_2Br \xrightarrow{KOH(alc)} (A) \xrightarrow{HBr} (B) \xrightarrow{KOH(aq.)} (C).$ he product (C) is [JIPMER 2001] (b) Propan -l - ol) Propan – 2 - *ol*) Propyne (d) Propene lkyl halide on heating with alc. NH₃ in a sealed tube [Orissa JEE 2002] sults... (b) 2° amine a) 1° amine) 3° amine (d) All of these Then $CH_3CH_2CHCl_2$ is treated with $NaNH_2$ the oduct formed is [CBSE PMT 2002] $CH_3 - CH = CH_2$ (b) $CH_3 - C \equiv CH$) $CH_3CH_2CH(NH_2)(Cl)$ (d) $CH_3CH_2C(NH_2)_2$ y heating a mixture of CHCl₃ with silver powder, the mpound formed is [Kurukshetra CET 2002] a) Acetylene (b) Silver acetate e) Methanol (d) None of these hloropicrin is [Kurukshetra CET 2002]) Trichloro acetaldehyde (b) Nitrochloroform 2,4,6-trinitro phenol (d) None of these hich of the following are correct statements about $_{2}H_{5}Br$ [Roorkee 1999]) It reacts with metallic *Na* to give ethane) It gives nitroethane on heating with aqueous ethanolic solution of AgNO2) It gives C_2H_5OH on boiling with alcoholic potash l) It forms ethylacetate on heating with silver acetate ryl halide is less reactive than alkyl halide towards icleophilic substitution because [RPMT 2002] () Less stable carbonium ion) Due to large C - Cl bond energy) Inductive effect) Resonance stabilization and sp^2 - hybridisation of C attached to halide ethyl chloride reacts with silver acetate to yield [BVP 2003]) Acetaldehvde (b) Acetvl chloride) Methyl acetate (d) Acetic acid hloroform for anesthetic purposes is tested for its purity ith the reagent [DPMT 2001]) Silver nitrate (b) Lead nitrate) Ammoniacal Cu_2Cl_2 (d) Lead nitrate 6 -Dimethylheptane monochlorination on oduces..... derivatives [DPMT 2001] (b) 6 l) 5 (d) 4 :) 3 he less reactivity of chlorine atom in $CH_2 = CH - Cl$ is ie to [DCE 2001]

(a) Inductive effect(b) Resonance stabilization(c) Electromeric effect(d) Electronegativity

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82.	$CH_3 - CH_2 - Br \xrightarrow{\text{alc.KCN}} CH_3 CH_2 CN \xrightarrow{\text{HOH}} X$
	In this reaction, product <i>X</i> is [MH CET 2002]
83.	 (a) Acetic acid (b) Propionic acid (c) Butyric acid (d) Formic acid In alkaline hydrolysis of a tertiary alkyl halide by aqueous alkali if concentration of alkali is doubled, then the
	reaction [MH CET 2002]
84.	 (a) Will be doubled (b) Will be halved (c) Will remain constant (d) Can't say AgNO₃ does not give precipitate with CHCl₃ because
~	[MP PET 1999; CPMT 2002]
	(a) $CHCl_3$ does not ionise in water
	(b) $AgNO_3$ does not reacts with $CHCl_3$
	(c) $CHCl_3$ is chemically inert
	(d) None of these
85.	The reaction between chlorobenzene and chloral in the
	presence of concentrated sulphuric acid produces [Pb. PMT 2001]
	(a) Gammexane
	(b) <i>p,p</i> -dichloro diphenyl trichloro ethane
	(c) Chloropicrin(d) Benzene hexachloride
86.	False statement is [RPET 1999]
	(a) Chloroform is heavier than water
	(b) CCl_4 is non-inflammable
	(c) Vinyl chloride is more reactive than allyl chloride
0 -	(d) Br^- is a good nucleophile as compared to I^- Chloroform is slowly oxidise by air in presence of light to
87.	form [MH CET 1999; UPSEAT 2001, 02; RPMT 2003]
	(a) Formyl chloride (b) Phosgene
00	(c) Trichloroacetic acid (d) Formic acid
88.	Alcoholic potash is used to bring about [KCET (Engg.) 2001]
	(a) Dehydrogenation (b) Dehydration
	(c) Dehydrohalogenation (d) Dehalogenation
89.	Vinyl chloride reacts with <i>HCl</i> to form [JIPMER 2000] (a) 1, 1- dichloro ethane
	(b) 1, 2- dichloro ethane
	(c) Tetrachloro ethylene
	(d) Mixture of 1, 2 and 1, 1 – dichloro ethane
90.	$R - X + NaOH \longrightarrow ROH + NaX$
	The above reaction is classified as
	[BHU 1982; CBSE PMT 1991; RPET 2000] (a) Nucleophilic substitution
	(b) Electrophilic substitution
	(c) Reduction
	(d) Oxidation
91.	Reduction of acetyl chloride with H_2 in presence of Pd
	gives [MP PMT 2001]
	(a) $CU COCU$ (b) $CU OU$
	(a) CH_3COCH_3 (b) C_2H_5OH
	(c) CH_3COOH (d) CH_3CHO
92.	(c) CH_3COOH (d) CH_3CHO When methyl bromide is heated with Zn it gives
92.	(c) CH_3COOH (d) CH_3CHO When methyl bromide is heated with Zn it gives [MP PMT 2001]
92.	(c) CH_3COOH (d) CH_3CHO When methyl bromide is heated with Zn it gives

93.	5	
		PMT 1997; CBSE PMT 2002]
	-	(b) Salicylaldehyde
	•	(d) Chlorobenzene
94.	Iodoform on heating with <i>KC</i> (a) CH_3CHO	(b) CH_3COOK
	-	(d) <i>HCHO</i>
95.	Which reaction is correct in t	
	to acetylene	[Pb. PMT 2000]
	(a) $CHCl_3 + AgNO_3$	(b) $CHCl_3 + O_2$
	(c) $CHCl_3 + HNO_3$	(d) $CHCl_3 + Ag$
96.	Which of the following gases	
		[Pb. PMT 2000]
	(a) $CHCl_3$	(b) CO_2
		(d) <i>CO</i>
97.	Which of the following a	lkyl halide is used as a
	methylating agent [KCET (a) <i>CH</i> ₃ <i>I</i>	(b) C_2H_5Br
	-	
		(d) C_6H_5Cl
98.	$C_6H_6Cl_6$, on treatment with	
		[AFMC 2000]
		(b) $C_6H_3Cl_3$
		(d) $C_6 H_6 C l_4$
99.	When ethyl iodide is heat product obtained is	ed with silver nitrate, the [CPMT 2000]
	(a) C_2H_5Ag	(b) $Ag - O - NO_2$
	(c) $C_2 H_5 O - NO_2$	(d) $C_2H_5I - NO_2$
100.	$CHCl_3$ and HF lead to the t	formation of a compound of
	fluorine of molecular weight	70. The compound is
		[RPET 2000]
		(b) Fluorine monoxide
101	(c) Fluorine dioxide	
101.	Chloroform with zinc dust in (a) CH_4	(b) Chloropicrin
		-
		(d) CH_2Cl_2
102.	Which of the following is use Grignard reagent	[KCET 1998]
	-	(b) Iodine powder
103.		(d) Manganese dioxide
103.	the order	[MP PMT 1997]
		(b) $RI < RCl < RBr$
10.4		(d) $RCl < RBr < RI$
104.	Which halide will be least rea	[MP PET 2003]
	(a) Vinyl chloride	(b) Allyl chloride
	-	(d) <i>t</i> -Butyl chloride
105.	In nucleophilic aliphatic subs	titution, the nucleophiles are
	generally	(h) D
	(a) Acids	(b) Bases

- (a) Acids (b) Bases (c) Salts
 - (d) Neutral molecules
- 106. Which one of the following compounds does not react with bromine [DPMT 1983]



(a) Ethylamine	(b) Propene
----------------	-------------

(c) Phenol (d) Chloroform

107. Allyl chloride on dehydro chlorination gives [Kerala (Med.) 2003]

(a) Propadiene

(b) Propylene (c) Acetylchloride (d) Acetone

108. Toluene reacts with excess of Cl_2 in presence of sunlight to give a product which on hydrolysis followed by reaction with NaOH gives [Orissa JEE 2004]

- **109.** An alkyl bromide produces a single alkene when it reacts with sodium ethoxide and ethanol. This alkene undergoes hydrogenation and produces 2-methyl butane. What is the identity of the alkyl bromide [Kerala PMT 2004]
 - (a) 1-bromo-2, 2-dimethylpropane
 - (b) 1-bromobutane
 - (c) 1-bromo-2-methylbutane
 - (d) 2-bromo-2-methylbutane
 - (e) 2-bromopentane
- 110. On treating a mixture of two alkyl halides with sodium metal in dry ether, 2-methyl propane was obtained. The alkyl halides are [KCET 2004]
 - (a) 2-chloropropane and chloromethane
 - (b) 2-chloropropane and chloroethane
 - (c) Chloromethane and chloroethane
 - (d) Chloromethane and 1-chloropropane
- 111. In which case formation of butane nitrile is possible

[Orissa JEE 2004] (b) $C_4 H_9 Br + KCN$

(c) $C_3H_7OH + KCN$ (d) $C_4 H_9 OH + KCN$

- The reaction of an aromatic halogen compound with an 112. alkyl halides in presence of sodium and ether is called [MP PMT 2004]
 - (a) Wurtz reaction

(a) $C_3H_7Br + KCN$

- (b) Sandmeyer's reaction
- (c) Wurtz-fittig reaction
- (d) Kolbe reaction
- 113. The compound added to prevent chloroform to form phosgene gas is [MP PET 2004] CU COOU

(a)
$$C_2H_5OH$$
 (b) CH_3COOH

(c)
$$CH_3COCH_3$$
 (d) CH_3OH

- 114. Among the following, the one which reacts most readily with ethanol is [AIIMS 2004]
 - (a) *p*-nitrobenzyl bromide
 - (b) *p*-chlorobenzyl bromide
 - (c) *p*-methoxybenzyl bromide
 - (d) *p*-methylbenzyl bromide
- Chloropicrin is obtained by the reaction of 115. [CBSE PMT 2004]
 - (a) Chlorine on picric acid
 - (b) Nitric acid on chloroform
 - (c) Steam on carbon tetrachloride

(d) Nitric acid on chlorobenzene

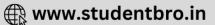
- 116. In Wurtz reaction alkyl halide react with [MH CET 2004] (a) Sodium in ether (b) Sodium in dry ether (c) Sodium only (d) Alkyl halide in ether
- 117. Chloroform, when kept open, is oxidised to [CPMT 2004]
 - (a) CO_2 (b) $COCl_2$
 - (c) CO_2, Cl_2 (d) None of these
- **118.** Chloroform reacts with concentrated HNO_3 to give
 - [Pb. CET 2000]
 - (a) Water gas (b) Tear gas (c) Laughing gas
- (d) Producer gas When ethyl chloride and alcoholic KOH are heated, the 119. compound obtained is [MH CET 2003]
 - (a) $C_2 H_4$ (b) C_2H_2 (c) $C_6 H_6$ (d) $C_2 H_6$
- 120. Chloroform, on warming with Ag powder, gives
 - (b) $C_3 H_8$ (a) $C_2 H_6$
 - (c) $C_2 H_4$ (d) $C_{2}H_{2}$
- **121.** When alkyl halide is heated with dry Ag_2O , it produces [CPMT 1997; BHU 2004]

[MH CET 2003]

- (a) Ester (b) Ether (c) Ketone (d) Alcohol
- 122. Reaction of alkyl halides with aromatic compounds in presence of anhydrous AlCl₃ is known as[UPSEAT 2004]
 - (a) Friedal-Craft reaction
 - (b) Hofmann degradation
 - (c) Kolbe's synthesis
 - (d) Beckmann rearrangement
- 123. Two percent of ethanol is added during the oxidation of chloroform to stop the formation of carbonyl chloride. In this reaction ethanol acts as [Pb. CET 2001] (a) Auto catalyst (b) Negative catalyst
 - (c) Positive catalyst (d) None of these
- 124. When benzene is heated with chlorine in the presence of sunlight, it forms [Pb. CET 2000]
 - (a) B.H.C. (b) Cyclopropane
 - (d) None of these (c) *p*-dichlorobenzene
- 125. Ethylene di bromide on heating with metallic sodium in [Pb. CET 2004]
 - ether solution yields
 - (b) Ethyne (a) Ethene
 - (c) 2-butene (d) 1-butene
- **126.** The reaction, $CH_3Br + Na \rightarrow Product$, is called

 - (a) Perkin reaction (b) Levit reaction
 - (c) Wurtz reaction (d) Aldol condensation
- 127. At normal temperature iodoform is [MP PET 2004] (a) Thick viscous liquid (b) Gas
 - (c) Volatile liquid (d) Solid
- 128. Which of the following statements about benzyl chloride is incorrect [KCET 2004]
 - (a) It is less reactive than alkyl halides
 - (b) It can be oxidised to benzaldehyde by boiling with copper nitrate solution
 - It is a lachrymatory liquid and answers Beilstein's (c) test
 - (d) It gives a white precipitate with alcoholic silver nitrate





[Pb. CET 2003]

- 129. Ethylene dichloride and ethylidine chloride are isomeric compounds. The false statement about these isomers is that they [DCE 2003]
 (a) React with alcoholic potash and give the same product
 - (b) Are position isomers
 - (c) Contain the same percentage of chlorine
 - (d) Are both hydrolysed to the same product
- **130.** An alkyl bromide (X) reacts with Na to form 4, 5-
diethyloctane. Compound X is**[Roorkee 1999]**
 - (a) $CH_3(CH_2)_3Br$
 - (b) $CH_3(CH_2)_5 Br$
 - (c) $CH_3(CH_2)_3CH.Br.CH_3$
 - (d) $CH_3(CH_2)_2CH.Br.CH_2CH_3$
- **131.** In the following reaction *X* is

 $CH_3NH_2 + X + KOH \rightarrow CH_3NC$ (highly offensive odour)

- [**MP PET 1994**]
- (a) CH_2Cl_2 (b) CHC(c) CH_3Cl (d) CCl_4

132. Which metal is used in Wurtz synthesis

[CPMT 1986: DPMT 1979: MP PET 2002]

	[01 11 1900, D1 11 19/
(a) <i>Ba</i>	(b) <i>Al</i>
(c) <i>Na</i>	(d) <i>Fe</i>

- **133.** Which of the following is boiled with ethyl chloride to form ethyl alcohol [MNR 1982]
 - (a) Alcoholic *KOH* (b) Aqueous *KOH* (c) H_2O (d) H_2O_2

134. Why is chloroform put into dark coloured bottles

- (a) To prevent evaporation
- (b) To prevent from moisture
- (c) To prevent it from oxidation to form phosgene

[MP PET 2002]

- (d) To prevent its reaction with glass
- 135. DDT is

00110	
(a) A solid	(b) A liquid
(c) A gas	(d) A solution

- **136.** Bottles containing C_6H_5I and $C_6H_5CH_2I$ lost their original labels. They were labelled *A* and *B* for testing. *A* and *B* were separately taken in test tubes and boiled with *NaOH* solution. The end solution in each tube was made acidic with dilute HNO_3 and then some A_{gNO_3} solution was added. Substance *B* give a yellow precipitate. Which one of the following statements is true for this experiment **[AIEEE 2003]**
 - (a) A was $C_6 H_5 I$
 - (b) A was $C_6H_5CH_2I$
 - (c) B was C_6H_5I
 - (d) Addition of HNO₃ was unnecessary
- **137.** Which of the following statements is incorrect regarding benzyl chloride **[KCET 2003]**
 - (a) It gives white precipitate with alcoholic A_gNO_3
 - (b) It is an aromatic compound with substitution in the side chain
 - (c) It undergoes nucleophilic substitution reaction(d) It is less reactive than vinyl chloride
- **138.** Alkyl halide can be converted into alkene by

- [BCECE 2005]
- (a) Nucleophilic substitution reaction
- (b) Elimination reaction
- (c) Both nucleophilic substitution and elimination reaction
- (d) Rearrangement
- **139.** The major product formed in the following reaction is CH_3

$$CH_{3} - CH_{2} Br \xrightarrow{CH_{3}O} CH_{3}OH \rightarrow [AIIMS 2005]$$

$$H$$

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

$$H OCH_{3} OCH_{3} OCH_{3} OCH_{3} OCH_{3} OCH_{3}$$

$$(b) CH_{3} - CH_{3} OCH_{3} OCH_{3}$$

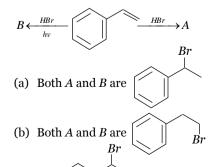
140. The major product obtained on treatment of $CH_3CH_2CH(F)CH_3$ with CH_3O^-/CH_3OH is

OCH 2

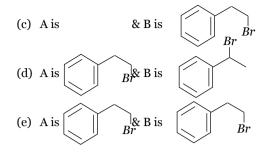
- (a) $CH_3CH_2CH(OCH_3)CH_3$
- (b) $CH_3CH = CHCH_3$
- (c) $CH_3CH_2CH = CH_2$
- (d) $CH_3CH_2CH_2CH_2OCH_3$
- 141. When phenyl magnesium bromide reacts with *t*-butanol, the product would be [IIT 2005]
 (a) Benzene (b) Phenol
- (c) *t*-butyl benzene (d) *t*-butyl phenyl ether **142.** Alkyl halides react with dialkyl copper reagents to give
 - [AIEEE 2005]

(a) Alkenes	(b) Alkyl copper handes
(c) Alkanes	(d) Alkenvl halides

- **143.** Which of the following is liquid at room temperature
 - [AFMC 2005]
 - (a) CH_3I (b) CH_3Br
 - (c) $C_2 H_5 Cl$ (d) $CH_3 F$
- 144. Which of the following haloalkanes is most reactive
 - (a) 1-chloropropane (b) 1-bromopropane
 - (c) 2-chloropropane (d) 2-bromopropane
- **145.** Grignard reagent adds to [KCET 2005] (a) > C = O (b) $-C \equiv N$
 - (a) > C = O(c) > C = S
 - (d) All of the above
- **146.** Analyse the following reaction and identify the nature of
A and B[Kerala CET 2005]



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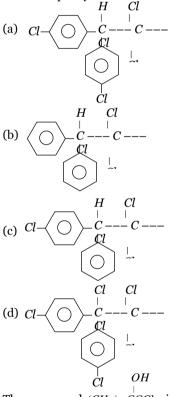


Uses of Halogen Containing Compounds

Which of these can be used as moth repellant 1.

[CPMT 1987]

- (a) Benzene hexachloride (b) Benzal chloride
- (c) Hexachloroethane (d) Tetrachloroethane
- 2. Which one of the following is the correct formula of dichlorodiphenyl trichloroethane [AIIMS 1982]



- The compound $(CH_3)_2.CCCl_3$ is 3. (a) Chloretone (b) Chloroquin (c) Chloropicrin (d) Chloropropyl chloride Depletion of ozone layer is caused by [RPMT 2002] 4. (a) Freon (b) Alkane
- (c) Gringard reagent (d) All of these Which of the following is Teflon [RPMT 2002] 5. (a) $[-CF_2 - CF_2 -]_n$ (b) $CF_2 = CF_2$
- (c) $CF \equiv CF$ (d) None of these Statement "Ozone in atmosphere is decreased by chloro-6. fluoro-carbon (Cl_2F_2C) " [RPET 1999]
 - (a) Is true
 - (b) Is false
 - (c) Only in presence of CO_2

 $CF_x Cl_y$ [where x + y = 4]. These compounds are not used 7. because [RPET 2000] (a) These are fluoro carbons (b) These are difficult to synthesise They deplete ozone layer (c) (d) None of the these The molecular formula of DDT has 8. [MP PMT 1997] (b) 4 chlorine atoms (a) 5 chlorine atoms (c) 3 chlorine atoms (d) 2 chlorine atoms What is the reagent used for testing fluoride ion in water 9.

(d) Only in absence of CO_2

- [EAMCET 2003]
- (a) Alizarin S (b) Quinalizarin (c) Phenolphthalein (d) Benzene 10. Chloropicrin is used as [UPSEAT 2000] (a) Solvent (b) Anaesthetic (c) Perfume (d) Tear gas Which is used in the manufacture of plastic 11. (a) $CH_2 = CHCl$ (b) $CH \equiv CH$ (c) $CH_2 = CH - CH_2I$ (d) CCl_{4} Freon (dichlorodifluoro methane) is used 12. [CPMT 1986; DPMT 1983; CBSE PMT 2001] (a) As local anaesthetic (b) For dissolving impurities in metallurgical process (c) In refrigerator (d) In printing industry 13. Which of the following is known as freon which is used as a refrigerant[DPMT 1982; CPMT 1979, 81, 89; AFMC 1995; Manipal MEE 1995; MP PET 1995, 2004]
 - (a) CCl_2F_2 (b) $CHCl_3$ (c) CH_2F_2 (d) *CF*₄
- Benzene hexachloride (BHC) is used as 14.
 - [MP PMT 1994; KCET 1999] (a) Dye (b) Antimalerial drug
 - (c) Antibiotic (d) Insecticide
- 15. Which plastic is obtained from *CHCl*₃ as follows

$$CHCl_{3} \xrightarrow{HF} X \xrightarrow{800^{\circ}C} Y \xrightarrow{Polymerisation} Plastic$$
(a) Bakelite
(b) Teflon
(c) Polythene
(d) Perspex

$$Cl \rightarrow CCl_3$$
. The above structural $Cl \rightarrow H$

16.

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formula refers to		[MP PET 1997]
(a) <i>BHC</i>	(b) <i>DNA</i>	
(c) DDT	(d) <i>RNA</i>	

The commercial uses of DDT and benzene hexachloride 17. are

(a) DDT is a herbicide, benzene hexachloride is a fungicide

- (b) Both are insecticides
- (c) Both are herbicides
- (d) DDT is a fungicide and benzene hexachloride is a herbicide

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- 18. Which of the following is used in fire extinguishers [AFMC 1993]
 - (b) $CHCl_3$ (a) CH_4

	(c) CH_2Cl_2	(d)	CCl_4
19.	Iodoform can b	e used as	[NCERT 1981]
	(a) Anaesthetic	e (b)	Antiseptic
	(c) Analgesic	(d)	Antifebrin
20.	Which of the fol	llowing is an anae	esthetic [AFMC 1989]
	(a) $C_2 H_4$		CHCl ₃
	(c) CH_3Cl	(d)	C_2H_5OH
21.	An important chloral on chlor		tained by the action of [KCET 1989]
	(a) BHC	(b)	Gammexene
	(c) DDT	(d)	Lindane
22.	In fire extinguis	her, pyrene is	[DPMT 1985]
	(a) CO_2	(b)	CCl_4
	(c) CS_2	(d)	CHCl ₃
23.	B.H.C. is used a	s	[Pb. CET 2002]
-	(a) Insecticide	(b)	Pesticide
	(c) Herbicide	(d)	Weedicide
24.	The use of the	product obtaine	d as a result of reaction
-		e and chloroform	
	(a) Hypnotic	(b)	Antiseptic
	(c) Germicidal	(d)	Anaesthetic
25.	Use of chloroflu	oro carbons is no	ot encouraged because

25. Use of chlorofluoro carbons is not encouraged because [KCET 2005]

- (a) They are harmful to the eyes of people that use it
- (b) They damage the refrigerators and air conditioners
- (c) They eat away the ozone in the atmosphere
- (d) They destroy the oxygen layer

Critical Thinking Objective Questions

- Among the following, the molecule with the highest dipole moment is [IIT-JEE (Screening) 2003]
 (a) CH₃Cl
 (b) CH₂Cl₂
 - (c) $CHCl_3$ (d) CCl_4

2. When $CHCl_3$ is boiled with *NaOH*, It gives

- [Orissa JEE 2003]
- (a) Formic acid (b) Trihydroxy methane
- (c) Acetylene (d) Sodium formate
- **3.** The hybridization state of carbon atoms in the product formed by the reaction of ethyl chloride with aqueous potassium hydroxide is **[EAMCET 1997]**
 - (a) sp (b) sp^2
 - (c) sp^3 (d) sp^3d
- 4. Which of the following compounds does not undergo nucleophilic substitution reactions [KCET 1998]
 (a) Vinyl chloride (b) Ethyl bromide
 - (c) Benzyl chloride (d) Isopropyl chloride
- 5. Replacement of *Cl* of chlorobenzene to give phenol requires drastic conditions but chlorine of 2, 4-dinitrochlorobenzene is readily replaced because[CBSE PMT 1997]
 (a) NO make ring electron rich at ortho and nero
 - (a) NO_2 make ring electron rich at ortho and para

(c) denotes e^- at meta position (d) NO_2 withdraws e^- from ortho/para positions 6. Among the following one with the highest percentage of chlorine is [MNR 1989; BHU 1998; MH CET 1999] (a) Chloral (b) Pyrene (c) PVC (d) Gammexene In which alkyl halide, SN² mechanism is favoured 7. maximum [RPMT 1997] (a) CH_3Cl (b) CH_3CH_2Cl (c) $(CH_3)_2 CHCl$ (d) $(CH_3)_3 C - Cl$ 8. Which conformation of $C_6H_6Cl_6$ is most powerful insecticide (a) aaeeee (b) aaaeee (c) aaaaee (d) aaaaaa The odd decomposition of carbon chlorine bond form 9. [UPSEAT 1999] (a) Two free ions (b) Two-carbanium ion (c) Two carbanion (d) A cation and an anion 10. A new carbon-carbon bond formation is possible in [IIT-JEE 1998] (a) Cannizzaro reaction (b) Friedel-Craft's alkylation (c) Clemmensen reduction (d) Reimer-Tiemann reaction

(b) NO₂ withdraws e^- from meta position

- 11. An isomer of C₃H₆Cl₂ on boiling with aqueous KOH gives acetone. Hence, the isomer is [UPSEAT 2000]
 (a) 2, 2-dichloropropane
 (b) 1, 2-dichloropropane
 (c) 1, 1-dichloropropane
 (d) 1, 3-dichloropropane
- **12.** Which of the following is the example of SN^2 reaction [CPMT 1999]
 - (a) $CH_3Br + OH^- CH_3OH + Br^-$
 - (b) $CH_3CHCH_3 + OH^- \longrightarrow CH_3CHCH_3 + Br^-$ | Br OH

(c)
$$CH_3CH_2OH \xrightarrow{-H_2O} CH_2 = CH_2$$

 $CH_3 \qquad CH_3$
(d) $CH_3 - C - CH_3 + OH^- \rightarrow CH_3 - C - O - CH_3 + Br^-$

13. Wurtz reaction of methyl iodide yields an organic compound *X*. Which one of the following reactions also yields *X*[EAMCET 2003]

(a)
$$C_2H_5Cl + Mg \xrightarrow{\text{dryether}}$$

(b)
$$C_2H_5Cl + LiAlH_4 \longrightarrow$$

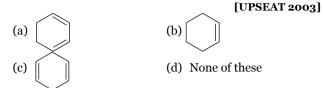
(c)
$$C_2H_5Cl + C_2H_5ONa \longrightarrow$$

(d) $CHCl_3 \xrightarrow{Ag \text{ powder}}$

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- 14. Ethyl orthoformate is formed by heating with sodium
 - ethoxide[EAMCET 2003](a) $CHCl_3$ (b) C_2H_5OH
 - (c) HCOOH (d) CH_3CHO
- 15. 1, 2 di-bromo cyclohexane on dehydro halogenation gives

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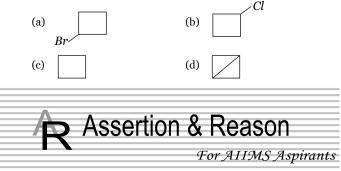


- **16.** In which one of the following conversions phosphorus pentachloride is used as a reagent **[EAMCET 1997]**
 - (a) $H_2C = CH_2 \rightarrow CH_3CH_2Cl$
 - (b) $H_3C O CH_3 \rightarrow CH_3Cl$
 - (c) $CH_3CH_2OH \rightarrow CH_3CH_2Cl$
 - (d) $HC \equiv CH \rightarrow CH_2 = CHCl$
- 17. When but -3-en -2- ol reacts with aq. HBr, the product formed is [DCE 2001]
 - (a) 3 bromobut 1- ene
 - (b) 1 bromobut 2- ene
 - (c) A mixture of both a and b
 - (d) 2 bromobut 2 ene
- **18.** Which of these do not form Grignard reagent
 - (a) CH_3F (b) CH_3Cl
 - (c) CH_3Br (d) CH_3I
- **19.** An organic compound $A(C_4H_6Cl)$ on reaction with Na/diethyl ether gives a hydrocarbon, which on monochlorination gives only one chloro derivative. *A* is
 - (a) *t*-butyl chloride (b) *s*-butyl chloride
 - (c) Isobutyl chloride (d) *n*-butyl chloride
 - (e) None of these
- **20.** Among the following the most reactive towards alcoholic *KOH* is [AIIMS 2004]
 - (a) $CH_2 = CHBr$ (b) $CH_3COCH_2CH_2Br$
 - (c) CH_3CH_2Br (d) $CH_3CH_2CH_2Br$

21. Which one of the following possess highest m.pt.

[Pb. CET 2004]

- (a) Chlorobenzene (b) *o*-dichlorobenzene
- (c) *m*-dichlorobenzene (d) *p*-dichlorobenzene
- **22.** Which chlorine atom is more electronegative in the following **[UPSEAT 2004]**
- (a) $CH_3 Cl$ (b) $CH_3 CH_2 Cl$ CH_3 CH_3 (c) H - C-Cl (d) $CH_3 - CH_2 - C-Cl$
- CH_3 CH_3 **23.** What would be the product formed when 1-Bromo-3-
- chloro cyclobutane reacts with two equivalents of metallic sodium in ether [IIT-JEE (Screening) 2005]



Read the assertion and reason carefully to mark the correct option out of the options given below:

- (a) If both assertion and reason are true and the reason is the correct explanation of the assertion.
- (b) If both assertion and reason are true but reason is not the correct explanation of the assertion.
- (c) If assertion is true but reason is false.
- (d) If the assertion and reason both are false.
- (e) If assertion is false but reason is true.

2.

4.

5.

9.

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- **1.** Assertion : *CHCl*₃ is stored in transparent bottles.
 - Reason : $CHCl_3$ is oxidised in dark. [AIIMS 1996]
 - Assertion : Addition of bromine to trans-2-butene yields meso-2, 3-dibromobutane
 - Reason : Bromine addition to an alkene is an electrophilic addition.

[IIT-JEE (Screening) 2001]

- **3.** Assertion : Alkyl halides are soluble in organic solvents.
 - Reason : *p*-dichlorobenzene possesses low melting point.
 - Assertion : CCl_4 is not a fire extinguisher.
 - Reason : CCl_4 is insoluble in water.
 - Assertion : Aqueous hydrohalogen acids are used to prepare alkyl halides from alkenes.
 - Reason : Hydrogen iodide readily reacts with alkenes to form alkyl halides.
- **6.** Assertion : Alkyl halides form alkenes when heated above 300°*C*.
 - Reason : CH_3CH_2I react slowly with strong base when compared to CD_3CH_2I .
- **7.** Assertion : Halogen acids react with alcohols to form haloalkanes.
 - Reason : Order of reactivity of halogen acids HCl > HBr > HI

8. Assertion :
$$CH_3$$

reactions.
Reason : Tertiary alkyl halides react predominantly

- by $S_N 1$ mechanism. Assertion : Electron withdrawing groups in aryl halides
- Assertion : Electron withdrawing groups in aryl halides decrease the reactivity towards nucleophilic substitution.
 - Reason : 2, 4-Dinitrochlorobenzene is less reactive than chlorobenzene.
- **10.** Assertion : Aryl halides undergo electrophilic substitutions more readily than benzene.
 - Reason : Aryl halide gives a mixture of *o* and *p*-products.
- **11.** Assertion : Addition of Br_2 to cis-but-2-ene is stereoselective.
 - Reason : SN^2 reactions are stereospecific as well as stereoselective.

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12. Assertion : Optically active 2-iodobutane on treatment with *NaI* in acetone undergoes recemization.

Reason	: Repeated	Walden	inversions	on	the
	reactant an racemic m	1	luct eventual	lly giv	ves a

- **13.** Assertion : Nucleophilic substitution reaction on an optically active alkyl halide gives a mixture of enantiomers.
 - Reason : The reaction occurs by SN^1 mechanism.



Introduction of Halogen containing compounds

1	а	2	b	3	b	4	С	5	b
6	а	7	b	8	а	9	b	10	a
11	d	12	а	13	b				

Preparation of Halogen containing compounds

1	b	2	d	3	b	4	a	5	а
6	b	7	d	8	d	9	b	10	а
11	а	12	b	13	а	14	а	15	а
16	b	17	а	18	b	19	C	20	C
21	а	22	C	23	С	24	b	25	d
26	d	27	C	28	а	29	C	30	b
31	С	32	b	33	d	34	а	35	С
36	d	37	C	38	b	39	b	40	d
41	c	42	C	43	а	44	b	45	b
46	а	47	C	48	а	49	b	50	а
51	b	52	а	53	d	54	а		

Properties of Halogen containing compounds

1	а	2	с	3	с	4	c	5	c
6	С	7	С	8	С	9	b	10	d
11	b	12	С	13	а	14	а	15	d
16	b	17	С	18	b	19	b	20	d
21	d	22	C	23	b	24	а	25	b
26	C	27	d	28	b	29	а	30	b
31	C	32	C	33	b	34	а	35	a
36	а	37	a	38	a	39	а	40	a
41	а	42	C	43	b	44	C	45	d
46	C	47	b	48	ab	49	b	50	b
51	а	52	а	53	b	54	b	55	а
56	d	57	a	58	b	59	b	60	b
61	c,d	62	C	63	C	64	C	65	b
66	С	67	C	68	а	69	d	70	b
71	а	72	d	73	d	74	а	75	b
76	b,d	77	d	78	C	79	a	80	d

81	b	82	b	83	C	84	a	85	b
86	cd	87	b	88	C	89	а	90	а
91	d	92	b	93	b	94	C	95	d
96	d	97	a	98	b	99	C	100	a
101	a	102	b	103	d	104	a	105	b
106	d	107	a	108	b	109	C	110	а
111	a	112	C	113	a	114	C	115	b
116	a	117	b	118	b	119	a	120	d
121	b	122	a	123	b	124	a	125	C
126	C	127	d	128	a	129	d	130	d
131	b	132	C	133	b	134	C	135	a
136	a	137	d	138	b	139	d	140	b
141	a	142	C	143	a	144	d	145	d
146	C								

Uses of Halogen containing compounds

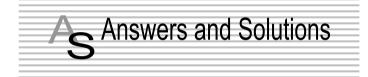
1	с	2	a	3	a	4	а	5	a
6	а	7	C	8	a	9	a	10	d
11	a	12	C	13	a	14	d	15	b
16	C	17	b	18	d	19	b	20	b
21	C	22	b	23	a	24	a	25	C



Critical Thinking Questions									
1	a	2	b	3	C	4	a	5	d
6	b	7	a	8	b	9	d	10	bd
11	а	12	а	13	b	14	а	15	d
16	bc	17	C	18	а	19	а	20	d
21	d	22	d	23	d				

Assertion and Reason

1	d	2	b	3	c	4	е	5	e
6	с	7	c	8	е	9	d	10	е
11	b	12	a	13	а				



Introduction of Halogen containing compounds

2. (b) % of
$$Br = \frac{\text{Mass of } Br}{\text{Mass of organic compound}} \times 100$$
$$= \frac{80}{109} \times 100 = 73.39\% \text{ or approx. } 75\%$$

3. (b) Gem-dihalides are those in which two halogen atoms are attached on the same carbon atom.

6. (a) Isopropyl chloride
$$CH_3 - CH_3 - CH_3$$
 chlorine atom is

attached to 2^o carbon atom.

7. (b)
$$CH_4 \xrightarrow{-3H} CHX_3$$
 $(X = Cl, Br, I)$

11. (d) Neohexyl chloride is a primary halide as in it *Cl*-atom is attached to a primary carbon.

$$CH_{3}$$

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

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

12. (a)
$$CCl_3CH$$

 $I^{0}CH_3$ $I^{0}CH_3$
 $I^{0}CH_3$ $I^{0}CH_3$
13. (b) $CH_3 - CH_3 - CH_2 - CH_2 - CH_3$
 Cl
 Cl
 Cl
 Cl
 Cl

Preparation of Halogen containing compounds

2. (d)
$$CH_3 - CH_1 = CH_2 + HBr \rightarrow CH_3 - CH_3 - CH_3$$

 $CH_3 - CH_3 - CH_3 - CH_3$
 $CH_3 - CH_3$

5. (a)
$$CH_3COOAg + Br_2 \xrightarrow{CS_2} CH_3Br + AgBr + CO_2$$

7. (d)
$$C_2H_5OH + SOCl_2 \xrightarrow{\text{Pyridine}} C_2H_5Cl + SO_2 + HCl$$

14. (a)
$$CH_2 = CH_2 + Br_2 \xrightarrow{CH_3OH} CH_2 - CH_2 + Br - CH_2 - CH_2$$

 $Br Br$

15. (a)
$$C_3H_8 + Cl_2 \xrightarrow{\text{Light}} C_3H_7Cl + HCl$$

This is an example of substitution reaction. Hydrogen atom of alkane is replaced by halogen atom.

 $-O-CH_3$

16. (b)
$$CH \equiv CH + HCl \rightarrow CH_2 = CHCl \xrightarrow{+HCl} CH_3CHCl_2$$

17. (a)
$$R - OX + HX \rightarrow R - X + H_2O$$

Reactivity order of alcohols for this reaction $3^{\circ} > 2^{\circ} > 1^{\circ}$ Reactivity order of halogen acids R - I > R - Br > R - Cl

(b)
$$C_6H_6 + 3Cl_2 \xrightarrow{\text{U.Vlight}} C_6H_6Cl_6$$

Benzene Cl_6

18.

21.

19. (c)
$$\bigcirc$$
 + 3Cl₂ $\xrightarrow{\text{Sunlight}}$ $Cl \xrightarrow{Cl}$ Cl
Benzene Cl Cl Cl Cl

(a)
$$C_2H_5OH \xrightarrow{KI}_{Na_2CO_3}CHI_3$$

22. (c)
$$CaOCl_2 + H_2O \rightarrow Ca(OH)_2 + Cl_2$$

Bleachingpowder

23. (c)
$$CaOCl_2 + H_2O \xrightarrow{Hydrolysis} Ca(OH)_2 + Cl_2$$

 $CH_3CH_2OH + Cl_2 \xrightarrow{Oxidation} CH_3CHO + 2HCl$
 $CH_3CHO + 3Cl_2 \xrightarrow{Chlorination} CCl_3CHO + 3HCl$
 $CCl_3CHO + Ca \swarrow OH \xrightarrow{OH} 2CHCl_3 + \frac{HCOO}{HCOO} Ca$
Calcium fomate

ВНС

24. (b)
$$CCl_3CHO + NaOH \xrightarrow{\text{Boil}} CHCl_3 + HCOONa$$

Chlorol Chloroform

25. (d)
$$CaOCl_2 + H_2O \rightarrow Ca(OH)_2 + Cl_2$$

 $CH_3 - CH - CH_3 + Cl_2 \rightarrow CH_3 - C - CH_3 + 2HCl$
 U
 OH
 2 -propanol
 $CH_3 - C - CH_3 + 3Cl_2 \rightarrow CCl_3 - CO - CH_3 + 3HCl$
 U
 O

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$$\begin{array}{c} CCl_{3}COCH_{3} + Ca \swarrow OH \\ CCl_{3}COCH_{3} + Ca \swarrow OH \\ OH \end{array} \rightarrow 2CHCl_{3} + \begin{array}{c} CH_{3}COO \\ CH_{3}COO \end{array} \searrow Ca \end{array}$$

26. (d)
$$CH_3CH_2OH + Cl_2 \rightarrow CH_3CHO + 2HCl$$

 $CH_3CHO + 3Cl_2 \rightarrow CCl_3CHO + 3HCl$
Chloral

27. (c)
$$C_2H_5 - O - C_2H_5 + 2HI \rightarrow 2C_2H_5I + H_2O$$

Ethyliodide

29. (c)
$$CH_3CH_2 - CO - CH_2 - CH_3 \xrightarrow{MaOH/I_2}$$
 No yellow ppt
 $CH_3COCH_3 \xrightarrow{NaOH/I_2} CHI_3$
 $C_2H_5OH \xrightarrow{NaOH/I_2} CHI_3$
 $CH_3 - CH - CH_3 \xrightarrow{NaOH/I_2} CHI_3$
 OH yellow ppt.

COONa

51.

4.

7.

30. (b)
$$CH_3 - CC_6H_5 \xrightarrow{NaOH} CHI_3 + \bigcirc$$

 O
Acetophenone

31. (c)
$$CH_3COCH_3 + 3I_2 + 4NaOH \rightarrow$$

 $CHI_3 + 3Na + CH_3COONa + 3H_2O$

32. (b)
$$C_2H_5OH + SOCl_2 \xrightarrow{\text{Pyridine}} C_2H_5Cl + SO_2 + HCl$$

33. (d)
$$(d) \xrightarrow{NH_2} N = N - Cl Cl$$
$$(d) \xrightarrow{HNO_2} HRO_2 \xrightarrow{Cu_2Cl_2} HCl OC Chlorobenzene chloride} + N_2$$

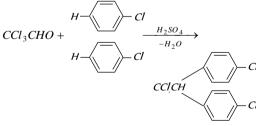
34. (a)
$$CH_3OH + HI \xrightarrow{ZnCl_2} CH_3I + H_2O$$

35. (c)
$$C_2H_5I + Mg \xrightarrow{D_2 \text{ current}} C_2H_5 - Mg - I$$

Ethyl iodide Ethyl magnesium iodide

43. (a)
$$CH_3 - CH = CH_2 + HBr \xrightarrow[rule]{Marko wnikoffs} CH_3 - CH - CH_3$$

45. (b) DDT is prepared by heating chlorobenzene and chloral with concentrated sulphuric acid



46. (a) Acetone forms chloroform when heated with bleaching powder.

$$CaOCl_2 + H_2O \rightarrow Ca(OH)_2 + Cl_2$$

$$CH_3COCH_3 + 3Cl_2 \rightarrow CCl_3COCH_3 + 3HCl$$

$$\begin{aligned} & 2CCl_3COCH_3 + Ca(OH)_2 \rightarrow & 2CHCl_3 + (CH_3COO)_2Ca_{\text{chloroform}} \end{aligned}$$

$$\begin{aligned} & \textbf{47.} \quad \text{(c)} \qquad & CaOCl_2 \quad + H_2O \rightarrow Ca(OH)_2 + Cl_2 \end{aligned}$$

Bleaching powder

$$Cl_2 + H_2O \rightarrow 2HCl + O$$

$$C_{2}H_{5}OH + O \rightarrow CH_{3}CHO + H_{2}O$$

ethanol

$$CH_{3}CHO + 3Cl_{2} \rightarrow CCl_{3}CHO + 3HCl$$

chloral

$$2CCl_{3}CHO + Ca(OH)_{2} \rightarrow 2CHCl_{3} + (HCOO)_{2}Ca$$

chloroform or
trichloromethane

48. (a)
$$CaOCl_2 + H_2O \rightarrow Ca(OH)_2 + Cl_2$$

 $CH_3CH_2OH + Cl_2 \rightarrow CH_3CHO + HCl$
 $CH_3CHO + Cl_2 \xrightarrow{Ca(OH)_2} CHCl_3 + (CH_3COO)_2Ca$

49. (b) When ethylene reacts with bromine, it forms ethylene dibromide.

$$\begin{array}{c} H_2C = CH_2 + Br_2 \\ \text{Ethylene} \end{array} \xrightarrow{\rightarrow} \begin{array}{c} H_2C - CH_2 \\ Br Br \\ Br Br \\ \text{Ethylenedibromide} \end{array}$$

50. (a) The chlorination of alcohol by $SOCl_2$ (thionyl chloride) is the best method for the preparation of alkyl halides as in this method all the other product are gaseous and thus halides are obtained on quite pure state $R - OH + SOCl_2 \xrightarrow{\Delta} R - Cl + HCl \uparrow + SO_2 \uparrow$

(b)
$$CCl_3CHO + 2 \bigcirc -Cl_3 - CH \bigcirc -CH \bigcirc -Ch = CH \bigcirc -CH \bigcirc -Ch = CH \bigcirc -CH \bigcirc -C$$

- **52.** (a) DDT is formed by reaction of chloral with chloro benzene.
- **54.** (a) *NBS* is a selective brominating reagent since it normally brominates the ethylenic compounds in the allylic position.

Properties of Halogen containing compounds

1. (a)
$$CCl \xrightarrow{CCl} \xrightarrow{Br_2} O$$

As $-CCl_3$ is a *m*-directing group

2. (c)
$$Ag_2O + H_2O \rightarrow 2AgOH$$

 $C_2H_5Br + AgOH \rightarrow C_2H_5OH + AgBr$
3. (c) $C_2H_5Cl + 2Na + ClC_2H_5 \xrightarrow{Dry} C_2H_5 - C_2H_5 + 2NaCl$

(c)
$$C_2H_5Cl \xrightarrow{NH_3} C_2H_5 - NH_2 \xrightarrow{C_2H_5Cl} (C_2H_5)_2 - NH$$

$$\xrightarrow{C_2H_5Cl} (C_2H_5)_3 N \xrightarrow{C_2H_5Cl} \begin{bmatrix} C_2H_5 \\ C_2H_5 \\ -N - C_2H_5 \end{bmatrix}^+ Cl^-$$
$$C_2H_5 = \begin{bmatrix} C_2H_5 \\ C_2H_5 \\ -N - C_2H_5 \\ -C_2H_5 \end{bmatrix}^+ Cl^-$$

If $\mathit{N\!H}_3$ is in excess, then 1^{o} amine will be the main product,

if C_2H_5Cl is in excess then mixture of $1^o, 2^o, 3^o$ and quaternary amine is obtained.

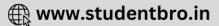
5. (c)
$$2CHCl_3 + O_2 \xrightarrow{\text{Light}} 2COCl_2 + 2HCl_{\text{Phosgene}}$$

6. (c)
$$COCl_2$$
 carbonyl chloride is commonly called as phosgene.

(c)
$$C_2H_5NH_2 + CHCl_3 + 3KOH \rightarrow C_2H_5 - N \stackrel{=}{=} C + 3KCl + 3H_2O$$

Ethylisocyanide(offensive odour)

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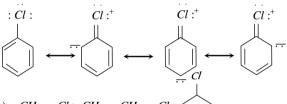
8. (c)
$$CH_3 - CH - Cl + 2Na + Cl - CH_3 \xrightarrow{\text{Dry}}_{\text{Hethyl chloride}} \xrightarrow{\text{Ether}} CH_3$$

Isopropyl chloride $CH_3 - CH - CH_3 + 2NaCl$

9. (b)
$$RX + Mg \xrightarrow{\text{Dry ether}} R - Mg - X$$

10. (b) $C_2H_5 - Cl > C_6H_5 - CH_2 - Cl$
13. (a) Chlorobenzene
 $CH_2 - Cl$
 $CH_2 - Cl$
chloride

In chlorobenzene the lone pairs present on Cl atom get involved in resonance with π electrons of benzene due to which C-Cl bond acquires double bond character Hence, reactivity decreases.



14. (a)
$$CH_3 - Cl > CH_3 - CH_2 - Cl > \bigcirc$$

15. (d) CHI_3 gives a yellow ppt. of *AgI*.

~ . .

17. (c)
$$OH \rightarrow 4NaCl + 2H_2O$$

+ $OH \rightarrow 4NaCl + 2H_2O$
+ $OH \rightarrow OH$
salicyliacid

18. (b)
$$RX + Mg \xrightarrow{\text{Dry}} R - Mg - X$$

Grignard's reagent $(X = Cl, Br, I)$

19. (b)
$$CH_3 - \stackrel{|}{C} - Br + CH_3ONa \xrightarrow{\text{Elimination}} CH_3$$

$$CH_3$$

 $CH_3 - C = CH_2 + CH_3OH + NaBr$
Isobutylene

$$CH_3ONa \rightarrow CH_3O^- + Na^+$$

methoxide ion (CH_3O^-) is a strong base, therefore it abstract proton from 3^o alkyl halide and favours elimination reaction. $CHCl_2 + HO - NO_2 \rightarrow CCl_2NO_2 + H_2O_2$

20. (d)
$$CHCl_3 + HO - NO_2 \rightarrow \frac{CCl_3NO_2}{\text{Chloropicrin(war gas)}} + H_2O$$

21. (d) $CCl_4 + AgNO_3 \rightarrow \text{No reaction}$

 $CCl_{\,4}\,$ is a covalent compound. Therefore does not provide $Cl^{\,-}\,$ ions.

22. (c)
$$OH$$

 $+ CCl_4 + 4NaOH \rightarrow OH$
 $+ 4NaCl + 2H_2O$
Salicylic acid
23. (b) $C_6H_5 - CH_2 - Cl + KCN(aq) \rightarrow C_6H_5 - CH_2 - C \equiv N + KCl$
24. (a) NH_2
 $+ CHCl_3 + 3KOH \rightarrow OH$
 $+ 3KCl + 3H_2O$
Phenyl isocyanide
25. (b) $CH_3 - CH \lt Cl \xrightarrow{KOH} CH_3 - CH \lt OH$
 $unstable$
 $-H_2O \rightarrow CH_3 - CHO + H_2O$
27. (d) OH
 $+ CHL_2 = CH_2 - CH_2 - Br \xrightarrow{AlCl_3}$

27. (d)
$$(H_3 - CH_2 - CH_2 - Br \xrightarrow{AlCl_3}$$

Benzene $CH_3 - CH - CH_3$
 $(H_3 - CH - CH_3)$
Benzene HBr
Isopropyl benzene

28. (b)
$$CH_3 - CH - CH_2 - CH_3 + KOH_{(alc)} \xrightarrow{Saytzeffs rule} Br$$

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

29. (a)
$$| \xrightarrow{Hydrolysis} |$$

 $CH_2 - F \qquad CH_2 - OH$
 $CH_2 - F \qquad CH_2 - OH$

30. (b)
Benzyl chloride
$$\xrightarrow{\text{Oxidation}}$$
 Benzaldehyde

32. (c) CCl_4 is a covalent compound, Hence it does not give Cl^- ion in solution.

 $CCl_4 + AgNO_3 \rightarrow No reaction$

33. (b)
$$CHCl_3 + 3NaOH \xrightarrow{-3HCl} CH \xrightarrow{OH} OH \xrightarrow{-H_2O} OH \xrightarrow{OH} OH$$

$$HCOOH \xrightarrow{NaOH} HCOONa$$

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34. (a)
$$4C_2H_5Br + 4Pb / Na \rightarrow (C_2H_5)_4Pb + 4NaBr$$

Tetra Ethyl lead
(TEL)

35. (a)
$$CHI_3 + 6Ag + I_3CH \rightarrow CH \equiv CH + 6AgI$$

Acetylene

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36. (a)
$$C_2H_5Br + Ag - O - N = O \rightarrow C_2H_5 - N \swarrow O$$

Nitro ethane

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Ag - O - N = O is a covalent compound. Therefore, attack of nucleophile occurs through Nitrogen atom. Hence, nitroethane is formed.

40. (a)
$$C_2H_5Br \xrightarrow{KCN(X)} C_2H_5CN \xrightarrow{LiAlH_4(Y)} C_2H_5CH_2NH_2(C_3H_7NH_2)$$

$$X = KCN, Y = LiAlH_4$$

41. (a) $CH_3CH_2CH_2CH_2 - Cl + KOH(alc.) \rightarrow$

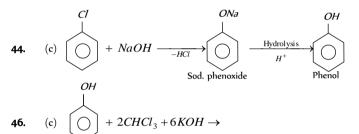
$$CH_3CH_2 - CH = CH_2 + KCl + H_2O$$

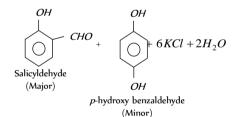
1-butene

42. (c)
$$CH_2Br - C \equiv C - CH_2Br \xrightarrow{Z_n} CH_2 = C = C = CH_2$$

43. (b) $C_2H_5NH_2 + CHCl_3 + 3KOH \rightarrow C_2H_5N \equiv C$ ethylamine Reaction (Unpleasant smell)

$$+3KCl + 3H_2O$$





47. (b)
$$C_2H_5Cl + AgCN \rightarrow C_2H_5 - N \stackrel{=}{=} C + AgCl$$

Ethyl isocyanide
(X)

The functional isomer of ethyl isocyanide is ethyl cyanide $C_2 H_5 - C \equiv N \; . \label{eq:c2}$

48. (a,b)
$$C_2H_5Br + alcKOH \rightarrow C_2H_4 + H_2O + KBr$$

 $C_2H_5[Br + 2Na + Br] - C_2H_5 \rightarrow C_2H_5 - C_2H_5 + 2NaBr$
Butane

49. (b) $CHCl_3 + \frac{1}{2}O_2 \xrightarrow{\text{Sunlight}} Phosene \text{ or carbonyl chloride} + HCl$

50. (b)
$$C_6H_5 - CH_2 - Cl \xrightarrow{NaOH} C_6H_5 - CH_2 - OH$$

$$\xrightarrow{\text{dil }HNO_3} C_6 H_5 - CHO$$

White *ppt* of *AgCl* are obtained.

51. (a) $C_2 Cl_3 OH$ + Fehlingsol. $\rightarrow Cu_2 O$ ARed ppt

It means -CHO group is present.

$$C_2Cl_3OH \xrightarrow{\text{Oxidation}} CCl_3 - COOH$$

 $A \xrightarrow{\text{Oxidation}} CCl_3 - COOH$
Monocarbox ylic acid

It means only one -CHO group is present.

$$C_{2}H_{5}OH + Cl_{2} \rightarrow CH_{3}CHO + 2HCl$$

$$CH_{3}CHO + 3Cl_{2} \rightarrow CCl_{3}CHO + 3HCl$$
Charal

53. (b) Ethanol cannot undergo dehydrohalogenation.

54. (b)
$$C_6H_5NH_2 + CHCl_3 + 3NaOH \rightarrow (Aniline)$$

ОН

$$3NaCl + 3H_2O + C_6H_5 - N \stackrel{?}{=} C$$

Phenyl isocyanide

55. (a)
$$C_2H_5I \xrightarrow{\text{Anhy.}} C_6H_5OC_2H_5$$

56. (d)
$$C_2H_5Cl + KCN \rightarrow C_2H_5CN \xrightarrow{\text{Hydrolysis}} C_2H_5COOH$$

Ethyl cyanide Propanoic acid
(X) (Y)

59. (b)
$$H - \stackrel{|}{C} - \stackrel{|}{C} - H \xrightarrow{\text{Dehydrohal ogenation}} H - \stackrel{|}{C} = \stackrel{|}{C} - H + HCl$$

 $H - Cl$

60. (b)
$$CHCl_3 + \text{conc. } HNO_3 \rightarrow CCl_3 - NO_2 + H_2O_{\text{Chloroform}}$$

- **61.** (c,d) Before using the sample of chloroform as an anaesthetic, it is tested by treating with *aq.* solution of $AgNO_3$. A pure sample does not give *ppt* with *aq.* $AgNO_3$.
- **62.** (c) Alkyl halide gives alkene on elimination, reaction takes place in presence of alc. *KOH*.

 $CH_3CH_2Br + Alc. KOH \rightarrow CH_2 = CH_2 + KBr + H_2O$

There are two types of elimination reactions.

- (a) $E_1 \rightarrow$ Unimolecular elimination
- (b) $E_2 \rightarrow$ Bimolecular elimination

63. (c) (i) Ethyl alcohol (ii) Phenol

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$$C_{2}H_{5}Br + NaOH \rightarrow C_{2}H_{5}OH + NaBr$$
Ethyl alcohol
$$ONa$$



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$$\xrightarrow{\text{di} l \ HCl}{-NaCl} \rightarrow$$

64. (c)
$$CH_3 - CH - CH_2 - CH_2 - CH_3 + KOH$$

Br
$$\xrightarrow{C_2H_5OH} CH_3 - CH = CH - CH_2 - CH_3$$

Elimination
reaction 2-Pentene

When alkyl halide reacts with alc. *KOH* then it favours elimination reaction (Dehydrohalogenation). Since, *trans* pentene-2 is more symmetrical than *cis* isomers. Hence, it is main product.

$$CH_2 - CH_3$$

 $CH_3 = CH$
 CH_3
 $Trans-pentene -2$
(Main product)

66. (c)
$$CHCl_3 + O_2 \xrightarrow{hv} COCl_2 + Cl_2 + H_2O$$

70. (b) Alkyl halide reacts with *Mg* in presence of dry ether to give alkyl magnesium halide which is also called as Grignard reagent. This reaction is also called as Grignard's reaction.

$$R - X + Mg \xrightarrow{\text{dry}} R - Mg - X$$

ether $R - Mg - X$
Grignard's reagent

71. (a)
$$CH_3 - CH_2 - CH_2 - Br \xrightarrow{\text{alc. KOH}} CH_3 - CH = CH_2$$

(A) \downarrow^{HBr}
 $CH_3 - CH - CH_3 \xleftarrow{aq. KOH} CH_3 - CH - CH_3$
 $\cup \\ OH$
Propan -2-ol
 Br

76. (b,d)
$$C_2H_5Br$$
 + alc. $AgNO_2 \rightarrow C_2H_5 - NO_2 + AgBr_{nitro ethane}$

$$C_2H_5Br + CH_3COOAg \rightarrow CH_3 - COO - C_2H_5 + AgBr$$

Ester

- **79.** (a) If $CHCl_3$ sample contains phosgene $(COCl_2)$ then it will give a white *ppt*. When treated with cold $AgNO_3$.
- 80. (d) Because

$$CH_3 - CH_2 - CH_2 - CH_2 - CH_2 - CH_3$$
 has four CH_3 CH_3

methyl groups on the corner so it can produce for derivatives.

84. (a)
$$CHCl_3 + AgNO_3 \rightarrow No react$$

 $\ensuremath{\textit{CHCl}_3}$ is a covalent compound. It does not ionize in water.

86. (c,d) Vinyl chloride is less reactive than allyl chloride due to resonance effect.

Order of nucleophilicity amongst the halide ion are as $\varGamma^- > Br^- > Cl^-\,.$

87. (b)
$$CHCl_3 + O_2 \rightarrow COCl_2 + HCl_{Phosene}$$

89. (a)
$$CH_2 = CH - Cl + HCl \rightarrow CH_3 - CHCl_2$$

1,1-dichloro ethane

91. (d)
$$CH_3 COCl + H_2 \xrightarrow{Pd}_{\text{Reduction}} CH_3 CHO + HCl$$

92. (b)
$$CH_3Br + Zn + BrCH_3 \xrightarrow{\Delta} C_2H_6 + ZnBr_2$$

93. (b)
$$OH \qquad OH \qquad OH \qquad OH \qquad OH \qquad OH \qquad OH \qquad Phenol \qquad Salicyldehyde$$

94. (c)
$$CHI_3 + 4KOH(aq.) \rightarrow HCOOK + 3KCl + 2H_2O$$

Potassium formate

95. (d)
$$CHCl_3 + 6Ag + Cl_3CH \rightarrow CH \equiv CH + 6AgCl$$

96. (d) *CO* is poisonous gas.

99

98. (b)
$$C_6H_6Cl_6 + 3KOH \rightarrow C_6H_3Cl_3 + 3KCl + 3H_2O$$

Thus Benzene hexahalides decomposes when heated with alc. *KOH* and yield trichloro benzene.

(c)
$$C_2H_5 - I + AgNO_3 \rightarrow C_2H_5ONO_2 + AgI$$

100. (a) We know that $CHCl_3 + HF \rightarrow CHF_3 + 3HCl$. Thus in this reaction the compound obtained in fluoroform (CHF_3) . As we know molecular weight of $CHF_3 = 70$.

102. (b)
$$RX + Mg \xrightarrow{\text{Dry ether}} R - Mg - X$$

 $I_2 \text{ powder}$

103. (d) Density of alkyl halide increases as the size of halogen atom increases.

RF < RCl < RBr < RI

104. (a) Due to resonance partial double bond character is created on vinyl chloride. So, chlorine atom is not replaced easily.

105. (b)
$$R - X + OH^{-}_{\text{Nucleophile}} \rightarrow R - OH + X^{-}_{\text{or base}}$$

108. (b)

$$\begin{array}{c} CH, CI \\ & \bigcirc \\ +CI \\ & \odot \\ +CI \\ & OI \\ & OI \\ \\ +CI \\ & OI \\ \\ +CI \\ & OI \\ \\ +CI \\ & OI \\ \\ +CI$$

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$$CH_{3}$$

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

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

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

110. (a) It is Wurtz reaction in which hydrocarbon formed when alkyl halide react with Na metal in dry ether.

$$Cl$$

$$CH_{3} - CH - CH_{3} + CH_{3}Cl + 2Na \xrightarrow{\text{ether}}$$

$$2 \text{ chloro propane} \xrightarrow{\text{chloro}} CH_{3}$$

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

$$2 \text{ methyl propane}$$

111. (a)
$$C_3H_7Br + KCN \rightarrow C_3H_7CN + KBr$$

In IUPAC system the carbon of functional group also take in numbering. So C_3H_7CN is butane nitrile.

112. (c) It is Wurtz fittig reaction

$$C_6H_5Br + CH_3Br \xrightarrow{Na} C_6H_5CH_3 + 2NaBr$$

- 113. (a) Because it float over chloroform and prevent its oxidation.
- 114. (c) Due to the presence of electron rich methoxy group (+*i*) at *p*-position the polarity increase on *C-X* bond by which it becomes more reactive towards nucleophillic attack of ethanol, *p*-nitro and chloro are electron deficient group decrease the polarity of *C-X* bond. Hence by them it become difficult to react with ethanol due to less polarity. Methyl group is less electron rich than methoxy group.
- **115.** (b) When chloroform is treated with concentrated nitric acid, its hydrogen is replaced by nitro group.

$$CHCl_3 + HONO_2 \rightarrow CNO_2Cl_3 + H_2O$$

chloropicnin

116. (a) Alkyl halides give alkane when react with sodium in ether. This is called Wurtz reaction.

$$R - Cl + 2Na + R - Cl \xrightarrow{\text{ether}} R - R + 2NaCl$$

117. (b) Chloroform is oxidised to a poisonous gas, phosgene (COCl₂) by atmospheric gas.

$$CHCl_3 + O \rightarrow COCl_2 + HCl$$

118. (b) When chloroform reacts with HNO_3 product formed are chloropicrin or tear gas and water.

$$\begin{array}{c} CHCl_3 + HNO_3 \rightarrow CCl_3NO_2 + H_2O \\ \text{chloropicrin} & \text{conc.} & \text{chloropicrin} & \text{water} \end{array}$$

119. (a) We know that

$$CH_3CH_2Cl + KOH \rightarrow CH_2 = CH_2 + KCl + H_2O$$

Thus in this reaction ethene (C_2H_4) is produced.

120. (d) We know that

$$HCCl_{3} + 6Ag + Cl_{3}CH \xrightarrow{\text{heat}} HC \equiv CH + 6AgCl$$

chloroform chloroform

Thus in this reaction acetylene $(HC \equiv CH)$ is produced.

121. (b) Alkyl halide on reaction with dry silver oxide furnish ether.

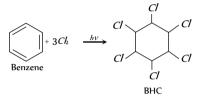
$$2CH_{3}Cl + Ag_{2}O \xrightarrow{\Delta} CH_{3}OCH_{3} + 2AgCl$$
(methoxy methane)

122. (a) Acylation or alkylation of aromatic compound in presence of

$$AlCl_3$$
 is known as Friedal-craft reaction.

$$\begin{array}{c} C_6H_6 + CH_3Cl \xrightarrow{dry} C_6H_5CH_3 + HCl \\ \hline \text{Benzene} & \text{chloro} \\ methane \end{array} \xrightarrow{dry} C_6H_5CH_3 + HCl \\ \hline \text{Toluene} \end{array}$$

- 123. (b) Any substance which when added to a chemical reaction inhibit or decrease the rate of reaction is called negative catalyst. In $CHCl_3$ when two percent ethanol is added, it stops the formation of carbonyl chloride. So ethanol acts as negative catalyst.
- 124. (a) When benzene is heated with chlorine in the presence of sunlight, it form benzene hexachloride.



125. (c)
$$CH_3CH < \frac{Br}{Br} + 4Na + \frac{Br}{Br} > CH - CH_3 \xrightarrow{\text{ether}} \Delta$$

 $CH_3 - CH = CH - CH_3 + 4NaBr$
 2-buttene

126. (c) It is a common method to prepare alkanes. Methane cannot be prepared by Wurtz reaction.

$$CH_3Br + 2Na + BrCH_3 \rightarrow C_2H_6 + 2NaBr$$

ethane

- 127. (d) At room temperature iodoform is the yellow solid.
- 128. (a) Benzyl chloride are far more reactive than alkyl halide towards nucleophilic substitution reaction due to the reason that the carbocation formed after the removal of halide ion is stabilized by resonance.

129. (d) On hydrolysis, ethylene dichloride gives ethylene glycol. While ethylidine chloride give acetaldehyde.

$$\begin{array}{c} CH_2Cl.CH_2Cl & \xrightarrow{\text{aq. KOH}} CH_2OH - CH_2OH \\ \text{ethylene dichloride} & \text{glycol} \end{array}$$

$$CH_{3} - CH < \stackrel{Cl}{\underset{Cl}{\overset{aq. KOH}{\longrightarrow}}} CH_{3}CH < \stackrel{OH}{\underset{OH}{\overset{-H_{2}O}{\longrightarrow}}} H$$
ethylidinechloride

CH ₃CHO acetaldehyde

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131. (b)
$$CH_3NH_2 + CHCl_3 + 3KOH \rightarrow 3KCl + CH_3NC + 3H_2O$$

132. (c)
$$CH_3Br + 2Na + Br - CH_3 \xrightarrow{\text{Dry}} CH_3CH_3 + 2NaBr$$

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133. (b)
$$C_2H_5Cl + KOH \rightarrow C_2H_5OH + KCl$$

138. (b) Alkyl halide is best converted to alkene by mean of elimination reaction in form of dehydrohalogenation.

$$R - CH_2 - CH_2 - X \xrightarrow{\text{dehydrohal ogenation}} R - CH = CH_2$$

$$CH_3$$

$$H_3C - C - CH_2 - Br \xrightarrow{CH_3O^-}_{CH_3OH} A?$$

Alkyl halide is 1°.

Keep in mind 1° halide give product by $S_2 / E - 2$ mechanism and 1° halide always gives substitution reaction except when strongly hindered base is used.

ex.: With
$$CH_3 - C - O^{(-)}$$
 it gives mainly elimination.

The reaction involves carbocation intermediate.

*CH*₃
i.e.
$$CH_3 - C - CH_2$$

H
(primary carbocation)

but as it is a primary carbocation it will rearrange to give a tertiary carbocation, which completes the reaction

$$CH_{3}$$

$$CH_{3} - C^{\oplus}$$

$$CH_{3} - C^{\oplus}$$

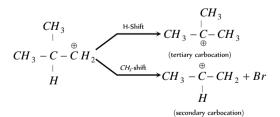
$$CH_{3}$$

teritiarycarbocation

Stability of carbocation : $3^{\circ} > 2^{\circ} > 1^{\circ} > \overset{\oplus}{C}H_3$

It is because the stability of a charged system is increased by dispersal of the charge. The more stable the carbocation, the faster it is formed.

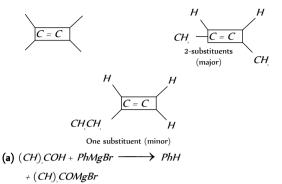
N.B. - Rearrangement can be done in two ways.



Therefore,

$$CH_{3} \qquad CH_{3} \qquad CH_{3} \\ CH_{3} - C - CH_{2} - Br = CH_{3} - C - CH_{2}^{\oplus} + Br^{-} \\ H \qquad H \qquad H \qquad H \\ CH_{3} - C - CH_{3} \qquad CH_{3} \\ CH_{3} - C - CH_{3} \qquad CH_{3} - C - CH_{3} \\ CH_{3} - C - CH_{3} \qquad CH_{3} - C - CH_{3} \\ CH_{3} - C - CH_{3} \qquad CH_{3} - C - CH_{3} \\ CH_{3} - C - CH_{3} - C - CH_{3} \\ CH_{3} - C - CH_{3} - C - CH_{3} \\ CH_{3} \\ CH_{3} - C - CH_{3} \\ CH_{3} - C - CH_{3} \\ CH_{3} \\ CH_{3} - C - CH_{3} \\ CH_{3} \\$$

140. (b) According to Saytzeff's rule, the major product will be that one which contains more number of substituents around the double bond.



142. (c)
$$R_2CuLi + R'X \longrightarrow R - R' + R - Cu + LiX$$

141.

- **143.** (a) CH_3F , CH_3Cl , CH_3Br and C_2H_5Cl are gases at room temperature. CH_3I is a liquid at room temperature and solidifies at $-66.5^{\circ}C$.
- 144. (d) The alkyl halides are highly reactive, the order of reactivity is lodide > bromide > chloride > (nature of the halogen atom). Tertiary > secondary > primary. Thus 2-bromopropane is the given option.
- **145.** (d) Grignard reagent gives addition reactions with compounds containing $C = O, -C \ge N$ and C = S group \gg

$$R H OH$$

$$> C = O + RMgX \rightarrow > C - OMgX \longrightarrow$$

$$R + OH$$

$$> C - OH + Mg < OH$$

$$R + OH$$

$$- C = N + RMgX \rightarrow -C = N MgX \longrightarrow$$

$$O + MgX \longrightarrow$$

$$R - C = O + NH_3 + Mg < OH_X$$

$$>C = S + RMgX \rightarrow >C - S | MgX \longrightarrow R$$

$$>C - SH + Mg < QH$$

$$>C - SH + Mg < QH$$

146. (c)
$$\xrightarrow{HBr} A$$

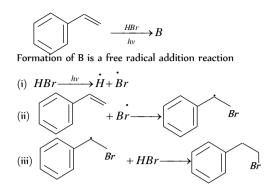
Formation of A is a electrophilic addition reaction

(i)
$$HBr \rightarrow H^+ + Br^-$$

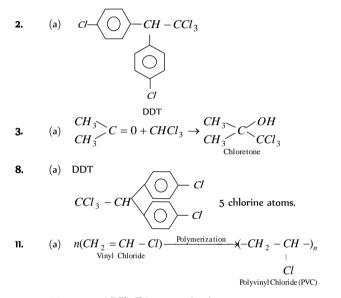
 $CH^- = CH_2$
(ii) $+ H^+ \rightarrow C_6H_5CHCH_3$
 Br
 $CH^- + Br \rightarrow$
 $H^+ \rightarrow C_6H_5CHCH_3$

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Uses of Halogen Containing Compounds



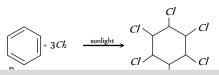
12. (c) Freon (CCl_2F_2) is an odourless, non-corrosive, non toxic gas which is stable even at high temperatures and pressures. It has low b.Pt, low specific heat and can be easily liquified by applying pressure at room temperature. It is therefore, widely used in refrigerant (cooling agent) in refrigerators and air conditioners.

15. (b)
$$2CHCl_3 \xrightarrow{HF} 2CHF_2Cl \xrightarrow{800^{\,0}C} -2HCl \rightarrow CF_2 = CF_2 \xrightarrow{\text{Polymari}} (-CF_2 - CF_2 -)_r$$

- (d) Its vapours are non inflammable (*i.e.* do not catch fire). Hence used as fire extinguishers under the name pyren.
- 19. (b) lodoform is used as an antiseptic for dressing wounds. When it comes in contact with skin (organic matter), lodine is set free which responsible for antiseptic action.
- (b) Inhalation of CHCl₃ vapours produces loss of consciousness and is therefore, used as a general anaesthetic agent in surgery.
- 22. (b) CCl_4 is stable to red heat. Its vapours are highly noninflammable *i.e.* do not catch fire. It is because of this property CCl_4 is used as a fire extinguisher. But now a days its use as a fire extinguisher is restricted because with water vaporous. It forms highly poisonous phosgene gas

$$CCl_4 + H_2O \rightarrow COCl_2 + 2HCl_{Phosgene}$$

23. (a) Benzene hexachloride is an insecticide generally known as gammexane. It is obtained by the following reaction



25. (c) Chlorofluorocarbon is used in air-conditioning and in domestic refrigerators for cooling purposes. Its main drawback is this, it is responsible for ozone depletion.

Critical Thinking Questions

1. (a) CH_3Cl have one Cl atom which is more electronegative so it will have highest dipole moment.

a. (b)
$$CHCl_3 + 3NaOH(aq.) \rightarrow CH \swarrow_{OH}^{OH}$$

2

3.

4

7.

9

CLICK HERE

(c)
$$CH_3 - CH_2 - Cl + \underset{(aq)}{KOH} \rightarrow CH_3 - CH_2 - OH + KCl$$

Ethylalcohol

(a) As a result of resonance, the carbon-chloride bond acquires some double bond character. Hence, vinyl chloride does not undergo nucleophillic substitution reactions.

5. (d)
$$(O_1 \cap O_2 \cap O_2) \cap O_2 \cap O_2$$

 $(O_2 \cap O_2 \cap O_2) \cap O_2 \cap O_2$
 $(O_1 \cap O_2 \cap O_2) \cap O_2$
 $(O_1 \cap O_2) \cap O_2) \cap O_2$
 $(O_1 \cap O_2) \cap O_2) \cap O_2$
 $(O_1 \cap O_2) \cap O_2)$

Chloral
$$(CCl_3CHO) = \frac{106.5}{147.5} \times 100 = 72.20$$

Pyrene $(CCl_4) = \frac{142}{154} \times 100 = 92.20$ Highest

Gammexene
$$(C_6H_6Cl_6) = \frac{213}{291} \times 100 = 73.19$$

(a) SN^2 Substitution nucleophilic bimolecular order of different alkyl halides. $1^o > 2^o > 3^o$

 SN^1 Substitution nucleophilic unimolecular order of different alkyl halides , $3^{\,o}\,>2^{\,o}\,>1^{\,o}$.

8. (b) aaaeee form is the most powerful insecticide form of $C_6 H_6 C l_6 \,.$

(d)
$$R - CH_2 - Cl \xrightarrow{\text{Heterolytic bond fission}} RCH_2^{\oplus} + Cl^{\text{eff}}_{anion}$$

Cl is more electronegative than C by which it form anion and hydrocarbon form cation.

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10. (b,d) New carbon-carbon bond formation take place in Friedel Craft's alkylation and Reimer-Tiemann reaction. In Friedel Craft's alkylation following mechanism involve

$$R - Cl + AlCl_{3} \rightleftharpoons \mathbb{R}^{\oplus} + AlCl_{4}^{\oplus} + HCl$$

$$\xrightarrow{R^{\oplus}} \stackrel{R^{\oplus}}{\longrightarrow} \stackrel{R}{\xrightarrow{I_{+}}} + AlCl_{4} + HCl$$

Here new \mathcal{L} -C bond formed between carbon of benzene ring and alkyl group.

Similarly in Reimer-Tiemann reaction.

$$\bigcirc OH \\ + CHCl + 3NaOH \rightarrow \bigcirc OH \\ + 3NaCl + 2HCl \\ CHO \\ Salicylaldehyde$$

Here new C-C bond formed between carbon of benzene ring and -CHO group.

n. (a)
$$CH_{3} - C - CH_{3} + 2KOH \xrightarrow{boil}{-2KCl} CH_{3} - C - CH_{3}$$
$$Cl \xrightarrow{OH}_{(isomer of C_{3}H_{6}Cl_{2})} OH$$
$$Unstable$$

$$\xrightarrow[(Acetone)]{O} \xrightarrow[(Acetone)]{O} \xrightarrow[(Acetone)]{O}$$

Cyclohex-diene

22.

5.

7.

- 12. (a) Only 1° alkyl halides, *i.e.* CH_3Br undergoes S_N2 reaction.
- **13.** (b) Wurtz reaction gives ethane

$$2CH_3I + 2Na \xrightarrow{\text{dry}} C_2H_6 + 2NaI$$

 $C_2H_5Cl + 2H \xrightarrow{\text{LiAlH}_4} C_2H_6 + HCl$

Similarly C_2H_5Cl reduced by $LiAlH_4$ to give ethane

14. (a)
$$H - C \bigvee_{Cl}^{Cl} H_5 ONa \xrightarrow{\Delta} H - C \bigvee_{OC_2H_5}^{OC_2H_5} H_5 ONa \xrightarrow{\Delta} H - C \bigvee_{OC_2H_5}^{OC_2H_5} H_5 OC_2H_5$$

Ethylorthoforma te

15.

16

Br -2HBr 1, 2 dibromo cyclohexane

. (b, c)
$$CH_3 - O - CH_3 + PCl_5 \rightarrow 2CH_3Cl + POCl_3$$

$$CH_3CH_2OH + PCl_5 \rightarrow CH_3CH_2Cl + HCl + POCl_3$$

Dehydrohal ogenation

So, both reaction carried out by PCl_5

17. (c)
$$H_{2}C = CH - CH - CH_{3} \xrightarrow{H^{\oplus}} [H_{2}C = CH - CH_{3} \leftrightarrow H_{2}C - CH = CH - CH_{3} \leftrightarrow H_{2}C - CH = CH - CH_{3}] \xrightarrow{Br^{\oplus}} H_{2}C = CH - CH_{3} + Br - CH_{2} - CH = CH - CH_{3}$$

18. (a) The C-F bond energy is maximum in CH_3F . Thus fluoride is the less reactive to form the grignard reagent with Mg.

19. (a)
$$2CH_{3} - CH_{3} + 2NaCl$$

$$\downarrow Cl + CL + CH_{3} - CH_{3} + CH_{3} - CH_{3} + CH_{3} + CL_{3} +$$

20. (d) The polarity between *C-X* bond increase by increasing the +*I* effect which increase by increasing the alkyl group by which *X* of *C-X* easily eliminate. In *CH*₃*CH*₂*CH*₂*Br* the polarity is maximum due to 3 alkyl group while in rest polarity decrease due to the presence of double bond, presence of -*CO* group (-*I*) and less no. of alkyl group.

$$CH_3CH_2CH_2Br + KOH \xrightarrow{\text{alc.}}$$

$$CH_3CH = CH_2 + KBr + H_2O$$

- (d) *p*-dichlorobenzene molecule has symmetrical structure. It can fit well in its crystal lattice. The intermolecular forces of attraction are strong. Hence, it possesses highest melting point.
 - (d) Due to +1 effect of 3 alkyl group in option (d), the chlorine atom occupy the maximum charge in it so it is more electronegative.
- 23. (d) It is the example of Wurtz reaction.

$$Br \xrightarrow{2N_{\theta} \rightarrow 2N_{\theta} + 2c} \xrightarrow{\oplus} \overbrace{Cl}^{\oplus} \xrightarrow{O} \overbrace{Cl}^{O}$$

Assertion and Reason

- (d) CHCl₃ is stored in dark bottles of prevent oxidation of CHCl₃ in presence of sunlight.
- **3.** (c) Due to symmetrical nature and more closer packing *p*-dichlorobenzene has highest melting point.
- 4. (e) CCl₄ is used as a fire extinguisher. The dense, non combustible vapours cover the burning substance and prevents the availability of oxygen round burning material.
 - (e) Dry gaseous hydrohalogen acids are better electrophile. Also in aqueous solution, H_2O , acting as nucleophile may produce alcohol.
- 6. (c) CH_3CH_2I reacts more rapidly with strong base in comparison to CD_3CH_2I . The elimination of HI (or DI) in presence of strong base shows E_2 elimination. The rate determining step involves the breaking up of C-H (or C-D) bond. The C-D bond being stronger than C-H and thus elimination is faster in case of CH_3CH_2I .
 - (c) For a given alcohol the order of reactivity of halogen acids follows the sequence *HI* > *HBr* > *HCl*. It is because of the fact

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that I^- is a stronger nucleophile than Br^- which in turn is a stronger nucleophile than Cl^- .

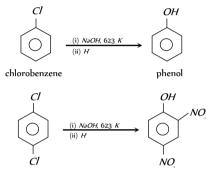
8.

(e)

CH CI is more reactive than CI because the former is a tertiary alkyl halide and the latter is a secondary

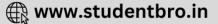
alkyl halide. Tertiary alkyl halides react predominantly by $S_N 1$ mechanism.

9. (d) Halobenzenes become reactive to nucleophilic substitution reactions when electron withdrawing groups (nitro, cyano) are present at ortho/para position. This is evident from the milder conditions required for hydrolysis in 2, 4-dinitrochlorobenzene than chlorobenzene.



- 10. (e) Halogensiiniteodidmoining 2but diritiophiessting. As a result, aryl halides undergo the usual electrophilic substitution reactions less readily than benzene.
- **11.** (b) A reaction is said to be stereo selective if a particular stereoisomer can give two or more stereoisomeric products but gives one of them in greater amount than the other or even to the exclusion of the other. So, addition of Br_2 to cis-but-2-ene is stereoselective since it gives only (\pm) 2, 3-dibromobutane.
- 13. (a) In SN^1 mechanism, recemization takes place, which is due to inverting nucleophilic displacement of halogen atom from the alkyl halide by the halide in solution.





Halogen Containing compounds

Preparation of alkyl halides in laboratory is least preferred by 1. (a) Halide exchange (b) Direct halogenation of alkanes Treatment of alcohols (c) (d) Addition of hydrogen halides to alkenes An alkyl halide may be converted into an alcohol by 2. [EAMCET 1980; CBSE PMT 1997; BHU 1999; AllMS 2001] (a) Addition (b) Substitution (c) Dehydrohalogenation (d) Elimination The C - Cl bond in chlorobenzene as compared with C - Cl3. bond in methyl chloride is [MP PMT 1995] (a) Longer and weaker Shorter and weaker (b) (c) Shorter and stronger (d) Longer and stronger A salt solution is treated with chloroform drops. Then it is shaked 4 with chlorine water. Chloroform layer becomes violet. Solution contains [CPMT 1982] (a) NO_2^- ion (b) NO_3^{-} ion (c) Br^{-} ion (d) I^{-} ion The following reaction belongs to 5 $(CH_3)_3 C - Br \xrightarrow{H_2O} (CH_3)_3 - C - OH$ [AIEEE 2002] (b) Substitution reaction (a) Elimination reaction Free radical reaction (d) Displacement reaction (c) 6. The order of reactivities of methyl halides in the formation of Grignard reagent is [KCET 2003] (a) $CH_3I > CH_3Br > CH_3Cl$ (b) $CH_3Cl > CH_3Br > CH_3I$ (c) $CH_3Br > CH_3Cl > CH_3I$ (d) $CH_3Br > CH_3I > CH_3Cl$ Identify Z in the following series 7. $C_2H_5I \xrightarrow{Alco. KOH} X \xrightarrow{Br_2} Y \xrightarrow{KCN} Z$

[AIIMS 1983; AFMC 1998; MP PET 1997]

 CH_2CN

(a)
$$CH_3CH_2CN$$

8.

(c)
$$BrCH_2 - CH_2CN$$
 (d) $BrCH = CHCN$

The total number of stereoisomeric forms of
$$C_6H_6Cl_6$$
 known is

(b)

(b) 7 (a) 6 (d) None of these (c) 8

ET Self Evaluation Test - 25

- The correct order of C X bond polarity is [RPMT 2000] 9. $CH_3Br > CH_3Cl > CH_3I$ (a)
 - $CH_3I > CH_3Br > CH_3Cl$ (b)

(c)
$$CH_3Cl > CH_3Br > CH_3I$$

- (d) $CH_3Cl > CH_3I > CH_3Br$
- The order of reactivities of the following alkyl halides for a SN^2 10. reaction is [IIT-JEE (Screening) 2000]
 - (a) RF > RCl > RBr > RI
 - (b) RF > RBr > RCl > RI
 - RCl > RBr > RF > RI(c)
 - (d) RI > RBr > RCl > RF

Which of the following reactions doesn't give benzene

(a)
$$C_6H_5N_2Cl \xrightarrow{\text{boiling}}$$

(b)
$$C_6H_5N_2Cl \xrightarrow{C_2H_5OH}$$

(c)
$$C_6H_5N_2Cl + H_3PO_2 + H_2O \longrightarrow$$

(d) All of these

(a) CH_3Cl

11.

Benzene hexachloride is prepared from benzene and chlorine in 12. sunlight by

- (a) Substitution reaction (b) Elimination reaction
- (c) Addition reaction (d) Rearrangement
- Carbon-halogen bond is strongest among the following 13.

(b) CH_3Br

[RPMT 2003]

(c) CH_3F (d) CH_3I

Which of these do not undergo Wurtz reaction 14.

(a) C_2H_5F (b) C_2H_5Br

(c)
$$C_2 H_5 Cl$$
 (d) $C_2 H_5 I$

When ethyl bromide reacts with sodium acetylide the main product 15. [Pb. CET 2002] is (b) 1-butene (a) 1-butane

 C_2H_5I and Ag_2O reacts to produce [Pb. PMT 2004] 16.

(a)
$$C_2H_6$$
 (b) $C_2H_5 - C_2H_5$
(c) $C_2H_5 - O - C_2H_5$ (d) $C_2H_5 - CH_3$

$$C_2H_5 - O - C_2H_5$$
 (d) $C_2H_5 - CH_3$

Answers and Solutions

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(SET -25)

 (b) Direct halogenation of alkenes is not preferred because in it a mixture of monohalogen, dihalogen, trihalogen and tetrahalogen substituted product is obtained which is difficult to separate.

e.g.
$$CH_4 \xrightarrow{Cl_2} CH_3Cl \xrightarrow{Cl_2} CH_2Cl_2$$

 $\xrightarrow{Cl_2} CHCl_3 \xrightarrow{Cl_2} CCl_4$

2. (b)

Addition Not shown by alkyl halide reaction (saturated compound) Dehydrohalogenation $R - CH = CH_2 + HX$ $R - CH_2 - CH_2 - X$ Alkene Alc.KOH Alkyhalide Elimination $R - CH = CH_2 + HX$ Alkene Alc.KOH aq.*KOH* $R - CH_2 - CH_2 - OH + HX$ Alcohol Substitution

- **3.** (c) In chlorobenzene C Cl bond acquires partial double bond character because of resonance.
- 4. (d) $2NaI + Cl_2 \rightarrow 2NaCl + I_2$ (Dissolves in $CHCl_3$ to give violet colour)

Chlorine displaces iodine from salt. The iodine get dissolve in $CHCl_3$ or CCl_4 to produce violet colour.

5. (b)
$$(CH_3)_3 C - Br \xrightarrow{H_2O} (CH_3)_3 - C - OH$$

Here Br substitute by -OH group.

6. (a) Reactivity towards grignard reagent are as under $CH_{3}I > CH_{3}Br > CH_{3}Cl$

8. (c) $C_6H_6Cl_6$ has 8 stereoisomer.

- 9. (c) The C-X bond polarity order are as under $CH_3Cl > CH_3Br > CH_3I$
- 10. (d) The order of reactivity of alkyl holides for SN^2 reaction is R-I>R-Br>R-Cl>R-F

n. (a)
$$C_6H_5N_2Cl \xrightarrow{\text{Boiling}} C_6H_5OH + N_2 + HCl$$

12. (c)
$$3Cl_2 \xrightarrow{\text{Sunlight}}_{\text{Addition reaction}} \xrightarrow{Cl}_{Cl} \xrightarrow{Cl}_{Cl}$$

BHC

13. (c)
$$CH_3F > CH_3Cl > CH_3Br > CH_3I$$

14. (a)
$$C_2H_5F + 2Na + FC_2H_5 \xrightarrow{\text{Dry}} \text{No reaction}$$

15. (c)
$$C_2H_5Br + NaC \equiv CH \rightarrow C_2H_5C \equiv CH + NaBr$$

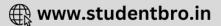
Ethyl bromide sodium acetylide 1-butyne sodium bromide

Thus in this reaction 1-butyne is main product.

16. (c)
$$C_2H_5I$$
 and Ag_2O reacts as below

$$\begin{split} 2C_2H_5I+Ag_2O &\to C_2H_5OC_2H_5+I_2\\ &\text{ether} \end{split}$$
 Thus, $C_2H_5-O-C_2H_5$ is produced.

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	G Ordinary Thinking
	Objective Questions
Int	troduction of Halogen containing compounds
I.	How many structural isomers are possible for a compound with molecular formula C_3H_7Cl [MH CET 2001]
	(a) 2 (b) 5
2.	(c) 7 (d) 9 In CH_3CH_2Br , % of Br is [DPMT 1996]
	(a) 80 (b) 75
	(c) 70 (d) 7
3.	Gem- dibromide is [RPMT 2000]
	(a) $CH_3CH(Br)OH(Br)CH_3$ (b) $CH_3CBr_2CH_3$
	(c) $CH_2(Br)CH_2CH_2$ (d) CH_2BrCH_2Br
•	Ethylidene dibromide is (a) $CH_3 - CH_2 - Br$ (b) $Br - CH_2 - CH_2 - Br$
	(c) $CH_3 - CHBr_2$ (d) $CH_2 = CBr_2$ Benzylidene chloride is
	(a) $C_6H_5CH_2Cl$ (b) $C_6H_5CHCl_2$
	Which of the following halide is 2° (a) Isopropyl chloride (b) Isobutyl chloride
	(a) Isopropyl chloride(b) Isobutyl chloride(c) n-propyl chloride(d) n-butyl chloride
	Haloforms are trihalogen derivatives of [CPMT 1985]
	(a) Ethane (b) Methane
	(c) Propane (d) Benzene Benzene hexachloride is
•	(a) 1, 2, 3, 4, 5, 6-hexachlorocyclohexane
	(b) 1, 1, 1, 6, 6, 6-hexachlorocyclohexane
	 (c) 1, 6-phenyl-1, 6-chlorohexane (d) 1, 1-phenyl-6, 6-chlorohexane
	(d) 1, 1-phenyl-6, 6-chlorohexane Number of $\pi-{ m bonds}$ present in <i>B.H.C.</i> (Benzene hexachloride)
•	are [RPMT 1999]
	(a) 6 (b) Zero
	(c) 3 (d) 12 The general formula for alkyl halides is
•	(a) $C_n H_{2n+1} X$ (b) $C_n H_{2n+2} X$
	(c) $C_n H_{n+1} X$ (d) $C_n H_{2n} X$
	Which of the following is a primary halide [DCE 2004]
	(a) Isopropyl iodide (b) Secondary butyl iodide
	(c) Tertiary butyl bromide (d) Neo hexyl chloride
•	Full name of DDT is [KCET 1993] (a) 1, 1, 1-trichloro-2, 2- <i>bis</i> (<i>p</i> -chlorophenyl) ethane
	(b) 1, 1-dichloro-2, 2-diphenyl trimethylethane
	(c) 1, 1-dichloro-2, 2-diphenyl trichloroethane
	(d) None of these
.	The compound which contains all the four $1^{o}, 2^{o}, 3^{o}$ and 4^{o}
	carbon atoms is [J & K 2005] (a) 2, 3-dimethyl pentane

(b) 3-chloro-2, 3-dimethylpentane

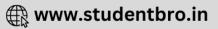
(d) 3. 3-dimethylpentane Preparation of Halogen containing compounds 1. The following reaction is known as $C_2H_5OH + SOCl_2 \xrightarrow{\text{Pyridine}} C_2H_5Cl + SO_2 + HCl$ [AllMS 2002] (a) Kharasch effect (b) Darzen's procedure (c) Williamson's synthesis (d) Hunsdiecker synthesis reaction What is the main product of the reaction between 2-methyl propene 2. with HBr [RPMT 2002] (a) 1-bromo butane (b) 1-bromo-2 methyl propane (c) 2-bromo butane (d) 2-bromo-2 methyl propane [KCET 2002] з. Halogenation of alkanes is (a) A reductive process (b) An oxidative process (c) An isothermal process (d) An indothermal process $N \equiv NBF_A$ 4. $\xrightarrow{\Delta} A$ In the above process product A is [Kerala (Engg.) 2002] (a) Fluorobenzene (b) Benzene (c) 1, 4-difluorobenzene (d) 1, 3-difluorobenzene Silver acetate + $Br_2 \xrightarrow{CS_2}$. The main product of this reaction is 5. [Kurukshetra CET 2002] (a) $CH_3 - Br$ (b) CH_3COI (c) CH_3COOH (d) None of these ClDiazonium salts $+ Cu_2Cl_2 + HCl \rightarrow \bigcirc$ 6. the reaction is known as [Kerala (Med.) 2002] (a) Chlorination (b) Sandmeyer's reaction (d) Substitution reaction (c) Perkin reaction When ethyl alcohol (C_2H_5OH) reacts with thionyl chloride, in the 7. presence of pyridine, the product obtained is [AIIMS; CBSE PMT 2001] (a) $CH_3CH_2Cl + HCl$ (b) $C_2H_5Cl + HCl + SO_2$ (c) $CH_3CH_2Cl + H_2O + SO_2$ (d) $CH_3CH_2Cl + HCl + SO_2$ Preparation of alkyl halides in laboratory is least preferred by [DPMT 2000] 8. (a) Treatment of alcohols

(c) 2, 3, 4-trimethylpentane

- $(b) \quad \text{Addition of hydrogen halides to alkenes}$
- (c) Halide exchange
- (d) Direct halogenation of alkanes

Which of the following organic compounds will give a mixture of 1-chlorobutane and 2-chlorobutane on chlorination [CPMT 2001]

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(a)
$$CH_1 - CH - CH = CH_2$$

 CH_1
(b) $HC = C^- C = CH_2$
(c) $CH_2 = CH - CH = CH_2$
(c) $CH_2 = CH - CH_2 - CH_2$
(c) $CH_2 = CH_2 - CH_2$
(c) $CH_2 - CH_2 - CH_2 - CH_2 - CH_2$
(c) $CH_2 - CH_2 - CH_2 - CH_2 - CH_2$
(c

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	(b) Cu_2Cl_2	47.	Which of the following compounds gives trichloromethane on
	(c) Cl_2 in presence of anhydrous $AlCl_3$		distilling with bleaching powder [KCET 2004; EAMCET 1986]
	(d) HNO_2 and then heated with Cu_2Cl_2		(a) Methanal (b) Phenol
34.	The starting substance for the preparation of CH_3I is	_	(c) Ethanol (d) Methanol
-דע	[CPMT 1975]	48.	The product formed on reaction of ethyl alcohol with bleaching powder is [Orissa JEE 2004; DPMT 1978; AIIMS 1991]
	(a) CH_3OH (b) C_2H_5OH		(a) $CHCl_3$ (b) CCl_3CHO
	(c) CH_3CHO (d) $(CH_3)_2CO$		
35.	A Grignard's reagent may be made by reacting magnesium with [CPM]	F 1072 -82	(c) CH_3COCH_3 (d) CH_3CHO
55.	(a) Methyl amine (b) Diethyl ether	1974993	(a) Chloroethane (b) Ethylene dibromide
	(c) Ethyl iodide (d) Ethyl alcohol		(c) Cyclohexane (d) 1-bromo propane
36.	Which of the following is responsible for iodoform reaction	50.	Best method of preparing alkyl chloride is [MH CET 2004]
	[CPMT 1980; RPMT 1997]		(a) $ROH + SOCl_2 \longrightarrow$
	(a) Formalin (b) Methanol		(b) $ROH + PCl_5 \longrightarrow$
	(c) Acetic acid (d) Ethanol		-
37.	When a solution of sodium chloride containing ethyl alcohol is electrolysed, it forms		(c) $ROH + PCl_3 \longrightarrow$
	(a) Ethyl alcohol (b) Chloral		(d) $ROH + HCl \xrightarrow{\text{anhy. } ZnCl_2} \rightarrow$
	(c) Chloroform (d) Acetaldehyde	51.	DDT is prepared by reacting chlorobenzene with
38.	Which reagent cannot be used to prepare an alkyl halide from an		[BHU 1998, 2005]
	alcohol [CPMT 1989, 94]		(a) CCl_4 (b) $CCl_3 - CHO$
	(a) $HCl + ZnCl_2$ (b) NaCl		(c) CHCl ₃ (d) Ethane
	(c) PCl_5 (d) $SOCl_3$	52.	Which compound needs chloral in its synthesis
39.	Ethyl benzoate reacts with PCl_5 to give [KCET 2003]		[Pb. PET 2003] (a) <i>D. D. T.</i> (b) Gammexane
19.	, , , , , , , , , , , , , , , , , , ,		(a) <i>D. D. T.</i> (b) Gammexane (c) Chloroform (d) Michler's Ketone
	(a) $C_2H_5Cl + C_6H_5COCl + POCl_3 + HCl$	53.	To get DDT, chlorobenzene has to react with which of the following
	(b) $C_2H_5Cl + C_6H_5COCl + POCl_3$		compounds in the presence of concentrated sulphuric acid [KCET (Engg/Med
	(c) $CH_3COCl + C_6H_5COCl + POCl_3$		(a) Trichloroethane (b) Dichloroacetone
	(d) $C_2H_5Cl + C_6H_5COOH + POCl_3$	54.	(c) Dichloroacetaldehyde (d) Trichloroacetaldehyde What will be the product in the following reaction
10	On treatment with chlorine in presence of sunlight, toluene gives	01	∧ ∠CH
10 .	the product		[BHU 2005]
	[Orissa JEE 2003; MH CET 1999, 2002]		Br
	(a) <i>o</i> -chloro toluene (b) 2, 5-dichloro toluene		
	(c) <i>p</i> -chloro toluene (d) Benzyl chloride		(a) (b) (b) (b)
μ.	When chlorine is passed through warm benzene in presence of the sunlight, the product obtained is [KCET 2003]		Br CHP
	(a) Benzotrichloride (b) Chlorobenzene		
	(c) Gammexane (d) DDT		
2.	Which of the following acids adds to propene in the presence of		\sim
	peroxide to give anti-Markownikoff's product [MP PET 2003]		Br
	(a) <i>HF</i> (b) <i>HCl</i>	P	roperties of Halogen containing compounds
	(a) HI (b) HCt (c) HBr (d) HI		CCI
13.	Propene on treatment with <i>HBr</i> gives [CPMT 1986]		
-	(a) Isopropyl bromide (b) Propyl bromide	1.	
	(c) 1, 2-dibromoethane (d) None of the above		[Orissa JEE 2005]
4.	The catalyst used in Raschig's process is		cci, cci,
	(a) <i>LiAlH</i> ₄ (b) Copper chloride		(a) (b) Br
	(c) Sunlight (d) Ethanol/Na		
5.	The compound formed on heating chlorobenzene with chloral in the		∽ `Br ∽
	presence of concentrated sulphuric acid, is		
	(a) Erron (b) DDT		
	(a) Freon(b) DDT(c) Gammexene(d) Hexachloroethane		
6.	Acetone is mixed with bleaching powder to give		$Br \longrightarrow Br$
	[AFMC 2004]	2.	Ethyl bromide can be converted into ethyohol by
			[KCET 1989]
	(a) Chloroform (b) Acetaldehyde		(a) Heating with dilute hydrochloric acid and zinc

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	(b) Boiling with an alcoholic solution of <i>KOH</i>		(c) Nearly as reactive as methyl chloride
	(c) The action of moist silver oxide	14	(d) More reactive than isopropyl chloride
	(d) Refluxing methanol	14.	The reactivities of methyl chloride, propyl chloride and chlorobenzene are in the order [KCET 1988]
3.	Reaction of ethyl chloride with sodium leads to		(a) Methyl chloride > propyl chloride > chlorobenzene
	[NCERT 1984] (a) Ethane (b) Propane		(b) Propyl chloride > methyl chloride > chlorobenzene
			(c) Methyl chloride > chlorobenzene > propyl chloride
	(c) <i>n</i> -butane (d) <i>n</i> -pentane Treatment of ammonia with excess of ethyl chloride will yield[A11MS 1992]		(d) Chlorobenzene > propyl chloride > methyl chloride
4.	(a) Diethyl amine	15.	Which of the following compound will make precipitate most readily
	(b) Ethane		with <i>AgNO</i> ₃ [CPMT 1992]
	(c) Tetraethyl ammonium chloride		(a) CCl_3CHO (b) $CHCl_3$
	(d) Methyl amine		(c) $C_6H_5CH_2Cl$ (d) CHI_3
-	$2CHCl_3 + O_2 \xrightarrow{X} 2COCl_2 + 2HCl$	16	
5.		16.	Carbylamine is liberated when is heated with chloroform and alcoholic potash [KCET 1992]
	In the above reaction, X stands for [CPMT 1985]		(a) An aldehyde (b) A primary amine
	(a) An oxidant (b) A reductant		(c) A secondary amine (d) A phenol
~	(c) Light and air (d) None of these	17.	Salicylic acid can be prepared using Reimer-Tiemann's reaction by
6.	Phosgene is the common name for		treating phenol with [KCET 1989]
	[DPMT 1983; CPMT 1993; MP PMT 1994; Kurukshetra CEE 1998; RPMT 2000, 02]		(a) Methyl chloride in the presence of anhydrous aluminium chloride(b) Carbon dioxide under pressure in sodium hydroxide solution
	(a) CO_2 and PH_3 (b) Phosphoryl chloride		(c) Carbon tetrachloride and concentrated sodium hydroxide
			(d) Sodium nitrite and a few drops of concentrated sulphuric acid
7.	(c) Carbonyl chloride (d) Carbon tetrachloride When chloroform is treated with amine and <i>KOH</i> , we get	18.	Grignard reagent is prepared by the reaction between [CBSE PMT 1994; DPMT 1996; Pb. PMT 1999;
7.	[CPMT 1979]		[CBSE PMT 1994; DPMT 1996; PD. PMT 1999; MH CET 1999]
	(a) Rose odour smell		(a) Zinc and alkyl halide
	(b) Sour almond like smell		(b) Magnesium and alkyl halide
	(c) Offensive odour		(c) Magnesium and alkane(d) Magnesium and aromatic hydrocarbon
	(d) Sour oil of winter green like smell	19.	Reaction of <i>t</i> -butyl bromide with sodium methoxide produces[CBSE PMT 1994]
8.	A mixture of two organic chlorine compounds was treated with		(a) Isobutane (b) Isobutylene
	sodium metal in ether solution. Isobutane was obtained as a product. The two chlorine compounds are [KCET 1988]		(c) Sodium <i>t</i> -butoxide (d) <i>t</i> -butyl methyl ether
		20.	War gas is formed from [BHU 1995]
	(a) Methyl chloride and propyl chloride(b) Methyl chloride and ethyl chloride		(a) PH_3 (b) C_2H_2 (c) Zinc phosphate (d) Chloropicrin
	(c) Isopropyl chloride and methyl chloride	21	
	(d) Isopropyl chloride and ethyl chloride	21.	What happens when CCl_4 is treated with $AgNO_3$ [EAMCET 1987; CBSE PMT 1988; MP PET 2000]
9.	Alkyl halides can be converted into Grignard reagents by		(a) NO_2 will be evolved
	[KCET 1989]		
	(a) Boiling them with <i>Mg</i> ribbon in alcoholic solution		
	(b) Warming them with magnesium powder in dry ether		(c) CCl_4 will dissolve in $AgNO_3$
	(c) Refluxing them with $MgCl_2$ solution	00	(d) Nothing will happen If (CCL) is the Diegree Tiegreen question in place
		22.	If we use pyrene (CCl_4) in the Riemer-Tiemann reaction in place of chloroform, the product formed is
			[CBSE PMT 1989; MP PMT 1990; MH CET 1999]
10.	Which is not present in Grignard reagent [CBSE PMT 1991]		(a) Salicylaldehyde (b) Phenolphthalein
	(a) Methyl group (b) Magnesium		(c) Salicylic acid (d) Cyclohexanol
	(c) Halogen (d) -COOH group	23.	$C_6H_5CH_2Cl + KCN(aq.) \rightarrow X + Y$
11.	The reactivity of ethyl chloride is [KCET 1986]		Compounds X and Y are [BHU 1979]
	(a) More or less equal to that of benzyl chloride		(a) $C_6H_6 + KCl$ (b) $C_6H_5CH_2CN + KCl$
	(b) More than that of benzyl chloride		(c) $C_6H_5CH_3 + KCl$ (d) None of these
	(c) More or less equal to that of chlorobenzene	24.	The bad smelling substance formed by the action of alcoholic caustic
	(d) Less than that of chlorobenzene		potash on chloroform and aniline is [MP PMT 1971, 92, 2001; CPMT 1971, 86; AFMC 2002;
12.	The reactivity of halogen atom is minimum in [KCET 1985]		RPMT 1999]
	(a) Propyl chloride (b) Propyl iodide		(a) Phenyl isocyanide (b) Nitrobenzene
	(c) Isopropyl chloride (d) Isopropyl bromide	0F	(c) Phenyl cyanide (d) Phenyl isocyanate Ethylidene chloride on treatment with aqueous <i>KOH</i> gives
13.	Chlorobenzene is	25.	[MP PMT 1986]
	(a) Less reactive than benzyl chloride		(a) Ethylene glycol (b) Acetaldehyde
	(b) More reactive than ethyl bromide		(c) Formaldehyde (d) None

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26.Reaction
$$C_2H_2I + C_2H_1I + 2Na \rightarrow C_2H_2 - C_2H_1 + 2NaI is calledto calledto calledis called(MP MT 1991)(a) Infimum's reaction(b) Dow's reaction(c) With's reaction with reaction(c) With's reaction(c)$$

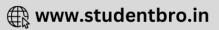
$$\begin{aligned} (i) \quad H_{1}C - NH - CH_{1} \quad (ii) \quad C_{1}H_{1}NH_{2} \\ (i) \quad C_{1}H_{2}Fr rests with a K-ND/1 form C_{2}F_{2}OH \\ (i) \quad C_{1}H_{2}Fr rests with a K-ND/1 form C_{2}F_{2}OH \\ (i) \quad C_{1}H_{2}Fr rests with a K-ND/1 form C_{2}F_{2}OH \\ (i) \quad C_{1}H_{2}Fr rests with a K-ND/1 form C_{2}F_{2}OH \\ (i) \quad C_{1}H_{2}Fr with AgCN form schlp isocondi (i) \\ (i) \quad C_{2}H_{2}Fr with AgCN form (i) \\ (i) \quad C_{2}H_{2}Fr w$$

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	(a) Magnesium halide	(b) Grignard's reagent	84.	$AgNO_3$ does not give precipitate with $CHCl_3$ because
	(c) Alkene	(d) Alkyne	- •	[MP PET 1999; CPMT 2002]
71.	In the following sequence of re			(a) CHCl ₃ does not ionise in water
	$CH_3CH_2CH_2Br_{(alc)}$	$\rightarrow (A) \xrightarrow{HBr} (B) \xrightarrow{KOH(aq.)} (C),$		(b) $AgNO_3$ does not reacts with $CHCl_3$
	The product (C) is	[JIPMER 2001]		(c) CHCl ₃ is chemically inert
	(a) Propan – 2 - <i>ol</i>	(b) Propan $-1 - ol$		(d) None of these
	(c) Propyne	(d) Propene	85.	The reaction between chlorobenzene and chloral in the presence of
72.		c. NH_3 in a sealed tube results[Orissa]	EE 2002]	concentrated sulphuric acid produces [Pb. PMT 2001]
	(a) 1° amine	(b) 2° amine		(a) Gammexane
	(c) 3° amine	(d) All of these		(b) <i>p,p</i> -dichloro diphenyl trichloro ethane
73.	formed is	treated with $NaNH_{2}$, the product		(c) Chloropicrin(d) Benzene hexachloride
	(a) $CH_3 - CH = CH_2$	[CBSE PMT 2002]	86.	False statement is [RPET 1999]
		-		(a) Chloroform is heavier than water
	(c) $CH_3CH_2CH(NH_2)(C$	Cl) (d) $CH_3CH_2C(NH_2)_2$		(b) CCl ₄ is non-inflammable
74.		Cl_3 with silver powder, the compound		(c) Vinyl chloride is more reactive than allyl chloride
	formed is	[Kurukshetra CET 2002]		(d) Br^{-} is a good nucleophile as compared to I^{-}
	(a) Acetylene (c) Methanol	(b) Silver acetate(d) None of these	87.	Chloroform is slowly oxidise by air in presence of light to form[MH CET 1999; U (a) Formyl chloride (b) Phosgene
75.	Chloropicrin is	[Kurukshetra CET 2002]		 (a) Formyl chloride (b) Phosgene (c) Trichloroacetic acid (d) Formic acid
	(a) Trichloro acetaldehyde	(b) Nitrochloroform	88.	Alcoholic potash is used to bring about
_	(c) 2,4,6-trinitro phenol	(d) None of these	_	[KCET (Engg.) 2001]
76.		rect statements about C_2H_5Br [Roorke	e 1999]	 (a) Dehydrogenation (b) Dehydration (c) Dehydrohalogenation (d) Dehalogenation
	(a) It reacts with metallic <i>Na</i>(b) It gives nitroethane on he	to give ethane eating with aqueous ethanolic solution	89.	Vinyl chloride reacts with <i>HCl</i> to form [JIPMER 2000]
	of $AgNO_2$	eating with aqueous ethanolic solution		(a) 1, 1- dichloro ethane
	(c) It gives C_2H_5OH on bo	iling with alcoholic potash		(b) 1, 2- dichloro ethane
	(d) It forms ethylacetate on h			(c) Tetrachloro ethylene
77.		nan alkyl halide towards nucleophilic		(d) Mixture of 1, 2 and 1, 1 – dichloro ethane
	substitution because	[RPMT 2002]	9 0.	$R - X + NaOH \longrightarrow ROH + NaX$
	(a) Less stable carbonium ion			The above reaction is classified as [BHU 1982; CBSE PMT 1991; RPET 2000]
	(b) Due to large $C - Cl$ born (c) Inductive effect	d energy		(a) Nucleophilic substitution
				(b) Electrophilic substitution
	(d) Resonance stabilization a to halide	nd sp^2 - hybridisation of <i>C</i> attached		(c) Reduction (d) Oxidation
78.	Methyl chloride reacts with silv	ver acetate to yield	91.	Reduction of acetyl chloride with H_2 in presence of <i>Pd</i> gives[MP PMT 2001]
		[BVP 2003]	<i></i>	
	(a) Acetaldehyde(c) Methyl acetate	(b) Acetyl chloride(d) Acetic acid		(a) CH_3COCH_3 (b) C_2H_5OH
79.		poses is tested for its purity with the		(c) CH_3COOH (d) CH_3CHO
	reagent	[DPMT 2001]	92.	When methyl bromide is heated with Zn it gives
	(a) Silver nitrate	(b) Lead nitrate		[MP PMT 2001] (a) CH_4 (b) C_2H_6
80	(c) Ammoniacal Cu_2Cl_2	(d) Lead nitrate nochlorination produces derivatives		
80.	2, 6 - Dimethylneptane on mo	[DPMT 2001]		(c) C_2H_4 (d) CH_3OH
	(a) 5	(b) 6	93.	Phenol reacts with $CHCl_3$ and $NaOH$ (at $340K$) to give
81.	(c) 3 The less reactivity of chlorine a	(d) 4 atom in $CH_2 = CH - Cl$ is due to[DC]	F 2001	[MP PMT 1997; CBSE PMT 2002] (a) <i>o</i> -chlorophenol (b) Salicylaldehyde
01.	(a) Inductive effect	(b) Resonance stabilization	c 2001j	(c) Benzaldehyde (d) Chlorobenzene
	(c) Electromeric effect	(d) Electronegativity	94.	lodoform on heating with <i>KOH</i> gives [MP PMT 2000]
82.	$CH_3 - CH_2 - Br \xrightarrow{\text{alc.KCN}} C$	$H_3CH_2CN \longrightarrow X$		(a) CH_3CHO (b) CH_3COOK
	In this reaction, product X is	[MH CET 2002]		(c) HCOOK (d) HCHO
	(a) Acetic acid	(b) Propionic acid	95.	Which reaction is correct in the conversion of chloroform to
83.	(c) Butyric acidIn alkaline hydrolysis of a ter	(d) Formic acid tiary alkyl halide by aqueous alkali if		acetylene [Pb. PMT 2000]
-04	concentration of alkali is doubl	ed, then the reaction		(a) $CHCl_3 + AgNO_3$ (b) $CHCl_3 + O_2$
	(a) Will be doubled	[MH CET 2002] (b) Will be halved		(c) $CHCl_3 + HNO_3$ (d) $CHCl_3 + Ag$
	(c) Will remain constant	(d) Can't say	96.	Which of the following gases are poisonous
		-		[Pb. PMT 2000]

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	(a) CHCl ₃	(b) CO_2		(c) 1-bromo-2-methylbutar	ne	
	(c) None of these	(d) <i>CO</i>		(d) 2-bromo-2-methylbutar	ne	
97.	Which of the following alkyl	nalide is used as a methylating agent[K	CET (Med.) 20	(e) 2-bromopentane		
	(a) CH_3I	(b) C_2H_5Br	110.	On treating a mixture of tw ether, 2-methyl propane was		-
	(c) C_2H_5Cl	(d) C_6H_5Cl		(a) 2-chloropropane and cl		
98.	$C_6H_6Cl_6$, on treatment with			(b) 2-chloropropane and cl		
90.	$C_6 II_6 Cl_6$, on treatment wi		.1	(c) Chloromethane and ch		
	$(\mathbf{r}) C \mathbf{H}$	(h) C H Cl	ני	(d) Chloromethane and 1-c	hloropropane	
	(a) $C_6 H_6$	(b) $C_6H_3Cl_3$	111.	In which case formation of l	butane nitrile is possible	
	(c) $(C_6H_6) OH$	(d) $C_6H_6Cl_4$			[Orissa JEE 2004]
99.	When ethyl iodide is heated is	with silver nitrate, the product obtaine [CPMT 2000]	_	(a) $C_3H_7Br + KCN$	(b) $C_4H_9Br + K$	CN
	(a) C_2H_5Ag	(b) $Ag - O - NO_2$		(c) $C_3H_7OH + KCN$	(d) $C_4H_9OH + 1$	KCN
	(c) $C_2H_5O - NO_2$	(d) $C_2 H_5 I - NO_2$	112.	The reaction of an aerom		with an alkyl
100			.¢	halides in presence of sodium	m and ether is called	[MP PMT 2004]
100.	molecular weight 70. The cor	formation of a compound of fluorine c		(a) Wurtz reaction		[//// 1//// 2004]
	molecular weight 70. The cor	[RPET 2000	0	(b) Sandmeyer's reaction		
	(a) Fluoroform	(b) Fluorine monoxide		(c) Wurtz-fittig reaction		
	(c) Fluorine dioxide	(d) Fluromethanol	110	(d) Kolbe reaction	navant ablf · · ·	nhaa
101.	Chloroform with zinc dust in	water gives [UPSEAT 2000)] 113.	The compound added to pr is	revent chloroform to form	[MP PET 2004]
	(a) CH_4	(b) Chloropicrin		(a) C_2H_5OH	(b) CH ₃ COOH	[
	(c) CCl_4	(d) CH_2Cl_2		(c) CH_3COCH_3	(d) CH_3OH	
102.	Which of the following is us	ed as a catalyst for preparing Grignar	d 114.	Among the following, the or	ne which reacts most readi	ly with ethanol
	reagent	[KCET 1998	3]	is		[AIIMS 2004]
	(a) Iron powder	(b) lodine powder		 (a) <i>p</i>-nitrobenzyl bromide (b) <i>p</i>-chlorobenzyl bromide 	e	
	(c) Activated charcoal	(d) Manganese dioxide		(c) methowhenzyl brom		
103.		ensities of the halides follow the order[MP PMT 1997	(d) <i>p</i> -methylbenzyl bromid	le	
	(a) $RI < RBr < RCl$	(b) $RI < RCl < RBr$	115.	Chloropicrin is obtained by		
	(c) $RBr < RI < RCl$	(d) $RCl < RBr < RI$		(a) Chlorine on picric acid	•	CBSE PMT 2004]
104.	Which halide will be least rea	ctive in respect to hydrolysis [MP PET 2003]		(b) Nitric acid on chlorofo	rm	
	(a) Vinyl chloride	(b) Allyl chloride	•]	(c) Steam on carbon tetrac		
	(c) Ethyl chloride	(d) <i>t</i> -Butyl chloride	116.	(d) Nitric acid on chlorobe In Wurtz reaction alkyl halio		[MH CET 2004]
105.	In nucleophilic aliphatic substit	ution, the nucleophiles are generally		(a) Sodium in ether	(b) Sodium in dry	• . •
	(a) Acids	(b) Bases		(c) Sodium only	(d) Alkyl halide in	
	(c) Salts	(d) Neutral molecules	117.	Chloroform, when kept oper		[CPMT 2004]
106.	Which one of the following c	ompounds does not react with bromine	[DPMT 1983]	(a) CO_2	(b) $COCl_2$	
	(a) Ethylamine	(b) Propene		(c) CO_2, Cl_2	(d) None of these	
	(c) Phenol	(d) Chloroform	118.	Chloroform reacts with cone	centrated HNO ₃ to give	
107.	Allyl chloride on dehydro chl		.1			[Pb. CET 2000]
	(a) Propadiene	[Kerala (Med.) 2003 (b) Propylene	5]	(a) Water gas	(b) Tear gas	
	(c) Acetylchloride	(d) Acetone	119.	(c) Laughing gas When ethyl chloride and al	(d) Producer gas	the compound
108.		$f Cl_2$ in presence of sunlight to give		obtained is	icononic <i>Norr</i> are neated,	[MH CET 2003]
100.	product which on hydrolysis	followed by reaction with <i>NaOH</i> gives[a Onices IEE 200	(a) $C_2 H_4$	(b) $C_2 H_2$	
	produce which on hydrolysis	ionowed by reaction with <i>Nacin</i> gives	011380 JEE 200	(c) $C_6 H_6$	(d) $C_2 H_6$	
	(а) СООН	(b) COONa	120.	Chloroform, on warming wi		
				8	01111,011	[MH CET 2003]
	(c) COONa	(d) None of these		(a) C_2H_6	(b) $C_3 H_8$	
		(d) None of these		(c) $C_2 H_4$	(d) $C_2 H_2$	
109.	An alkyl bromide produces	a single alkene when it reacts wit	h 121.	When alkyl halide is heated		ices
		. This alkene undergoes hydrogenatio		, j	, 02	997; BHU 2004]
	and produces 2-methyl but	me. What is the identity of the alky	/1	(a) Ester	(b) Ether	
	bromide	[Kerala PMT 2004	1]	(c) Ketone	(d) Alcohol	
	(a) 1-bromo-2, 2-dimethylpr	opane	122.	Reaction of alkyl halides w	•	
						[LIDODATI as a l
	(b) 1-bromobutane			anhydrous <i>AlCl</i> ₃ is known	i as	[UPSEAT 2004]

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	(a) Friedal-Craft reaction		(d) To prevent its reaction with glass
	(b) Hofmann degradation	135.	DDT is
	(c) Kolbe's synthesis		(a) A solid (b) A liquid
	(d) Beckmann rearrangement		(c) A gas (d) A solution
123.	Two percent of ethanol is added during the oxidation of chloroform to stop the formation of carbonyl chloride. In this reaction ethanol	136.	Bottles containing C_6H_5I and $C_6H_5CH_2I$ lost their original
	acts as [Pb. CET 2001]		labels. They were labelled A and B for testing. A and B were separately taken in test tubes and boiled with $NaOH$ solution. The
	(a) Auto catalyst (b) Negative catalyst		end solution in each tube was made acidic with dilute HNO_3 and
124.	(c) Positive catalyst (d) None of these When benzene is heated with chlorine in the presence of sunlight, it		then some $AgNO_3$ solution was added. Substance <i>B</i> give a yellow
	forms [Pb. CET 2000]		precipitate. Which one of the following statements is true for this
	(a) B.H.C. (b) Cyclopropane		experiment
105	(c) <i>p</i> -dichlorobenzene (d) None of these		[AIEEE 2003]
125.	Ethylene di bromide on heating with metallic sodium in ether solution yields [Pb. CET 2004]		(a) $A \text{ was } C_6 H_5 I$
	(a) Ethene (b) Ethyne		(b) A was $C_6H_5CH_2I$
	(c) 2-butene (d) 1-butene		(c) B was C_6H_5I
126.	The reaction, $CH_3Br + Na \rightarrow Product$, is called		(d) Addition of HNO_3 was unnecessary
	[Pb. CET 2003]	137.	Which of the following statements is incorrect regarding benzyl chloride [KCET 2003]
	(a) Perkin reaction(b) Levit reaction(c) Wurtz reaction(d) Aldol condensation		chloride [KCET 2003] (a) It gives white precipitate with alcoholic $AgNO_3$
127.	At normal temperature iodoform is [MP PET 2004]		(b) It is an aromatic compound with substitution in the side chain
	(a) Thick viscous liquid (b) Gas		 (c) It undergoes nucleophilic substitution reaction
	(c) Volatile liquid (d) Solid		(d) It is less reactive than vinyl chloride
128.	Which of the following statements about benzyl chloride is incorrect[KC (a) It is less reactive than alkyl halides	CET1 39 04]	Alkyl halide can be converted into alkene by [BCECE 2005]
	(b) It can be oxidised to benzaldehyde by boiling with copper		(a) Nucleophilic substitution reaction
	nitrate solution		(b) Elimination reaction
	(c) It is a lachrymatory liquid and answers Beilstein's test		(c) Both nucleophilic substitution and elimination reaction
129.	(d) It gives a white precipitate with alcoholic silver nitrate Ethylene dichloride and ethylidine chloride are isomeric compounds.	139.	(d) Rearrangement The major product formed in the following reaction is
129.	The false statement about these isomers is that they [DCE 2003]		CH ₃
	(a) React with alcoholic potash and give the same product		$CH_3 - C - CH_2 Br \xrightarrow{CH_3O}$ [AllMS 2005]
	(b) Are position isomers		$\begin{array}{c} CH_3 - C - CH_2 \ Br \xrightarrow{CH_3O} \\ H \end{array} \qquad \qquad$
	(c) Contain the same percentage of chlorine(d) Are both hydrolysed to the same product		CH ₃
130.	An alkyl bromide (χ) reacts with <i>Na</i> to form 4, 5-diethyloctane.		
	Compound X is [Roorkee 1999]		(a) $CH_3 - C - CH_2 OCH_3$ (b) $CH_3 - CH - CH_2 CH_3$
	(a) $CH_3(CH_2)_3Br$		H OCH ₃
	(b) $CH_3(CH_2)_5 Br$		CH ₃ CH ₃
	(c) $CH_3(CH_2)_3CH.Br.CH_3$		(c) $CH_3 - C = CH_2$ (d) $CH_3 - C - CH_3$
	(d) $CH_3(CH_2)_2CH.Br.CH_2CH_3$		OCH ₃
131.	In the following reaction X is	140.	The major product obtained on treatment of
	$CH_3NH_2 + X + KOH \rightarrow CH_3NC$ (highlyoffensive odour)		$CH_3CH_2CH(F)CH_3$ with CH_3O^-/CH_3OH is
	[MP PET 1994]		[A11MS 2005]
	(a) CH_2Cl_2 (b) $CHCl_3$		(a) $CH_3CH_2CH(OCH_3)CH_3$
	(c) CH_3Cl (d) CCl_4		(b) $CH_3CH = CHCH_3$
132.	Which metal is used in Wurtz synthesis		(c) $CH_3CH_2CH = CH_2$
	[CPMT 1986; DPMT 1979; MP PET 2002]		(d) $CH_3CH_2CH_2CH_2OCH_3$
	(a) Ba (b) AI	141.	When phenyl magnesium bromide reacts with <i>t</i> -butanol, the
133.	(c) <i>Na</i> (d) <i>Fe</i> Which of the following is boiled with ethyl chloride to form ethyl		product would be [IIT 2005]
1001	alcohol [MNR 1982]		(a) Benzene(b) Phenol(c) t-butyl benzene(d) t-butyl phenyl ether
	(a) Alcoholic <i>KOH</i> (b) Aqueous <i>KOH</i>	142.	Alkyl halides react with dialkyl copper reagents to give
	(c) H_2O (d) H_2O_2	-	[AIEEE 2005]
134.	Why is chloroform put into dark coloured bottles		(a) Alkenes(b) Alkyl copper halides(c) Alkanes(d) Alkenyl halides
	(a) To prevent evaporation [MP PET 2002]	143.	(c) Alkanes (d) Alkenyl halides Which of the following is liquid at room temperature
	(b) To prevent from moisture		[AFMC 2005]
	(c) To prevent it from oxidation to form phosgene		(a) CH_3I (b) CH_3Br
			-

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(c)	C_2H_5Cl	(d)	$CH_{3}F$	

144. Which of the following haloalkanes is most reactive

(a) 1-chloropropane

(b) 1-bromopropane (c) 2-chloropropane 2-bromopropane (d)

(b)

 $-C \equiv N$

[KCET 2005]

[KCET 2005]

3.

4.

5.

6.

7.

8.

9.

10.

11.

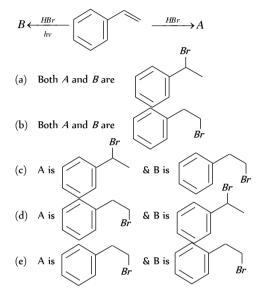
12.

145. Grignard reagent adds to

(a) > C = O

(c) > C = S(d) All of the above

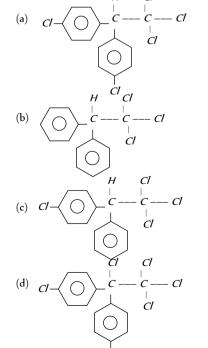
Analyse the following reaction and identify the nature of A and B146. [Kerala CET 2005]



Uses of Halogen Containing Compounds

Which of these can be used as moth repellant 1.

- [CPMT 1987] (a) Benzene hexachloride (b) Benzal chloride (d) Tetrachloroethane (c) Hexachloroethane following is Which one of the the correct formula of
- 2. dichlorodiphenyl trichloroethane [AIIMS 1982] Н Cl



ОН	
The compound $(CH_3)_2.CCCl_3$ is	
(a) Chloretone (b) (c) Chloropicrin (d)	Chloroquin Chloropropyl chloride
(c) Chloropicrin (d) Depletion of ozone layer is caused by	[RPMT 2002]
(a) Freon (b)	Alkane
(c) Gringard reagent (d)	All of these
Which of the following is Teflon	[RPMT 2002]
(a) $[-CF_2 - CF_2 -]_n$ (b)	$CF_2 = CF_2$
(c) $CF \equiv CF$ (d)	None of these
Statement "Ozone in atmosphere is	decreased by chloro-fluoro-
carbon (Cl_2F_2C) "	[RPET 1999]
(a) ls true	
(b) Is false	
(c) Only in presence of CO_2	
(d) Only in absence of CO_2	
$CF_x Cl_y$ [where $x + y = 4$]. These con	npounds are not used because
	[RPET 2000]
(a) These are fluoro carbons	
(b) These are difficult to synthesise	
(c) They deplete ozone layer	
(d) None of the these	
The molecular formula of DDT has $(x) = \frac{1}{2} \frac{1}{$	[MP PMT 1997]
	4 chlorine atoms 2 chlorine atoms
What is the reagent used for testing fl	
what is the reagent used for testing in	[EAMCET 2003]
(a) Alizarin - <i>S</i> (b)	Quinalizarin
(c) Phenolphthalein (d)	Benzene
Chloropicrin is used as	[UPSEAT 2000]
(a) Solvent (b)	Anaesthetic
(c) Perfume (d)	Tear gas
Which is used in the manufacture of p	
(a) $CH_2 = CHCl$ (b)	$CH \equiv CH$
	CCl_4
Freon (dichlorodifluoro methane) is us	
··· · · · ·	986; DPMT 1983; CBSE PMT 2001]
(a) As local anaesthetic(b) For dissolving impurities in meta	llurgical process
(c) In refrigerator	nargical process
(d) In printing industry	
Which of the following is known	as freon which is used as a

13. W [DPMT 1982; CPMT 1979, 81, 89; AFMC 1995; refrigerant Manipal MEE 1995; MP PET 1995, 2004]

(a) CCl_2F_2 (b) $CHCl_3$ (c) CH_2F_2 (d) CF_4

Benzene hexachloride (BHC) is used as 14.

[MP PMT 1994; KCET 1999]

(a) Dye (b) Antimalerial drug (c) Antibiotic (d) Insecticide

Which plastic is obtained from CHCl₃ as follows 15.

 $\xrightarrow{HF} X \xrightarrow{} SbF_3$ $\xrightarrow{800^{\circ}C} Y -$ *Polymerisation* → Plastic CHCl₃ – (a) Bakelite (b) Teflon (c) Polythene (d) Perspex Cl($C - CCl_3$. The above structural Η ĊĬ [MP PET 1997] formula refers to

CLICK HERE >>

16.



	(a) BHC	(b)	DNA	
	(c) DDT	(d)	RNA	
17.	The commercial uses of DDT and	l benz	zene hexachloric	le are
	(a) DDT is a herbicide, benzene	e hexa	chloride is a fui	ngicide
	(b) Both are insecticides			8
	(c) Both are herbicides			
	(d) DDT is a fungicide and ben	7000 l	avachlarida is	harbicida
18.	Which of the following is used in			anerbicide
10.	which of the following is used in	mee	extinguistiers	[ATMC 1000]
		(1)		[AFMC 1993]
	(a) CH_4		CHCl ₃	
	(c) CH_2Cl_2	(d)	CCl_4	
19.	lodoform can be used as			[NCERT 1981]
	(a) Anaesthetic	(b)	Antiseptic	
	(c) Analgesic	(d)	Antifebrin	
20.	Which of the following is an anac	esthet	ic	[AFMC 1989]
	(a) C_2H_4	(b)	CHCl ₃	
	(c) CH_3Cl	(d)	C_2H_5OH	
21.	An important insecticide is obt	ained	by the action	of chloral on
	chlorobenzene. It is		2	[KCET 1989]
	(a) BHC	(b)	Gammexene	
	(c) DDT	(d)	Lindane	
22.	In fire extinguisher, pyrene is			[DPMT 1985]
	(a) CO_2	(b)	CCl_4	
	_		·	
	(c) CS_2	(u)	CHCl ₃	
23.	B.H.C. is used as			[Pb. CET 2002]
	(a) Insecticide	(b)	Pesticide	
	(c) Herbicide	(d)	Weedicide	
24.	The use of the product obtained	ed as	a result of rea	action between
	acetone and chloroform is			[RPMT 1999]
	(a) Hypnotic	(b)	Antiseptic	
	(c) Germicidal	(d)	Anaesthetic	
25.	Use of chlorofluoro carbons is no	t enc	ouraged becaus	e
				[KCET 2005]
	(a) They are harmful to the eye	es of	people that use	it
	(b) They damage the refrigerat	ors at	nd air condition	ers
	(c) They eat away the ozone in			
	(d) They destroy the oxygen lay			
	(a) they destroy the oxygen my			

Critical Thinking **Objective Questions**

1.	Among the following, the molec	ule with the highest dipole moment [IIT-JEE (Screening) 2003]	
	(a) CH_3Cl	(b) CH_2Cl_2	
	(c) $CHCl_3$	(d) CCl ₄	
2.	When CHCl is boiled with NaOF	l, lt gives	
		[Orissa JEE 2003]	
	(a) Formic acid	(b) Trihydroxy methane	
	(c) Acetylene	(d) Sodium formate 14.	
3.		on atoms in the product formed by h aqueous potassium hydroxide is[EAMCET 199]	7]
	(a) <i>sp</i>	(b) sp^2	
	(c) sp^3	(d) sp^3d 15.	
4.	Which of the following compo substitution reactions	inds does not undergo nucleophilic [KCET 1998]	

(a) Vinyl chloride (b) Ethyl bromide

5.	(c) Benzyl chloride (d) Isopropyl chloride Replacement of <i>Cl</i> of chlorobenzene to give phenol requires drastic
	conditions but chlorine of 2, 4-dinitrochlorobenzene is readily replaced because [CBSE PMT 1997]
	(a) NO_2 make ring electron rich at ortho and para
	(b) NO_2 withdraws e^- from meta position
	(c) denotes e^- at meta position
	(d) NO_2 withdraws e^- from ortho/para positions
6.	Among the following one with the highest percentage of chlorine is[MNR 1989;(a) Chloral(b) Pyrene
	(c) PVC (d) Gammexene
7.	In which alkyl halide, SN^2 mechanism is favoured maximum[RPMT 1997]
	(a) CH_3Cl (b) CH_3CH_2Cl
	(c) $(CH_3)_2 CHCl$ (d) $(CH_3)_3 C - Cl$
8.	Which conformation of $C_6H_6Cl_6$ is most powerful insecticide
	(a) aaeeee (b) aaaeee
•	(c) aaaaee (d) aaaaaa
9.	The odd decomposition of carbon chlorine bond form [UPSEAT 1999]
	(a) Two free ions (b) Two-carbanium ion
	(c) Two carbanion (d) A cation and an anion
10.	A new carbon-carbon bond formation is possible in [IIT-JEE 1998]
	(a) Cannizzaro reaction (b) Friedel-Craft's alkylation
	(c) Clemmensen reduction (d) Reimer-Tiemann reaction
11.	An isomer of $C_3H_6Cl_2$ on boiling with aqueous KOH gives
	acetone. Hence, the isomer is [UPSEAT 2000]
	(a)2, 2-dichloropropane(b)1, 2-dichloropropane(c)1, 1-dichloropropane(d)1, 3-dichloropropane
10	Which of the following is the example of SN^2 reaction
12.	[CPMT 1999]
	(a) $CH_3Br + OH^ CH_3OH + Br^-$
	(b) $CH_3CHCH_3 + OH^- \longrightarrow CH_3CHCH_3 + Br^-$
	Br OH
	(c) $CH_3CH_2OH \xrightarrow{-H_2O} CH_2 = CH_2$
	CH ₃ CH ₃
	(d) $CH_3 - C - CH_3 + OH^- \rightarrow CH_3 - C - O - CH_3 + Br^-$
	Br H
13.	Wurtz reaction of methyl iodide yields an organic compound X . Which one of the following reactions also yields X

- [EAMCET 2003]
- dryether $C_2H_5Cl + Mg -$ (a)

(b)
$$C_2H_5Cl + LiAlH_4 \longrightarrow$$

(c)
$$C_2H_5Cl + C_2H_5ONa \longrightarrow$$

Ag powder CHCl₃ – (d) Δ

CLICK HERE

(a)

Ethyl orthoformate is formed by heating with sodium ethoxide[EAMCET 2003] 14.

(b)

(a)
$$CHCl_3$$
 (b) C_2H_5OH
(c) $HCOOH$ (d) CH_3CHO

1 , 2 di-bromo cyclohexane on dehydro halogenation gives

[UPSEAT 2003]



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	(c) (d) None of these				
		1.	Assertion	:	CHCl ₃ is stored in transparent bottles.
16.	In which one of the following conversions phosphorus pentachloride is used as a reagent [EAMCET 1997]		Reason	:	CHCl ₃ is oxidised in dark. [AIIMS 1996]
	(a) $H_2C = CH_2 \rightarrow CH_3CH_2Cl$	2.	Assertion	:	Addition of bromine to trans-2-butene yields meso-
	(b) $H_3C - O - CH_3 \rightarrow CH_3Cl$		Reason	:	2, 3-dibromobutane Bromine addition to an alkene is an electrophilic
	(c) $CH_3CH_2OH \rightarrow CH_3CH_2Cl$				addition. [11T-JEE (Screening) 2001]
	(d) $HC \equiv CH \rightarrow CH_2 = CHCl$	3.	Assertion	:	Alkyl halides are soluble in organic solvents.
17.	When but -3-en -2- ol reacts with aq. HBr, the product formed is[DCE 2		Reason		<i>p</i> -dichlorobenzene possesses low melting point.
	 (a) 3 - bromobut - 1- ene (b) 1 - bromobut - 2- ene 	4.	Assertion		CCl_4 is not a fire extinguisher.
	(c) A mixture of both a and b	5.	Reason Assertion		CCl_4 is insoluble in water. Aqueous hydrohalogen acids are used to prepare
-0	(d) 2 - bromobut - 2 - ene	J.	Assertion		alkyl halides from alkenes.
18.	Which of these do not form Grignard reagent(a) CH_3F (b) CH_3Cl		Reason	:	Hydrogen iodide readily reacts with alkenes to form alkyl halides.
	(c) CH_3Br (d) CH_3I	6.	Assertion	:	Alkyl halides form alkenes when heated above 300° <i>C</i> .
19.	An organic compound $A(C_4H_6Cl)$ on reaction with Na/diethyl		Reason	:	$CH_{3}CH_{2}I$ react slowly with strong base when
	ether gives a hydrocarbon, which on monochlorination gives only one chloro derivative. A is				compared to CD_3CH_2I .
	[Kerala PMT 2004]	7.	Assertion	:	Halogen acids react with alcohols to form haloalkanes.
	(a)t-butyl chloride(b)s-butyl chloride(c)Isobutyl chloride(d)n-butyl chloride		Reason	:	Order of reactivity of halogen acids
	(e) None of these				HCl > HBr > HI
20.	Among the following the most reactive towards alcoholic <i>KOH</i> is[AIIMS :	•			
	(a) $CH_2 = CHBr$ (b) $CH_3COCH_2CH_2Br$ (c) CH_3CH_2Br (d) $CH_3CH_2CH_2Br$	8.	Assertion	:	reactions.
21.	Which one of the following possess highest m.pt.		Reason	:	Tertiary alkyl halides react predominantly by $S_{\scriptscriptstyle N} 1$
	[Pb. CET 2004]	-	A		mechanism.
	(a) Chlorobenzene(b) o-dichlorobenzene(c) m-dichlorobenzene(d) p-dichlorobenzene	9.	Assertion	:	Electron withdrawing groups in aryl halides decrease the reactivity towards nucleophilic
	22. Which chlorine atom is more electronegative in the following		Reason		substitution. 2, 4-Dinitrochlorobenzene is less reactive than
	[UPSEAT 2004] (a) $CH_3 - Cl$ (b) $CH_3 - CH_2 - Cl$		Reason		chlorobenzene.
	CH ₃ CH ₃	10.	Assertion	:	Aryl halides undergo electrophilic substitutions more readily than benzene.
	(c) $H - C - Cl$ (d) $CH_3 - CH_2 - C - Cl$		Reason		Aryl halide gives a mixture of o - and p - products.
	$\begin{array}{c} (e) & H - C - C i \\ C H_3 & C H_3 - C H_2 - C - C i \\ C H_3 & C H_3 \end{array}$	11.	Assertion	:	Addition of Br_2 to cis-but-2-ene is stereoselective.
23.	What would be the product formed when 1-Bromo-3-chloro		Reason	:	SN^2 reactions are stereospecific as well as stereoselective.
-0-	cyclobutane reacts with two equivalents of metallic sodium in ether[11T-]	EE (Scre	ening) 2005]	:	Optically active 2-iodobutane on treatment with <i>Nal</i>
	(a) (b) <i>Cl</i>		Reason		in acetone undergoes recemization. Repeated Walden inversions on the reactant and its
			Reason	•	product eventually gives a racemic mixture.
	(c) (d)	13.	Assertion	:	Nucleophilic substitution reaction on an optically active alkyl halide gives a mixture of enantiomers.
			Reason	:	The reaction occurs by SN^1 mechanism.
					-
	Assertion & Reason			~	7
				7	nswers
	For AIIMS Aspirants				
	the assertion and reason carefully to mark the correct option out of ptions given below:				
(a)	If both assertion and reason are true and the reason is the correct	Int	roduction	0	f Halogen containing compounds
<i>(b)</i>	explanation of the assertion. If both assertion and reason are true but reason is not the correct	1	a 2		b 3 b 4 c 5 b
	explanation of the assertion.	6	a 2 a 7		b 3 b 4 c 5 b b 8 a 9 b 10 a
(c) (d)	If assertion is true but reason is false. If the assertion and reason both are false.	11	d 12		a 13 b
(e)	If assertion is false but reason is true.				

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Preparation of Halogen containing compounds

1	b	2	d	3	b	4	а	5	a
6	b	7	d	8	d	9	b	10	a
11	а	12	b	13	а	14	а	15	а
16	b	17	а	18	b	19	С	20	C
21	а	22	C	23	С	24	b	25	d
26	d	27	C	28	а	29	C	30	b
31	C	32	b	33	d	34	а	35	C
36	d	37	C	38	b	39	b	40	d
41	C	42	C	43	а	44	b	45	b
46	а	47	C	48	а	49	b	50	a
51	b	52	a	53	d	54	a		

Properties of Halogen containing compounds

1	а	2	C	3	С	4	С	5	С	
6	C	7	C	8	C	9	b	10	d	
11	b	12	C	13	а	14	а	15	d	
16	b	17	C	18	b	19	b	20	d	
21	d	22	C	23	b	24	а	25	b	
26	C	27	d	28	b	29	а	30	b	
31	C	32	C	33	b	34	а	35	а	
36	а	37	а	38	а	39	а	40	а	
41	а	42	C	43	b	44	C	45	d	
46	C	47	b	48	ab	49	b	50	b	
51	а	52	a	53	b	54	b	55	а	
56	d	57	a	58	b	59	b	60	b	
61	c,d	62	C	63	C	64	C	65	b	
66	C	67	C	68	а	69	d	70	b	
71	а	72	d	73	d	74	а	75	b	
76	b,d	77	d	78	C	79	а	80	d	
81	b	82	b	83	C	84	а	85	b	
86	cd	87	b	88	C	89	а	90	а	
91	d	92	b	93	b	94	C	95	d	
96	d	97	a	98	b	99	C	100	а	
101	а	102	b	103	d	104	а	105	b	
106	d	107	а	108	b	109	C	110	а	
111	а	112	C	113	а	114	C	115	b	
116	а	117	b	118	b	119	а	120	d	
121	b	122	а	123	b	124	а	125	C	
126	C	127	d	128	a	129	d	130	d	
131	b	132	C	133	b	134	C	135	a	
136	а	137	d	138	b	139	d	140	b	
141	а	142	C	143	а	144	d	145	d	
146	С									
Uses of Halogen containing compounds										
	Uses	of Ha	aloge	en co	ntain	ing c	omp	ound	S	

1	с	2	a	3	a	4	а	5	а
6	a	7	C	8	а	9	a	10	d
11	а	12	C	13	a	14	d	15	b
16	C	17	b	18	d	19	b	20	b
21	С	22	b	23	a	24	a	25	C

