

# Ordinary Thinking

## Objective Questions

### Introduction

- Reaction of acetaldehyde with  $HCN$  followed by hydrolysis gives a compound which shows [MP PET 1997] isomerism  
(a) Optical isomerism (b) Geometrical isomerism  
(c) Metamerism (d) Tautomerism
- In aldehydes and ketones, carbon of carbonyl group is [MP PMT 1995; RPET 1999, 2000]  
(a)  $sp^3$  hybridised (b)  $sp^2$  hybridised  
(c)  $sp$  hybridised (d) Unhybridised
- The IUPAC name of the following structure is  

$$\begin{array}{c} CH_3 \quad O \\ | \quad || \\ CH_3 - CH - C - CH_2 - CH_2OH \end{array}$$
 [MP PMT 1995]  
(a) 1-hydroxy 4-methyl 3-pentanone  
(b) 2-methyl 5-hydroxy 3-pentanone  
(c) 4-methyl 3-oxo 1-pentanol  
(d) Hexanol-1, one-3
- Glyoxal** is [BVP 2003]  
(a)  $CH_2O - CH_2O$  (b)  $\begin{array}{c} CH_2OH \\ | \\ CH_2OH \end{array}$   
(c)  $\begin{array}{c} CHO \\ | \\ CHO \end{array}$  (d)  $\begin{array}{c} CH_2OH \\ | \\ CHO \end{array}$
- Aldehydes are isomeric with  
(a) Ketones (b) Ethers  
(c) Alcohols (d) Fatty acids
- Which of the following compounds does not contain an  $-OH$  group [CPMT 1982]  
(a) Phenol (b) Carboxylic acid  
(c) Aldehydes (d) Alcohols
- IUPAC name of  $CH_3COCH_3$  is [MP PET 1991]  
(a) Acetone (b) 2-propanone  
(c) Dimethyl ketone (d) Propanal
- What is the compound called if remaining two valencies of a carbonyl group are satisfied by two alkyl groups [CPMT 1990]  
(a) Aldehyde (b) Ketone  
(c) Acid (d) Acid chloride
- $\begin{array}{c} OH \\ | \\ CH_3 - C - CN \\ | \\ H \end{array}$  is  
(a) Acetaldehyde cyanohydrin  
(b) Acetone cyanohydrin  
(c) Cyanoethanol  
(d) Ethanol nitrile
- Ethanedial has which functional group(s)  
(a) One ketonic (b) Two aldehydic  
(c) One double bond (d) Two double bond
- In the group  $\begin{array}{c} R' \\ > \\ R \end{array} C = O$  the carbonyl carbon is joined to other atoms by  
(a) Two sigma and one pi bonds  
(b) Three sigma and one pi bonds  
(c) One sigma and two pi bonds  
(d) Two sigma and two pi bonds
- Which of the following types of isomerism is shown by pentanone [MP PMT 1995]  
(a) Chain isomerism (b) Position isomerism  
(c) Functional isomerism (d) All of these
- IUPAC name of  $CCl_3CHO$  is [MP PMT/PET 1988]  
(a) Chloral (b) Trichloro acetaldehyde  
(c) 1, 1, 1-trichloroethanal (d) 2, 2, 2-trichloroethanal
- Which of the following is a mixed ketone [AFMC 1997]  
(a) Pentanone (b) Acetophenone  
(c) Benzophenone (d) Butanone
- Chloral is [CPMT 1976, 84]  
(a)  $CCl_3CHO$  (b)  $CCl_3COCH_3$   
(c)  $CCl_3COCCl_3$  (d)  $CCl_3CH_2OH$
- Carbonyl compounds are usually  
(a) Ethers, aldehydes, ketones and carboxylic acids  
(b) Aldehydes, ketones and carboxylic acids  
(c) Aldehydes and ketones  
(d) Carboxylic acids
- Acetone and acetaldehyde are [KCET 1998]  
(a) Position isomers (b) Functional isomers  
(c) Not isomers (d) Chain isomers
- Which of the aldehyde is most reactive? [DCE 2004]  
(a)  $C_6H_5 - CHO$  (b)  $CH_3CHO$   
(c)  $HCHO$  (d) All the equally reactive

### Preparation

- The end product in the following sequence of reaction is  

$$HC \equiv CH \xrightarrow[20\% H_2SO_4]{1\% HgSO_4} A \xrightarrow{CH_3MgX} B \xrightarrow{[O]}$$
 [Bihar CEE 2002]  
(a) Acetic acid (b) Isopropyl alcohol  
(c) Acetone (d) Ethanol
- In the following reaction, product  $P$  is  $R - \overset{O}{\parallel} C - Cl$   

$$\xrightarrow[Pd - BaSO_4]{H_2}$$
 [CBSE PMT 1991, 2000, 02; Kerala CET 2001;

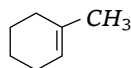


- IIT 1992; AIIMS 1997; AFMC 1998]
- (a)  $RCH_2OH$  (b)  $RCOOH$   
(c)  $RCHO$  (d)  $RCH_3$
3. Acetophenone is prepared from [CPMT 2003]  
(a) Rosenmund reaction  
(b) Sandmeyer reaction  
(c) Wurtz reaction  
(d) Friedel craft reaction
4. Compound which gives acetone on ozonolysis [UPSEAT 2003]  
(a)  $CH_3-CH=CH-CH_3$  (b)  $(CH_3)_2C=C(CH_3)_2$   
(c)  $C_6H_5CH=CH_2$  (d)  $CH_3CH=CH_2$
5.  $CH_3-\overset{\overset{O}{||}}{C}-CH_2-COOC_2H_5 \xrightarrow[H_2O]{NaOH} A$ ,  
product 'A' in the reaction is [RPMT 2003]  
(a)  $CH_3COOH$  (b)  $C_2H_5OH$   
(c)  $CH_3COCH_3$  (d)  $C_2H_5CHO$
6. Which one of the following compounds is prepared in the laboratory from benzene by a substitution reaction [EAMCET 2003]  
(a) Glyoxal (b) Cyclohexane  
(c) Acetophenone (d) Hexabromo cyclohexane
7. Ketones ( $R-\overset{\overset{O}{||}}{C}-R_1$ ) where  $R = R_1 =$  alkyl group. It can be obtained in one step by [CBSE PMT 1997]  
(a) Hydrolysis of esters  
(b) Oxidation of primary alcohol  
(c) Oxidation of secondary alcohol  
(d) Reaction of acid halide with alcohols
8. Predict the product 'B' in the sequence of reaction  
 $HC \equiv CH \xrightarrow[HgSO_4]{30\% H_2SO_4} A \xrightarrow{NaOH} B$  [CBSE PMT 2001]  
(a)  $CH_3COONa$  (b)  $CH_3COOH$   
(c)  $CH_3CHO$  (d)  $CH_3-\underset{\underset{OH}{|}}{CH}-CH_2CHO$
9.  $CH_3COCl \xrightarrow[Pd/BaSO_4]{2H} CH_3CHO + HCl$ ;  
The above reaction is called  
(a) Reimer-Tiemann reaction (b)  
(c) Rosenmund reaction (d) Reformatsky reaction
10. The oxidation of toluene to benzaldehyde by chromyl chloride is called [CBSE PMT 1996; AFMC 1998, 99; AIIMS 2000; JIPMER 2001; AFMC 2001; DCE 2004]  
(a) Cannizzaro reaction (b) Wurtz reaction  
(c) Etard reaction (d) Reimer-Tiemann reaction
11. From which of the following tertiary butyl alcohol is obtained by the action of methyl magnesium iodide [MP CET 2000]  
(a)  $HCHO$  (b)  $CH_3CHO$   
(c)  $CH_3COCH_3$  (d)  $CO_2$
12. Catalyst used in Rosenmund reduction is [Bihar MEE 1997]  
(a)  $Pd / BaSO_4$  (b)  $Zn-Hg$  couple  
(c)  $LiAlH_4$  (d)  $Ni / H_2$
13.  $CH_3-CH_2-C \equiv CH \xrightarrow[H_2O]{R}$  Butanone, R is [BHU 2003]  
(a)  $Hg^{++}$  (b)  $KMnO_4$   
(c)  $KClO_3$  (d)  $K_2Cr_2O_7$
14. Dry heating of calcium acetate gives [DPMT 1979, 81, 96; NCERT 1981; KCET 1993; Bihar CEE 1995; MNR 1986; MP PMT 1997; MP PET 1993, 95; JIPMER 2002; AIIMS 1996; CPMT 1982, 86, 96, 2003; RPMT 2002]  
(a) Acetaldehyde (b) Ethane  
(c) Acetic acid (d) Acetone
15. Identify the product C in the series  
 $CH_3CN \xrightarrow{Na / C_2H_5OH} A \xrightarrow{HNO_2} B \xrightarrow{\text{Tollen's reagent}} C$  [MP PET 1999]  
(a)  $CH_3COOH$  (b)  $CH_3CH_2NHOH$   
(c)  $CH_3CONH_2$  (d)  $CH_3CHO$
16. Acetophenone is prepared by the reaction of which of the following in the presence of  $AlCl_3$  catalyst [AIIMS 1996]  
(a) Phenol and acetic acid  
(b) Benzene and acetone  
(c) Benzene and acetyl chloride  
(d) Phenol and acetone
17. Isopropyl alcohol on oxidation gives [RPMT 1997; BHU 1997]  
(a) Acetone (b) Acetaldehyde  
(c) Ether (d) Ethylene
18. On heating calcium acetate and calcium formate, the product formed is [DPMT 1984; EAMCET 1985; MP PMT 1996, 92; KCET 1990; CPMT 1979, 82, 84; BIT 1992; RPET 2000]  
(a)  $CH_3COCH_3$  (b)  $CH_3CHO$   
(c)  $HCHO + CaCO_3$  (d)  $CH_3CHO + CaCO_3$
19. Which of the following compound gives a ketone with Grignard reagent [CPMT 1988; MP PET 1997]  
(a) Formaldehyde (b) Ethyl alcohol  
(c) Methyl cyanide (d) Methyl iodide
20. In the Rosenmund's reduction,  $BaSO_4$  taken with catalyst  $Pd$  acts as  
(a) Promotor (b) Catalytic poison  
(c) Cooperator (d) Absorber



## 1280 Aldehydes and Ketones

21. The Clemmenson reduction of acetone yields  
 (a) Ethanol (b) Ethanal  
 (c) Propane (d) Propanol
22. Catalyst  $\text{SnCl}_2 / \text{HCl}$  is used in [BHU 1995]  
 (a) Stephen's reduction  
 (b) Cannizzaro reaction  
 (c) Clemmensen's reduction  
 (d) Rosenmund's reduction
23. Methyl ethyl ketone is prepared by the oxidation of [IIT-JEE 1987; MP PMT 1992]  
 (a) 2-propanol (b) 1-butanol  
 (c) 2-butanol (d) *t*-butyl alcohol
24. Benzaldehyde can be prepared by oxidation of toluene by [BHU 1986]  
 (a) Acidic  $\text{KMnO}_4$  (b)  $\text{K}_2\text{Cr}_2\text{O}_7$   
 (c)  $\text{CrO}_2\text{Cl}_2$  (d) All of these
25.  $\text{C}_6\text{H}_6 + \text{CO} + \text{HCl} \xrightarrow{\text{Anhy AlCl}_3} \text{X} + \text{HCl}$   
 Compound X is [DPMT 1979, 83]  
 (a)  $\text{C}_6\text{H}_5\text{CH}_3$  (b)  $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$   
 (c)  $\text{C}_6\text{H}_5\text{CHO}$  (d)  $\text{C}_6\text{H}_5\text{COOH}$
26. Which of the following gases when passed through warm dilute solution of  $\text{H}_2\text{SO}_4$  in presence of  $\text{HgSO}_4$  gives acetaldehyde  
 (a)  $\text{CH}_4$  (b)  $\text{C}_2\text{H}_6$   
 (c)  $\text{C}_2\text{H}_4$  (d)  $\text{C}_2\text{H}_2$
27.  $\text{CH}_3\text{COCH}_3$  can be obtained by  
 (a) Heating acetaldehyde with methanol  
 (b) Oxidation of propyl alcohol  
 (c) Oxidation of isopropyl alcohol  
 (d) Reduction of propionic acid
28. Propyne on hydrolysis in presence of  $\text{HCl}$  and  $\text{HgSO}_4$  gives [DPMT 1980; CPMT 1983]  
 (a) Acetaldehyde (b) Acetone  
 (c) Formaldehyde (d) None of these
29. Which of the following on reaction with  $\text{NH}_3$  gives urinary antiseptic compound [MP PMT 1999]  
 (a)  $\text{HCHO}$  (b)  $\text{CH}_3\text{CHO}$   
 (c)  $\text{C}_6\text{H}_5\text{CHO}$  (d)  $\text{C}_6\text{H}_5\text{CH}_2\text{CHO}$
30. The oxidation product of 2-propanol with hot conc.  $\text{HNO}_3$  is  
 (a) Ethanoic acid (b) Propanone  
 (c) Propanal (d) None of these
31. Hydrolysis of ozonide of 1-butene gives [Kerala PMT 2003]  
 (a) Ethylene only  
 (b) Acetaldehyde and Formaldehyde  
 (c) Propionaldehyde and Formaldehyde  
 (d) Acetaldehyde only  
 (e) Acetaldehyde and Oxalic acid
32. Ketones are prepared by  
 (a) Clemmensen's reduction (b) Cannizzaro reaction  
 (c) Rosenmund's reduction (d) Oppenaur's oxidation
33.  $\text{O}_3$  reacts with  $\text{CH}_2 = \text{CH}_2$  to form ozonide. On hydrolysis it forms [MP PET 1986, 90]  
 (a) Ethylene oxide (b)  $\text{HCHO}$   
 (c) Ethylene glycol (d) Ethyl alcohol
34. Ethyne on reaction with water in the presence of  $\text{HgSO}_4$  and  $\text{H}_2\text{SO}_4$  gives [UPSEAT 1999; BVP 2003]  
 (a) Acetone (b) Acetaldehyde  
 (c) Acetic acid (d) Ethyl alcohol
35.  $\text{CH}_3 - \text{CH}_2 - \text{C} \equiv \text{CH} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HgSO}_4} \text{A}$ , the compound A is [Orissa JEE 2004]  
 (a)  $\text{CH}_3 - \text{CH}_2 - \overset{\text{O}}{\parallel} \text{C} - \text{CH}_3$   
 (b)  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CHO}$   
 (c)  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{COOH}$   
 (d) None of these
36. When a mixture of methane and oxygen is passed through heated molybdenum oxide, the main product formed is [KCET 2004]  
 (a) Methanoic acid (b) Ethanal  
 (c) Methanol (d) Methanal
37. Benzoin is [KCET 2004]  
 (a) Compound containing an aldehyde and a ketonic group  
 (b)  $\alpha, \beta$ -unsaturated acid  
 (c)  $\alpha$ -hydroxy aldehyde  
 (d)  $\alpha$ -hydroxy ketone
38. The oxidation of benzyl chloride with lead nitrate gives [MP PMT 2004]  
 (a) Benzyl alcohol (b) Benzoic acid  
 (c) Benzaldehyde (d) *p*-chlorobenzaldehyde
39.  $\text{R} - \text{CH} = \text{CH}_2 + \text{CO} + \text{H}_2 \xrightarrow[\text{High Pressure}]{\text{High Temp}} \text{RCH}_2\text{CH}_2\text{CHO}$ . [DPMT 2004]  
 The above reaction is  
 (a) Mendius reaction (b) Oxo process  
 (c) Sandorn's reaction (d) Stephen's reaction
40. Glycerol reacts with potassium bisulphate to produce [JIPMER 1997] [Pb. CET 2003]  
 (a) Allyl iodide (b) Allyl sulphate  
 (c) Acryl aldehyde (d) Glycerol trisulphate
- The reagent used in Gatterman Koch aldehyde synthesis is [CPMT 2004]  
 (a)  $\text{Pb} / \text{BaSO}_4$  (b) alkaline  $\text{KMnO}_4$   
 (c) acidic  $\text{KMnO}_4$  (d)  $\text{CO} + \text{HCl}$

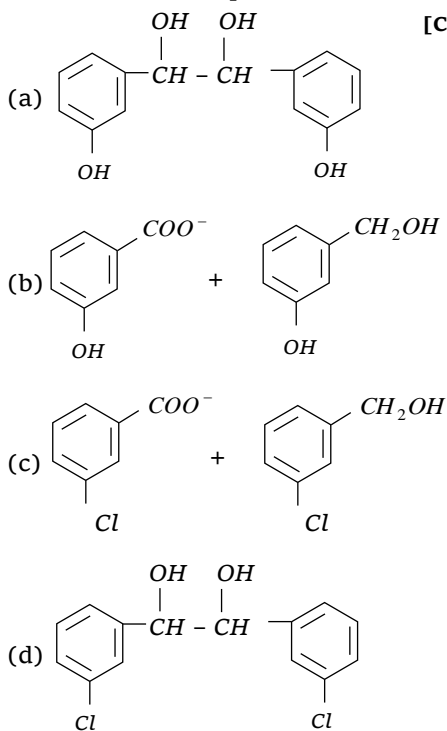


42. On reductive ozonolysis yields  
[Orissa JEE 2005]  
(a) 6-oxoheptanal (b) 6-oxoheptanoic acid  
(c) 6-hydroxyheptanal (d) 3-hydroxypentanal
43. An alkene of molecular formula  $C_9H_{18}$  on ozonolysis gives 2,2 dimethyl propanal & 2-butanone, then the alkene is  
[Kerala CET 2005]  
(a) 2, 2, 4-trimethyl -3-hexene  
(b) 2, 2, 6-trimethyl-3-hexene  
(c) 2, 3, 4-trimethyl-2-hexene  
(d) 2, 2, 4-trimethyl-2-hexene  
(e) 2, 2dimethyl-2-heptene

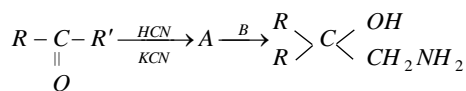
### Properties

1. Identify the reactant  $X$  and the product  $Y$   
 $CH_3 - CO - CH_3 + X \rightarrow (CH_3)_3 C - OMg - Cl$   
↓ Hydrolysis  
 $Y + Mg(OH)Cl$   
[Kerala PMT 2003]  
(a)  $X = MgCl_2$ ;  $Y = CH_3CH = CH_2$   
(b)  $X = CH_3MgCl$ ;  $Y = C_2H_5COCH_3$   
(c)  $X = CH_3MgCl$ ;  $Y = (CH_3)_3 C - OH$   
(d)  $X = C_2H_5MgCl$ ;  $Y = (CH_3)_3 C - OH$

2. When *m*-chlorobenzaldehyde is treated with 50% KOH solution, the product (s) obtained is (are)  
[CBSE PMT 2003]



3.  $A$  and  $B$  in the following reactions are



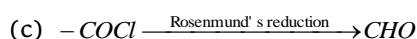
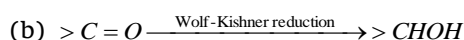
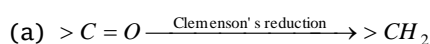
[CBSE PMT 2003]

- (a)  $A = RR'C \begin{matrix} CN \\ OH \end{matrix}$ ,  $B = LiAlH_4$   
(b)  $A = RR'C \begin{matrix} OH \\ COOH \end{matrix}$ ,  $B = NH_3$   
(c)  $A = RR'C \begin{matrix} CN \\ OH \end{matrix}$ ,  $B = H_3O^{\oplus}$   
(d)  $A = RR'CH_2CN$ ,  $B = NaOH$
4. Reduction of Aldehydes and Ketones to hydrocarbon take place in the presence of [CPMT 2003]  
(a) Zn amalgam and HCl acid  
(b) Pd / BaSO<sub>4</sub>  
(c) Anhydrous AlCl<sub>3</sub>  
(d) Ni / Pt
5. Reduction of  $>C=O$  to  $CH_2$  can be carried out with  
[DCE 2000]  
(a) Catalytic reduction (b) Na / C<sub>2</sub>H<sub>5</sub>OH  
(c) Wolf-Kischner reduction (d) LiAlH<sub>4</sub>
6. For C<sub>6</sub>H<sub>5</sub>CHO which of the following is incorrect  
[CPMT 1985]  
(a) On oxidation it yields benzoic acid  
(b) It is used in perfumery  
(c) It is an aromatic aldehyde  
(d) On reduction yields phenol
7. Grignard reagent on reaction with acetone forms  
[BHU 1995; RPMT 2002; Roorkee 1990]  
(a) Tertiary alcohol (b) Secondary alcohol  
(c) Acetic acid (d) Acetaldehyde
8. Which of the following is incorrect [CBSE PMT 2001]  
(a) FeCl<sub>3</sub> is used in the detection of phenols  
(b) Fehling solution is used in the detection of glucose  
(c) Tollen's reagent is used in detection of unsaturation  
(d) NaHSO<sub>3</sub> is used in the detection of carbonyl compounds
9. Consider the following statement Acetophenone can be prepared by  
(1) Oxidation of 1-phenylethanol  
(2) Reaction of benzaldehyde with methyl magnesium bromide  
(3) Friedel craft's reaction of benzene with acetyl chloride  
(4) Distillation of calcium benzoate [SCRA 2001]  
(a) 1 and 2 (b) 1 and 4  
(c) 1 and 3 (d) 3 and 4
10. Which one of the following pairs is not correctly matched



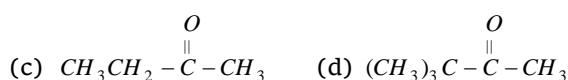
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[SCRA 2001]



11. Which of the following gives aldol condensation reaction

[CPMT 2001]



12. Which of the following products is formed when benzaldehyde is treated with  $CH_3MgBr$  and the addition product so obtained is subjected to acid hydrolysis

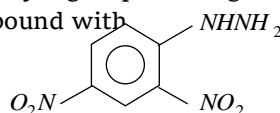
[Haryana CEET 2000]

- (a) Secondary alcohol (b) A primary alcohol  
(c) Phenol (d) Tert-Butyl alcohol

13. Aldol condensation will not be observed in [GATE 2001]

- (a) Chloral (b) Phenyl acetaldehyde  
(c) Hexanal (d) Ethanol

14. Which of the following compounds containing carbonyl group will give coloured crystalline compound with



[Kerala (Med.) 2001]

- (a)  $CH_3COCl$  (b)  $CH_3COCH_3$   
(c)  $CH_3CO(OC_2H_5)$  (d)  $CH_3CONH_2$   
(e)  $HO(C_6H_4)COOH$

15. Which of the following organic compounds exhibits positive Fehling test as well as iodoform test

[MP PET 1994; KCET 2001]

- (a) Methanal (b) Ethanol  
(c) Propanone (d) Ethanal

16. Which of the following compound will undergo self aldol condensation in the presence of cold dilute alkali

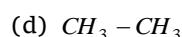
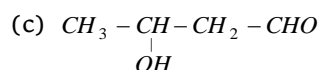
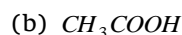
[CBSE PMT 1994]

- (a)  $C_6H_5CHO$  (b)  $CH_3CH_2CHO$   
(c)  $CH \equiv C-CHO$  (d)  $CH_2 = CH-CHO$

17. Acetaldehyde when treated with dilute  $NaOH$  gives

[EAMCET 1998]

- (a)  $CH_3CH_2OH$



18.  $C_2H_5CHO$  and  $(CH_3)_2CO$  can be distinguished by testing with

MP PMT 1996; RPMT 1997, 99]

- (a) Phenyl hydrazine (b) Hydroxylamine  
(c) Fehling solution (d) Sodium bisulphite

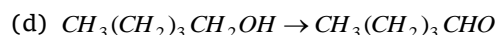
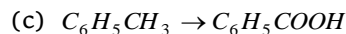
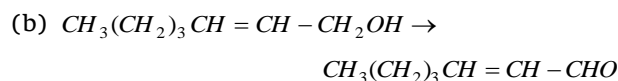
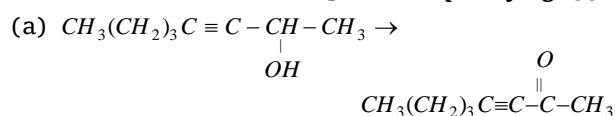
19. Which of the following will undergo aldol condensation

[IIT 1998]

- (a) Acetaldehyde (b) Propanaldehyde  
(c) Benzaldehyde (d) Trideuteroacetaldehyde

20. Which of the following oxidation reactions can be carried out with chromic acid in aqueous acetone at  $5-10^\circ C$

[Roorkee Qualifying 1998]



21. Acetaldehyde cannot show [AIIMS 1997]

- (a) Iodoform test (b) Lucas test  
(c) Benedict's test (d) Tollen's test

22. Benzaldehyde +  $NaOH \rightarrow$

[CPMT 1997, 2001; CBSE PMT 1999; Pb. PMT 1999]

- (a) Benzyl alcohol (b) Benzoic alcohol  
(c) Hydrobenzamide (d) Cinnamic acid

23. The following reagent converts  $C_6H_5COCHO$  to  $C_6H_5CHOHCOONa$  [Roorkee Qualifying 1998]

- (a) Aq.  $NaOH$  (b) Acidic  $Na_2S_2O_3$   
(c)  $Na_2CrO_4 / H_2SO_4$  (d)  $NaNO_2 / HCl$

24. Benzyl alcohol and sodium benzoate is obtained by the action of sodium hydroxide on benzaldehyde. This reaction is known as

- (a) Perkin's reaction (b) Cannizzaro's

reaction

- (c) Sandmeyer's reaction (d) Claisen condensation

25. To distinguish between formaldehyde and acetaldehyde, we require

- (a) Tollen's reagent (b) Fehling's solution  
(c) Schiff's reagent (d) Caustic soda solution



26. Which of the following does not give iodoform test  
[AIIMS 1992; MP PMT 1990, 96; CET Pune 1998  
DPMT 1981; CPMT 1976]  
(a)  $CH_3CH_2OH$  (b)  $CH_3OH$   
(c)  $CH_3CHO$  (d)  $PhCOCH_3$
27. Which of the following will not give iodoform test  
[Kurukshetra CEE 1991; Bihar CEE 1995;  
CBSE PMT 1998; MP PMT 2004]  
(a) Ethanal (b) Ethanol  
(c) 2-propanone (d) 3-pentanone
28. Which of the following will not give the iodoform test  
[MNR 1994]  
(a) Acetophenone (b) Ethanal  
(c) Benzophenone (d) Ethanol
29. Haloform test is given by the following substance  
[EAMCET 1988]  
(a)  $HCHO$  (b)  $(CH_3)_2CO$   
(c)  $CH_3OCH_3$  (d)  $CH_3CH_2Cl$
30. Dimethyl ketones are usually characterised through  
[MNR 1992]  
(a) Tollen's reagent (b) Iodoform test  
(c) Schiff's test (d) Benedict's reagent
31. The light yellow compound produced when acetone reacts with iodine and alkali, is [MP PMT 1992; EAMCET 1993]  
(a)  $CH_3.CO.CH_2I$  (b)  $CH_3I$   
(c)  $CHI_3$  (d) None of these
32. If formaldehyde and  $KOH$  are heated, then we get  
[MP PET 1999; KCET 2000]  
(a) Acetylene (b) Methane  
(c) Methyl alcohol (d) Ethyl formate
33. Which of the following reagent reacts differently with  $HCHO$ ,  $CH_3CHO$  and  $CH_3COCH_3$  [MP PET 1999]  
(a)  $HCN$  (b)  $NH_2NH_2$   
(c)  $NH_2OH$  (d)  $NH_3$
34. Acetaldehyde reacts with  $C_2H_5MgCl$  the final product is  
[Pb. CET 1985]  
(a) An aldehyde (b) A ketone  
(c) A primary alcohol (d) A secondary alcohol
35. Treatment of propionaldehyde with dilute  $NaOH$  solution gives [MNR 1992]  
(a)  $CH_3CH_2COOCH_2CH_2CH_3$   
(b)  $CH_3CH_2CHOHCH(CH_3)CHO$   
(c)  $CH_3CH_2CHOHCH_2CH_2CHO$   
(d)  $CH_3CH_2COCH_2CH_2CHO$
36. Aldol condensation of acetaldehyde involves the formation of which of the following intermediate [Pb. CET 1986]  
(a) Acetate ion (b) A carbanion  
(c) A carbonium ion (d) A free radical
37.  $3CH_3COCH_3 \xrightarrow{HCl} (CH_3)_2C = CH - CO - CH = C(CH_3)_2$   
This polymer (B) is obtained when acetone is saturated with hydrogen chloride gas, B can be  
(a) Phorone (b) Formose  
(c) Diacetone alcohol (d) Mesityl oxide
38. Aromatic aldehydes undergo disproportionation in presence of sodium or potassium hydroxide to give corresponding alcohol and acid. The reaction is known as [MNR 1987]  
(a) Wurtz's reaction (b) Cannizzaro reaction  
(c) Friedel-Craft's reaction (d) Claisen reaction
39. *m*-chlorobenzaldehyde on reaction with conc.  $KOH$  at room temperature gives [IIT-JEE 1991]  
(a) Potassium *m*-chlorobenzoate and *m*-hydroxy benzaldehyde  
(b) *m*-hydroxy benzaldehyde and *m*-chlorobenzyl alcohol  
(c) *m*-chlorobenzyl alcohol and *m*-hydroxy benzyl alcohol  
(d) Potassium *m*-chlorobenzoate and *m*-chlorobenzyl alcohol
40. Which of the following does not give yellow precipitate with  $NaOH + KI$   
(a) Acetone (b) Acetaldehyde  
(c) Benzaldehyde (d) Acetophenone
41. The alkaline  $CuSO_4$  containing sodium potassium tartrate does not react with [MP PMT 1997]  
(a)  $C_6H_5CHO$  (b)  $C_2H_5CHO$   
(c)  $C_6H_5CH_2CHO$  (d)  $C_6H_5CHO$
42. Correct order of reactivity of  $CH_3CHO$ ,  $C_2H_5COCH_3$  and  $CH_3COCH_3$  is [MP PMT 1991]  
(a)  $CH_3CHO > CH_3COCH_3 > CH_3COC_2H_5$   
(b)  $C_2H_5COCH_3 > CH_3COCH_3 > CH_3CHO$   
(c)  $CH_3COCH_3 > CH_3CHO > C_2H_5COCH_3$   
(d)  $CH_3COCH_3 > C_2H_5COCH_3 > CH_3CHO$
43. One mole of an organic compound requires 0.5 mole of oxygen to produce an acid. The compound may be [NCERT 1981]  
(a) Alcohol (b) Ether  
(c) Ketone (d) Aldehyde
44. Aldehydes can be oxidised by [NCERT 1983]  
(a) Tollen's reagent (b) Fehling solution  
(c) Benedict solution (d) All of these
45. Silver mirror is a test for [DPMT 1983; CBSE PMT 1988]  
(a) Aldehydes (b) Thio alcohols  
(c) Amines (d) Ethers
46.  $CH_3CH = CHCHO$  is oxidised to  $CH_3CH = CHCOOH$  using  
(a) Alkaline  $KMnO_4$  (b) Selenium dioxide  
(c) Ammoniacal  $AgNO_3$  (d) All of these



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47. Which of the following does not turn Schiff's reagent to pink  
[DPMT 1981; CPMT 1989]  
 (a) Formaldehyde (b) Benzaldehyde  
 (c) Acetone (d) Acetaldehyde
48. Fehling's test is positive for [KCET 1993]  
 (a) Acetaldehyde (b) Benzaldehyde  
 (c) Ether (d) Alcohol
49. Acetaldehyde and acetone differ in their reaction with [KCET 1989]  
 (a) Sodium bisulphite  
 (b) Ammonia  
 (c) Phosphorus pentachloride  
 (d) Phenyl hydrazine
50. The final product formed when acetaldehyde is reduced with sodium and alcohol is [BHU 1976]  
 (a) Ethylene (b) Ethyl alcohol  
 (c) Ethene (d) All of these
51. The compound obtained by the reduction of propionaldehyde by amalgamated zinc and concentrated HCl is [MP PMT 1983]  
 (a) Propanol (b) Propane  
 (c) Propene (d) All of these
52. Formaldehyde when treated with KOH gives methanol and potassium formate. The reaction is known as [MP PET 1997]  
 (a) Perkin reaction (b) Claisen reaction  
 (c) Cannizzaro reaction (d) Knoevenagel reaction
53. Aldehydes and ketones give addition reaction with [KCET 1992]  
 (a) Hydrazine (b) Phenyl hydrazine  
 (c) Semicarbazide (d) Hydrogen cyanide  
 (e) All of these
54. Acetaldehyde reacts with [CBSE PMT 1991]  
 (a) Electrophiles only  
 (b) Nucleophiles only  
 (c) Free radicals only  
 (d) Both electrophiles and nucleophiles
55. The typical reactions of aldehyde is [Pb. CET 1986]  
 (a) Electrophilic addition (b) Nucleophilic substitution  
 (c) Nucleophilic addition (d) Nucleophilic elimination
56. Which will not give acetamide on reaction with ammonia [CPMT 1985]  
 (a) Acetic acid (b) Acetyl chloride  
 (c) Acetic anhydride (d) Methyl formate
57. The addition of HCN to carbonyl compounds is an example of [Haryana CEET 2000]  
 (a) Nucleophilic substitution  
 (b) Electrophilic addition  
 (c) Nucleophilic addition  
 (d) Electrophilic substitution
58. Which of the following reagents is used to distinguish acetone and acetophenone [RPMT 2002; KCET 1993]  
 (a) NaHSO<sub>3</sub> (b) Grignard reagent  
 (c) Na<sub>2</sub>SO<sub>4</sub> (d) NH<sub>4</sub>Cl
59. The product formed by the reaction of chlorine with benzaldehyde in the absence of a catalyst is [Tamil Nadu CET 2002]  
 (a) Chlorobenzene (b) Benzyl chloride  
 (c) Benzoyl Chloride (d) o-Chlorobenzaldehyde
60. Which of the following compound is resistant to nucleophilic attack by hydroxyl ions [CBSE PMT 1998; KCET (Med.) 2001; AFMC 2001]  
 (a) Methyl acetate (b) Acetonitrile  
 (c) Dimethyl ether (d) Acetamide
61. Glucose molecule reacts with X number of molecules of phenylhydrazine to yield osazone. The value of X is [CBSE PMT 1998]  
 (a) One (b) Two  
 (c) Three (d) Four
62. In which of the following reactions aromatic aldehyde is treated with acid anhydride in presence of corresponding salt of the acid to give unsaturated aromatic acid [BHU 1998, KCET (Med.) 2001]  
 (a) Friedel-Craft's reaction (b) Perkin reaction  
 (c) Wurtz reaction (d) None of these
63.  $2CH_3 - \underset{\text{O}}{\underset{\parallel}{C}} - CH_3 \xrightarrow[H^+]{Mg/Hg}$  Product, product in the reaction is [RPMT 2003]  
 (a)  $H_3C - \underset{\text{OH}}{\underset{|}{C}} - \underset{\text{OH}}{\underset{|}{C}} - CH_3$  (b)  $CH_3 - \underset{\text{O}}{\underset{\parallel}{C}} - O - \underset{\text{O}}{\underset{\parallel}{C}} - CH_3$   
 (c)  $CH_3 - \underset{\text{OH}}{\underset{|}{CH}} - \underset{\text{OH}}{\underset{|}{CH}} - CH_3$  (d) None of these
64. Cinnamic acid is formed when C<sub>6</sub>H<sub>5</sub>-CHO condenses with (CH<sub>3</sub>CO)<sub>2</sub>O in presence of [Orissa JEE 2003]  
 (a) Conc. H<sub>2</sub>SO<sub>4</sub> (b) Sodium acetate  
 (c) Sodium metal (d) Anhydrous ZnCl<sub>2</sub>
65. A mixture of benzaldehyde and formaldehyde on heating with aqueous NaOH solution gives [IIT-JEE (Screening) 2001]  
 (a) Benzyl alcohol and sodium formate  
 (b) Sodium benzoate and methyl alcohol  
 (c) Sodium benzoate and sodium formate  
 (d) Benzyl alcohol and methyl alcohol
66. The reaction,  
 $CH_3 - \underset{\text{O}}{\underset{\parallel}{C}} - OCH_3 + C_2H_5OH \xrightarrow{H^+ \text{ or } OH^-}$

- $$\text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} - \text{OC}_2\text{H}_5 + \text{CH}_3\text{OH}$$
 is called [MP PMT 2003]
- (a) Perkin's reaction (b) Claisen Schmidt reaction  
 (c) Esterification (d) Trans-esterification
- 67.** Formaldehyde reacts with ammonia to give urotropine. The formula of urotropine is  
 [MP PMT 1989, 96, 2003; AIIMS 1982; NCERT 1987; MP PET 1990, 91, 2000; CPMT 1978, 82, 86, 97; KCET 2003]
- (a)  $(\text{CH}_2)_6\text{N}_4$  (b)  $(\text{CH}_2)_4\text{N}_3$   
 (c)  $(\text{CH}_2)_6\text{N}_6$  (d)  $(\text{CH}_2)_3\text{N}_3$
- 68.** Aldol condensation will not take place in  
 [CBSE PMT 1996, 99; RPMT 1999; CPMT 1988, 04]
- (a)  $\text{HCHO}$  (b)  $\text{CH}_3\text{CH}_2\text{CHO}$   
 (c)  $\text{CH}_3\text{CHO}$  (d)  $\text{CH}_3\text{COCH}_3$
- 69.** Contents of three bottles were found to react
- (i) Neither with Fehling's solution nor with Tollen's reagent  
 (ii) Only with Tollen's reagent but not with Fehling's solution  
 (iii) With both Tollen's reagent and Fehling's solution.
- If they contained either ethanal (acetaldehyde) or propanone (acetone) or benzal (benzaldehyde), which bottle contained which
- (a) In (i) benzal, in (ii) ethanal and in (iii) propanone  
 (b) In (i) benzal, in (ii) propanone and in (iii) ethanal  
 (c) In (i) propanone, in (ii) benzal and in (iii) ethanal  
 (d) In (i) propanone, in (ii) ethanal and in (iii) benzal
- 70.** Action of hydrazine on aldehydes and ketones gives compound of the general structure
- (a)  $>\text{C}=\text{N}-\text{NH}_2$   
 (b)  $>\text{C}=\text{N}-\text{OH}$   
 (c)  $>\text{C}=\text{N}-\text{NH}-\text{CONH}_2$   
 (d)  $>\text{C}=\text{N}-\text{NH}-\text{C}_6\text{H}_5$
- 71.** The reaction in which sodium cyanide is used  
 [MP PET/PMT 1998]
- (a) Perkin reaction (b) Reimer-Tiemann reaction  
 (c) Benzoin condensation (d) Rosenmund reaction
- 72.** Which one of the following reactions is a method for the conversion of a ketone into a hydrocarbon  
 [MP PET/PMT 1998; CBSE PMT 1989]
- (a) Aldol condensation (b) Reimer-Tiemann reaction  
 (c) Cannizzaro reaction (d) Wolf-Kishner reduction
- 73.** Bakelite is a polymer of [DPMT 1996; MP PET 2002]
- (a)  $\text{HCHO}$  + phenol  
 (b)  $\text{HCHO}$  + aldehyde (acetaldehyde)
- (c) Phenol +  $\text{H}_2\text{SO}_4$   
 (d)  $\text{HCHO}$  + acetone
- 74.** Clemmenson reduction involves  $>\text{C}=\text{O}$  to  $>\text{CH}_2$  in presence of [DPMT 1996]
- (a)  $\text{Zn} / \text{Hg}$  (b) Alcohol  
 (c)  $\text{Zn}$  dust (d)  $\text{Zn} / \text{alcohol}$
- 75.** Aldol condensation involving  $\text{CH}_3\text{CHO} + \text{CH}_3\text{CHO}$  gives the product [DPMT 1996]
- (a)  $\text{CH}_3\text{CHOHCH}_2\text{CHO}$  (b)  $\text{CH}_3\text{COCH}_2\text{CH}_3$   
 (c)  $\text{CH}_3\text{CH}=\text{CH}_2$  (d) None of these
- 76.** Enol content is highest in
- (a) Acetone (b) Acetophenone  
 (c) Acetic acid (d) Acetyl acetone
- 77.** Which one of the following reacts with  $\text{HCN}$  and Tollen's reagent, but is not oxidised by Fehling's solution
- (a) Methanal (b) Ethanal  
 (c) Benzaldehyde (d) Acetone
- 78.** During reaction of benzaldehyde with alkali one of the product is
- (a) Phenol (b) Benzyl alcohol  
 (c) Benzene (d) Benzophenone
- 79.** Cannizzaro reaction is given by [DPMT 1996]
- (a)  $\text{HCHO}$  (b)  $\text{CH}_3\text{COCH}_3$   
 (c)  $\text{CH}_3\text{CHO}$  (d)  $\text{CH}_3\text{CH}_2\text{OH}$
- 80.** The reaction  

$$\text{C}_6\text{H}_5\text{CHO} + \text{CH}_3\text{CHO} \rightarrow \text{C}_6\text{H}_5\text{CH}=\text{CH}-\text{CHO}$$
 is known as [BHU 1996]
- (a) Perkin's reaction (b) Claisen condensation  
 (c) Benzoin condensation (d) Cannizzaro's reaction
- 81.** When two molecules of acetaldehyde condense in the presence of dilute alkali, it forms [Bihar MEE 1996]
- (a) Acetal (b) Sodium formate  
 (c) Aldol (d) Mesitylene  
 (e) None of these
- 82.** Acetaldehyde on treatment with dil.  $\text{NaOH}$  followed by heating gives
- (a)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$   
 (b)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$   
 (c)  $\text{CH}_3-\text{CH}=\text{CHCHO}$   
 (d)  $\text{CH}_3-\text{CH}=\text{CHCH}_2\text{OH}$
- 83.** Reaction  $\text{R}_2\text{C}=\text{O} + \text{HCN} \rightarrow \text{R}-\overset{\text{R}}{\underset{\text{CN}}{\text{C}}}-\text{OH}$  is  
 [Kurukshetra CEE 1998; IIT 1990]
- (a) Electrophilic substitution  
 (b) Electrophilic addition  
 (c) Nucleophilic addition  
 (d) Nucleophilic substitution
- 84.** Benzaldehyde on reaction with acetophenone in the presence of sodium hydroxide solution gives [BVP 2000]





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- (a)  $C_6H_5CH = CHCO_6H_5$   
 (b)  $C_6H_5COCH_2C_6H_5$   
 (c)  $C_6H_5CH = CHC_6H_5$   
 (d)  $C_6H_5CH(OH)CO_6H_5$
85. Aldehydes and ketones can be reduced to hydrocarbon by using [Orissa JEE 2003]  
 (a)  $LiAlH_4$  (b)  $H_2 / Pd - BaSO_4$   
 (c)  $Na - Hg / HCl$  (d)  $NH_2 - NH_2 / C_2H_5ONa$
86. An important reaction of acetone is autocondensation in presence of concentrated sulphuric acid to give the aromatic compound [KCET 2003; MP PET 1986, 89; MP PMT 1992, 2000]  
 (a) Mesitylene (b) Mesityl oxide  
 (c) Trioxan (d) Phorone
87. Identify the organic compound which, on heating with strong solution of  $NaOH$ , partly converted into an acid salt and partly into alcohol [KCET 2003]  
 (a) Benzyl alcohol (b) Acetaldehyde  
 (c) Acetone (d) Benzaldehyde
88. Which of the following does not give brick red precipitate with Fehling solution [AIIMS 1996]  
 (a) Acetone (b) Acetaldehyde  
 (c) Formalin (d) D-glucose
89. Acetaldehyde and acetone can be distinguished by [AIIMS 1996; DCE 1999; Pb. CET 2000]  
 (a) Molisch test (b) Bromoform test  
 (c) Solubility in water (d) Tollen's test
90. Which compound is soluble in  $H_2O$  [RPMT 1997]  
 (a)  $HCHO$  (b)  $CH_3CHO$   
 (c)  $CH_3COCH_3$  (d) All
91.  $CH_3CHO + CH_3MgBr \rightarrow \text{Product} \xrightarrow{H_2O} A$   
 What is A? [RPMT 1997]  
 (a) Primary alcohol (b) Secondary alcohol  
 (c) Tertiary alcohol (d) Ketone
92. Which gives lactic acid on hydrolysis after reacting with  $HCN$  [UPSEAT 2003; MP PMT 2003]  
 (a)  $HCHO$  (b)  $CH_3CHO$   
 (c)  $C_6H_5CHO$  (d)  $CH_3COCH_3$
93.  $CH_3CHO$  react with aqueous  $NaOH$  solution to form [MP PMT 1992]  
 (a) 3-hydroxy butanal (b) 2-hydroxy butanal  
 (c) 4-hydroxy butanal (d) 3-hydroxy butanol
94. Fehling solution react with  $HCHO$  to form precipitate of [MP PMT 1992]  
 (a) White colour (b) Yellow colour  
 (c) Red colour (d) Blue colour
95. Product in following reaction is  
 $CH_3MgI + HCHO \rightarrow \text{Product}$   
 [RPMT 2003; BHU 1998, 2005; DCE 1999]  
 (a)  $CH_3CHO$  (b)  $CH_3OH$
- (c)  $C_2H_5OH$  (d)  $CH_3 - O - CH_3$
96.  $A \xrightarrow[800^\circ C]{\Delta} CH_2 = C = O$ , Reactant 'A' in the reaction is [RPMT 2003]  
 (a)  $CH_3CH_2CHO$  (b)  $CH_3CHO$   
 (c)  $CH_3 - \underset{\underset{O}{||}}{C} - CH_3$  (d)  $C_2H_5OH$
97. Only an aldehyde having..... can undergo the aldol condensation [KCET 1998]  
 (a) At least one beta H atom  
 (b) At least one alpha H atom  
 (c) An aromatic ring  
 (d) No alpha H atom
98. Clemenson's reduction of ketones is carried out in [BHU 2000]  
 (a)  $H_2$  with  $Pd$  catalyst (b) Glycol with  $KOH$   
 (c)  $LiAlH_4$  in water (d)  $Zn - Hg$  with  $HCl$
99. Reaction  

$$\begin{matrix} R \\ \diagup \\ C = O \\ \diagdown \\ R \end{matrix} \xrightarrow[\text{KOH / glycol}]{H_2NNH_2} \begin{matrix} R \\ \diagup \\ C \\ \diagdown \\ R \end{matrix} \begin{matrix} H \\ / \\ H \\ \backslash \\ H \end{matrix} + N_2 + H_2$$
 is called [MP PET 2003]  
 (a) Wolff-Kishner reaction (b) Tischenko reaction  
 (c) Reformatsky reaction (d) Gattermann reaction
100. Propanal on treatment with dilute sodium hydroxide forms [Kerala CET 2000]  
 (a)  $CH_3CH_2CH_2CH_2CH_2CHO$   
 (b)  $CH_3CH_2CH(OH)CH_2CH_2CHO$   
 (c)  $CH_3CH_2CH(OH)CH(CH_3)CHO$   
 (d)  $CH_3CH_2COONa$
101. Identify the product Y in the sequence  
 $CH_3CHO + CH_3MgI \xrightarrow{\text{Ether}} X \xrightarrow{H_2O / H^+} Y$   
 [Kerala (Med.) 2001]  
 (a)  $CH_3OH$  (b)  $CH_3CH_2OH$   
 (c)  $(CH_3)_2CHOH$  (d)  $(CH_3)_3COH$
102. What is the name of reaction when benzaldehyde changes into benzyl alcohol [CPMT 1996; RPET 1999]  
 (a) Friedel-Craft's reaction (b) Kolbe's reaction  
 (c) Wurtz reaction (d) Cannizzaro reaction
103. The reagent that gives an orange coloured precipitate with acetaldehyde [EAMCET 1997; Pb. PMT 2004; AIIMS 1987]  
 (a)  $NH_2OH$  (b)  $NaHSO_3$   
 (c) Iodine (d) 2, 4-DNP
104. Which one is used in the manufacture of mirror [MP PET 1992]  
 (a) Red lead (litharge)  
 (b) Ammoniacal  $AgNO_3$   
 (c) Ammoniacal  $AgNO_3 + \text{Red lead}$   
 (d) Ammoniacal  $AgNO_3 + HCHO$

105. When  $CH_3COCH_3$  reacts with  $Cl_2$  and  $NaOH$ , which of the following is formed [CPMT 1996]  
 (a)  $CHCl_3$  (b)  $CCl_4$   
 (c)  $CCl_2H_2$  (d)  $CH_3Cl$
106. Which gives difference between aldehyde and ketone [CPMT 1994]  
 (a) Fehling's solution (b) Tollen's reagent  
 (c) Schiff's reagent (d) Benedict's solution  
 (e) All of these
107. Aldehyde turns pink with [Bihar MEE 1997]  
 (a) Benedict solution (b) Schiff reagent  
 (c) Fehling solution (d) Tollen's reagent  
 (e) Mollisch reagent
108. Which of the following would undergo aldol condensation [MP PMT 1986; BHU 1995]  
 (a)  $CCl_3.CHO$  (b)  $CH_3 - \overset{\overset{CH_3}{|}}{C} - CHO$   
 (c)  $CH_3.CH_2.CHO$  (d)  $HCHO$
109. The reaction of acetaldehyde with conc.  $KMnO_4$  gives [DPMT 1982; AIIMS 1996]  
 (a)  $CH_3COOH$  (b)  $CH_3CH_2OH$   
 (c)  $HCHO$  (d)  $CH_3OH$
110. When acetaldehyde is heated with Tollen's reagent, following is obtained [CPMT 1989; MP PET/PMT 1988]  
 (a) Methyl alcohol (b) Silver acetate  
 (c) Silver mirror (d) Formaldehyde
111. Boiling point of acetone is [CPMT 1975, 89]  
 (a)  $56^\circ C$  (b)  $60^\circ C$   
 (c)  $100^\circ C$  (d)  $90^\circ C$
112. Urotropine is  
 (a) Hexamethylene tetramine  
 (b) Hexaethylene tetramine  
 (c) Hexamethylene diamine  
 (d) None of these
113. Magenta is [DPMT 1982; Kurukshetra CEE 1998]  
 (a) Alkaline phenolphthalein  
 (b) Methyl red  
 (c) *p*-rosaniline hydrochloride  
 (d) Red litmus
114. An aldehyde on oxidation gives [CPMT 1973, 03; DPMT 1983; Manipal MEE 1995]  
 (a) An alcohol (b) An acid  
 (c) A ketone (d) An ether
115. The reaction of an aldehyde with hydroxylamine gives a product which is called [MP PET 1993; AFMC 2002]  
 (a) Aminohydroxide (b) Hydrazone  
 (c) Semicarbazone (d) Oxime
116. Cannizzaro reaction is not shown by [BHU 1980; IIT 1983; KCET 1993; Bihar MEE 1995; RPMT 1997, 2000, 02]  
 (a)  $HCHO$  (b)  $C_6H_5CHO$   
 (c)  $CH_3CHO$  (d) All of these
117. When acetone is heated with hydroxylamine, the compound formed is [MP PMT 1993]  
 (a) Cyanohydrin (b) Oxime  
 (c) Semicarbazone (d) Hydrazone
118. The product of the reaction between ammonia and formaldehyde is [MP PMT 1993]  
 (a) Urotropine (b) Formamide  
 (c) Paraformaldehyde (d) Methanol
119. Which of the following products is obtained by the oxidation of propionaldehyde [CPMT 1989]  
 (a) Acetic acid  
 (b) Formic acid and acetic acid  
 (c) Propanoic acid  
 (d) *n*-propyl alcohol
120. When acetaldehyde reacts with  $PCl_5$ , the resulting compound is [MP PMT 1992, 93]  
 (a) Ethyl chloride (b) Ethylene chloride  
 (c) Ethylidene chloride (d) Trichloro acetaldehyde
121. Benzaldehyde and acetaldehyde can be differentiated by  
 (a)  $HCN$  (b)  $NH_2OH$   
 (c) Hydrazine (d)  $NaOH$  solution
122. In the presence of a dilute base  $C_6H_5CHO$  and  $CH_3CHO$  react together to give a product. The product is [MP PET 1994]  
 (a)  $C_6H_5CH_3$  (b)  $C_6H_5CH_2CH_2OH$   
 (c)  $C_6H_5CH_2OH$  (d)  $C_6H_5CH=CHCHO$
123. Grignard's reagent reacts with ethanal (acetaldehyde) and propanone to give  
 (a) Higher aldehydes with ethanal and higher ketones with propanone  
 (b) Primary alcohols with ethanal and secondary alcohols with propanone  
 (c) Ethers with ethanal and alcohols with propanone  
 (d) Secondary alcohols with ethanal and tertiary alcohols with propanone
124. Base catalysed aldol condensation occurs with [IIT-JEE 1991]  
 (a) Benzaldehyde



## 1288 Aldehydes and Ketones

- (b) 2, 2-dimethyl propionaldehyde  
(c) Acetaldehyde  
(d) Formaldehyde
125. Benzaldehyde reacts with ammonia to form  
[CPMT 1989; AFMC 1998]  
(a) Benzaldehyde ammonia  
(b) Urotropine  
(c) Hydrobenzamide  
(d) Aniline
126. Glucose + Tollen's reagent  $\rightarrow$  Silver mirror shows  
[CPMT 1997]  
(a) Presence of acidic group  
(b) Presence of alkaline group  
(c) Presence of ketonic group  
(d) Presence of aldehyde group
127. Fehling solution is [MP PMT 1989]  
(a) Ammoniacal cuprous chloride solution  
(b) Acidified copper sulphate solution  
(c) Copper sulphate and sodium hydroxide + Rochelle salt  
(d) None of these
128. Reduction of an aldehyde produces  
[MP PMT 1994; MP PET 2001]  
(a) Primary alcohol (b) Monocarboxylic acid  
(c) Secondary alcohol (d) Tertiary alcohol
129. Which of the following on reaction with conc. NaOH gives an alcohol [MP PET 1996]  
(a) Methanal (b) Ethanal  
(c) Propanal (d) Butanal
130. Schiff's reagent is [MP PMT 1989]  
(a) Magenta colour solution decolourised with sulphurous acid  
(b) Ammoniacal cobalt chloride solution  
(c) Ammoniacal manganese sulphate solution  
(d) Magenta solution decolourised with chlorine
131. Pyrolysis of acetone gives  $CH_2 = C = O$  called  
(a) Methylene oxide  
(b) Methyl carbon monoxide  
(c) Ketene  
(d) Methone
132. Which one of the following on oxidation will not give a carboxylic acid with the same number of carbon atoms  
[CBSE PMT 1992; MP PET 1996]  
(a)  $CH_3COCH_3$  (b)  $CCl_3CH_2CHO$   
(c)  $CH_3CH_2CH_2OH$  (d)  $CH_3CH_2CHO$
133. Acetal is obtained by reacting in the presence of dry HCl and alcohol with [MP PET 1996]  
(a) Aldehyde (b) Ketone  
(c) Ether (d) Carboxylic acid
134. The reagent with which both aldehyde and acetone react easily is [CPMT 1973, 74, 89; BIT 1992]  
(a) Fehling's reagent (b) Grignard reagent  
(c) Schiff's reagent (d) Tollen's reagent
135. Phenylmethanol can be prepared by reducing the benzaldehyde with [CBSE PMT 1997]  
(a)  $CH_3Br$  (b) Zn and HCl  
(c)  $CH_3Br$  and Na (d)  $CH_3I$  and Mg
136. Which of the following is used in the manufacture of thermosetting plastics  
(a) Formaldehyde (b) Acetaldehyde  
(c) Acetone (d) Benzaldehyde
137. Which compound undergoes iodoform reaction [DPMT 1984; CPMT 1989]  
(a) HCHO (b)  $CH_3CHO$   
(c)  $CH_3OH$  (d)  $CH_3COOH$
138. Which does not react with Fehling solution [MNR 1983, 93]  
(a) Acetaldehyde (b) Benzaldehyde  
(c) Glucose (d) Formic acid
139. Which of the following compound will react with ethanolic KCN [IIT-JEE 1984]  
(a) Ethane (b) Acetyl chloride  
(c) Chlorobenzene (d) Benzaldehyde
140. Schiff's reagent gives pink colour with [EAMCET 1980; MP PMT 2000]  
(a) Aldehydes (b) Ethers  
(c) Ketones (d) Carboxylic acid
141. Acetaldehyde reacts with  $Cl_2$  (in excess) to give [MP PMT 1997]  
(a) Chloral (b) Chloroform  
(c) Acetic acid (d) Trichloroacetic acid
142. The compound which reacts with Fehling solution is [CPMT 1989]  
(a)  $C_6H_5COOH$  (b) HCOOH  
(c)  $C_6H_5CHO$  (d)  $CH_2ClCH_3$
143. Which one of the following undergoes reaction with 50% sodium hydroxide solution to give the corresponding alcohol and acid  
(a) Butanal (b) Benzaldehyde  
(c) Phenol (d) Benzoic acid
144. Which one of the following is reduced with zinc and hydrochloric acid to give the corresponding hydrocarbon [AIEEE 2004]  
(a) Acetamide (b) Acetic acid  
(c) Ethyl acetate (d) Butan-2-one

145. Three molecules of acetone in the presence of dry  $HCl$  form  
[MP PET 2004]  
(a) Mesitylene (b) Phorone  
(c) Glyoxal (d) Mesityl oxide
146. Aldehydes and ketones can be reduced to corresponding hydrocarbons by  
(a) Refluxing with water  
(b) Refluxing with strong acids  
(c) Refluxing with soda amalgam and water  
(d) Refluxing with zinc amalgam and concentrated  $HCl$   
(e) Passing the vapour under heated  $PbO_2$
147. Acetone reacts with iodine to form iodoform in the presence of  
(a)  $CaCO_3$  (b)  $NaOH$   
(c)  $KOH$  (d)  $MgCO_3$
148. Cyanohydrin of which of the following forms lactic acid  
[MHCET 2003]  
(a)  $CH_3CH_2CHO$  (b)  $CH_3CHO$   
(c)  $HCHO$  (d)  $CH_3COCH_3$
149. Which of the following is used to detect aldehydes  
[MHCET 2004]  
(a) Million's test  
(b) Tollen's reagent  
(c) Neutral ferric chloride solution  
(d) Molisch's test
150. Which of the following aldehydes give red precipitate with Fehling solution?  
(a) Benzaldehyde (b) Salicylaldehyde  
(c) Acetaldehyde (d) None of these
151.  $A \longrightarrow (CH_3)_2C = CHCOCH_3$  A is [MHCET 2004]  
(a) Acetone (b) Acetaldehyde  
(c) Propionaldehyde (d) Formaldehyde
152. The aldehyde which react with  $NaOH$  to produce an alcohol and sodium salt is  
(a)  $HCHO$  (b)  $CH_3CHO$   
(c)  $CH_3CH_2CHO$  (d)  $CH_3CH_2CH_2CHO$
153. Acetaldehyde and Acetone can be distinguished by  
[DCE 2003]  
(a) Iododorm test  
(b) Nitroprusside test  
(c) Fehling's solution test  
(d) DNP test
154.  $OCH - CHO \xrightarrow{OH^-} HOH_2C - COOH$   
The reaction given is [DCE 2003]  
(a) Aldol condensation (b) Knoevenagel reaction  
(c) Cannizzaro reaction (d) None of these
155. The order of susceptibility of nucleophilic attack on aldehydes follows the order  
(a)  $1^\circ > 3^\circ > 2^\circ$  (b)  $1^\circ > 2^\circ > 3^\circ$   
(c)  $3^\circ > 2^\circ > 1^\circ$  (d)  $2^\circ > 3^\circ > 1^\circ$
156. In Wolf-Kishner reduction, the carbonyl group of aldehydes and ketones is converted into  
(a)  $>C=O$  group [Kerala BMT 2004] (b)  $-CH_3$  group  
(c)  $-CH_2OH$  group (d)  $>CHOH$  group
157. Which of the following react with  $NaHSO_3$   
[Pb. CET 2003]  
(a)  $CH_3COCH_3$  (b)  $CH_3CHO$   
(c)  $HCHO$  (d) All of these
158. Fehling solution is [Pb. CET 2003]  
(a)  $CuSO_4 + NaOH(aq)$   
(b)  $CuSO_4 + Na_2CO_3$  (c)  $CuSO_4 + Na_2CO_3$  (d) None of these
159. Wolf kishner reduction, reduces  
(a)  $-COOH$  group (b)  $-C \equiv C -$  group  
(c)  $-CHO$  group (d)  $-O -$  group
160. A compound has a vapour density of 29. On warming an aqueous solution of alkali, it gives a yellow precipitate. The compound is  
(a)  $CH_3CH_2CHO$  (b)  $CH_3CHOHCH_3$   
(c)  $CH_3COCH_3$  (d)  $CH_3CH_2COOH$
161. Which responds to +ve iodoform test? [Orissa JEE 2004]  
(a) Butanol (b) Butan-1-al  
(c) Butanol-2 (d) 3-pentanone
162. The correct order of reactivity of  $PhMgBr$  with  
[MHCET 2004] [IIT-JEE (Screening) 2004]  

$$Ph - \overset{O}{\parallel} C - Ph \quad CH_3 - \overset{O}{\parallel} C - H \quad CH_3 - \overset{O}{\parallel} C - CH_3$$
 is  
(I) (II) (III)  
(a) (I) > (II) > (III) (b) (III) > (II) > (I)  
(c) (II) > (III) > (I) (d) (I) > (III) > (II)
163. The pair of compounds in which both the [Pb. PMT 2004] compounds give positive test with Tollen's reagent is [IIT-JEE (Screening) 2004]  
(a) Glucose and Sucrose  
(b) Fructose and Sucrose  
(c) Acetophenone and Hexanal  
(d) Glucose and Fructose
164. The most appropriate reagent to distinguish between acetaldehyde and formaldehyde is [UPSEAT 2004]  
(a) Fehling's solution  
(b) Tollen's reagent  
(c) Schiff's reagent  
(d) Iodine in presence of base
165. Silver mirror test can be used to distinguish between



## 1290 Aldehydes and Ketones

[MP PET 2004]

- (a) Ketone and acid (b) Phenol and acid  
(c) Aldehyde and acid (d) Alcohol and phenol

166. Paraldehyde is

[CPMT 1985; MP PET 1992, 96; RPMT 2000]

- (a) A trimer of formaldehyde  
(b) A trimer of acetaldehyde  
(c) A hexamer of formaldehyde  
(d) A hexamer of acetaldehyde

167. Paraldehyde is used as a [CBSE PMT 1989]

- (a) Medicine (b) Poison  
(c) Polymer (d) Dye

168. Formalin is an aqueous solution of

[BHU 1979; DPMT 1983]

- (a) Formic acid (b) Formaldehyde  
(c) Fluorescein (d) Furfuraldehyde

169. Hexamethylene tetramine is used as [MP PMT 1979, 84]

- (a) Analgesic (b) Antipyretic  
(c) Urinary antiseptic (d) All of these

170. Methyl ketone group is identified by [BCECE 2005]

- (a) Iodoform test (b) Fehling solution  
(c) Tollen's reagent (d) Schiff's reagent

171. Which of the following does not give Fehling solution test?

[BCECE 2005]

- (a) Acetone (b) Propanal  
(c) Ethanal (d) Butanal

172. How will you convert butan-2-one to propanoic acid?

[IIT 2005]

- (a) Tollen's reagent (b) Fehling's solution  
(c)  $\text{NaOH}/\text{I}_2/\text{H}^+$  (d)  $\text{NaOH}/\text{NaI}/\text{H}^+$

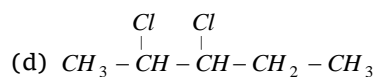
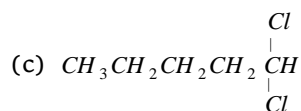
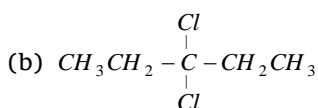
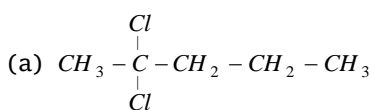
173. Ketones react with  $\text{Mg-Hg}$  over water gives [AFMC 2005]

- (a) Pinacolone (b) Pinacols  
(c) Alcohols (d) None of these

174. Which of the following will form two isomers with semi carbazide [Orissa JEE 2005]

- (a) Benzaldehyde (b) Acetone  
(c) Benzoquinone (d) Benzophenone

175. A compound  $A \rightarrow \text{C}_5\text{H}_{10}\text{Cl}_2$  on hydrolysis gives  $\text{C}_5\text{H}_{10}\text{O}$  which reacts with  $\text{NH}_2\text{OH}$ , forms iodoform but does not give fehling test.  $A$  is [DPMT 2005]



176.  $\text{CH}_3 - \text{CHO} + \text{HCN} \rightarrow A$ ; Compound  $A$  on hydrolysis gives [Kerala CET 2005]

- (a)  $\text{CH}_3 - \text{CH}_2 - \text{COOH}$   
(b)  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{NH}_2$   
(c)  $\text{CH}_3 - \text{CO} - \text{COOH}$   
(d)  $\text{CH}_3\text{CO} - \text{CH} = \text{NOH}$   
(e)  $\text{CH}_3 - \overset{\text{OH}}{\text{CH}} - \text{COOH}$

177. Which one does not give cannizzaro's reaction

[Kerala CET 2005]

- (a) Benzaldehyde  
(b) 2-methyl propanal  
(c) *p*-methoxy benzaldehyde  
(d) 2,2 dimethyl propanal  
(e) Formaldehyde

## Critical Thinking

### Objective Questions

1. Which of the following will fail to react with potassium dichromate and dilute sulphuric acid

- (a) Ethyl alcohol (ethanol)  
(b) Acetaldehyde (ethanal)  
(c) Secondary propyl alcohol (2-propanol)  
(d) Acetone (propanone)

2. Acetone and acetaldehyde are differentiated by

[CPMT 1987, 93]

- (a)  $\text{NaOH} + \text{I}_2$  (b)  $\text{Ag}(\text{NH}_3)_2^+$   
(c)  $\text{HNO}_2$  (d)  $\text{I}_2$

3. Which of the following will react with water [IIT 1998]

- (a)  $\text{CHCl}_3$  (b)  $\text{Cl}_3\text{CCHO}$   
(c)  $\text{CCl}_4$  (d)  $\text{ClCH}_2\text{CH}_2\text{Cl}$

4. An organic compound 'A' has the molecular formula  $\text{C}_3\text{H}_6\text{O}$ , it undergoes iodoform test. When saturated with dil.  $\text{HCl}$  it gives 'B' of molecular formula  $\text{C}_9\text{H}_{14}\text{O}$ .  $A$  and  $B$  respectively are [Tamil Nadu CET]

- (a) Propanal and mesitylene  
(b) Propanone and mesityl oxide



- (c) Propanone and 2,6-dimethyl -2, 5-heptadien-4-one  
(d) Propanone and mesitylene oxide

5. Which alkene is formed from the following reaction  $CH_3CH_2CH_2CH = PPh_3 + 2$ -Butanone [Manipal 2001]

- (a) 3-Methyl-3-heptene  
(b) 4-Methyl-3-heptene  
(c) 5-Methyl-3-heptene  
(d) 1-Methyl-5-methane

6. Compound 'A' (molecular formula  $C_3H_8O$ ) is treated with acidified potassium dichromate to form a product 'B' (molecular formula  $C_3H_6O$ ). 'B' forms a shining silver mirror on warming with ammoniacal silver nitrate. 'B' when treated with an aqueous solution of  $H_2NCONHNH_2 \cdot HCl$  and sodium acetate gives a product 'C'. Identify the structure of 'C' [IIT-JEE (Screening) 2002]

- (a)  $CH_3CH_2CH = NNHCONH_2$   
(b)  $CH_3 - CH = NNHCONH_2$   
 $\quad \quad \quad |$   
 $\quad \quad \quad CH_3$   
(c)  $CH_3CH = NCONHNH_2$   
 $\quad \quad \quad |$   
 $\quad \quad \quad CH_3$   
(d)  $CH_3CH_2CH - NCONHNH_2$

7. Which is not true about acetophenone [Manipal 2002]

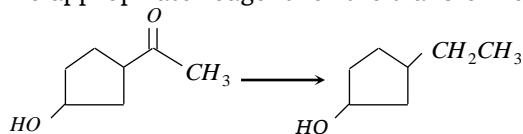
- (a) Reacts to form 2, 4-dinitrophenyl hydrazine  
(b) Reacts with Tollen's reagent to form silver mirror  
(c) Reacts with  $I_2 / NaOH$  to form iodoform  
(d) On oxidation with alkaline  $KMnO_4$  followed by hydrolysis gives benzoic acid

8. The enol form of acetone, after treatment with  $D_2O$ , gives

[IIT-JEE (Screening) 1999]

- (a)  $CH_3 - \overset{OD}{\underset{|}{C}} = CH_2$  (b)  $CD_3 - \overset{O}{\underset{||}{C}} - CD_3$   
(c)  $CH_2 = \overset{OH}{\underset{|}{C}} - CH_2D$  (d)  $CD_2 = \overset{OD}{\underset{|}{C}} - CD$

9. The appropriate reagent for the transformation



[IIT-JEE (Screening) 2000]

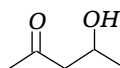
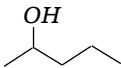
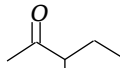
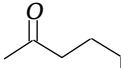
- (a)  $Zn(Hg), HCl$  (b)  $NH_2NH_2 \cdot OH^-$   
(c)  $H_2 / Ni$  (d)  $NaBH_4$

10. Which of the following has the most acidic hydrogen

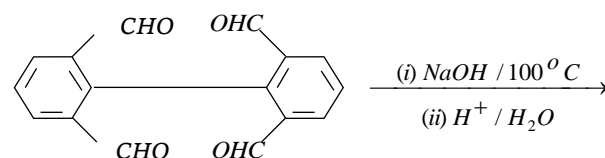
[IIT-JEE (Screening) 2000]

- (a) 3-hexanone (b) 2, 4-hexanedione  
(c) 2, 5-hexanedione (d) 2, 3-hexanedione

11. Which of the following will be most readily dehydrated in acidic conditions [IIT-JEE (Screening) 2000]

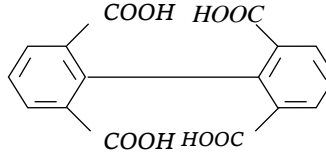
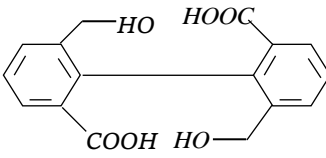
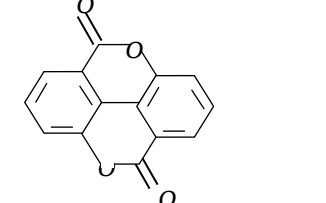
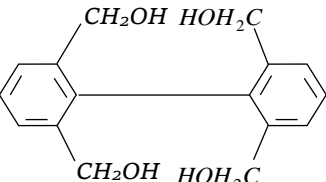
- (a)  (b)   
(c)  (d) 

12.



Major Product is

[IIT-JEE (Screening) 2003]

- (a)   
(b)   
(c)   
(d) 

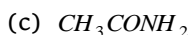
13. Among the given compounds, the most susceptible to nucleophilic attack at the carbonyl group is [IIT 1997]

- (a)  $MeCOCl$  (b)  $MeCHO$   
(c)  $MeCOOMe$  (d)  $MeCOOCOMe$

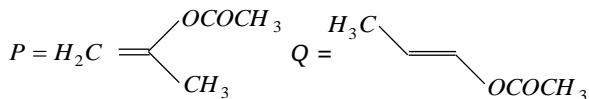
14. Which of the following will give yellow precipitate with  $I_2 / NaOH$



## 1292 Aldehydes and Ketones

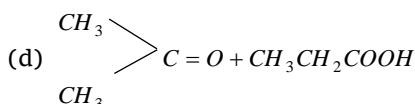
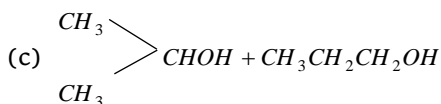
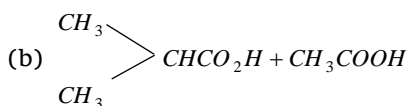
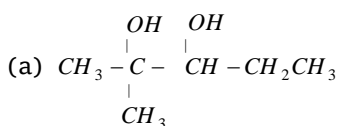


15. The product of acid hydrolysis of P and Q can be distinguished by [IIT-JEE (Screening) 2003]

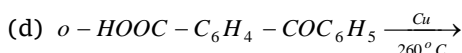
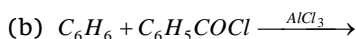
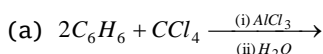


- (a) Lucas Reagent (b) 2,4-DNP  
(c) Fehling's Solution (d)  $NaHSO_3$

16. On vigorous oxidation by permanganate solution  $(CH_3)_2C = CH - CH_2CH_2CH_3$  gives [AIEEE 2002]



17. Which of the following reactions give benzo phenone [Roorkee Qualifying 1998]



18. Aldehyde and ketones can decolourize by [CPMT 2003]

- (a) Bromine water (b) Quick lime  
(c) dil.  $H_2SO_4$  (d) None of these

19. Which of the following statements regarding chemical properties of acetophenone are wrong

- (1) It is reduced to methyl phenyl carbinol by sodium and ethanol  
(2) It is oxidised to benzoic acid with acidified  $KMnO_4$

(3) It does not undergo iodoform electrophilic substitution like nitration at meta position

(4) It does not undergo iodoform reaction with iodine and alkali [Tamil Nadu CET 2001]

- (a) 1 and 2 (b) 2 and 4  
(c) 3 and 4 (d) 1 and 3

20. The product(s) obtained via oxymercuration ( $HgSO_4 + H_2SO_4$ ) of 1-butyne would be [IIT-JEE 1999]

- (a)  $CH_3CH_2COCH_3$   
(b)  $CH_3CH_2CH_2CHO$   
(c)  $CH_3CH_2CHO + HCHO$   
(d)  $CH_3CH_2COOH + HCOOH$

21. The most reactive compound towards formation of cyanohydrin on treatment with  $KCN$  followed by acidification is [GATE 2001]

- (a) Benzaldehyde (b) *p*-Nitrobenzaldehyde  
(c) Phenyl acetaldehyde (d) *p*-Hydroxybenzaldehyde

22. The key step in cannizzaro's reaction is the intermolecular shift of [Orissa JEE 2003]

- (a) Proton (b) Hydride ion  
(c) Hydronium ion (d) Hydrogen bond

23. Benzophenone does not react with [BHU 2003]

- (a)  $RNH_2$  (b)  $SO_3$   
(c)  $NaOH$  (d)  $Na_2CO_3$

24. The most suitable reagent for the conversion of  $RCH_2OH \rightarrow RCHO$  is [AIIMS 2004]

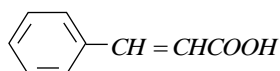
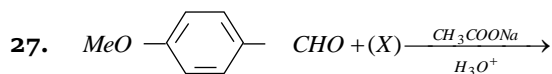
- (a)  $KMnO_4$   
(b)  $K_2Cr_2O_7$   
(c)  $CrO_3$   
(d) PCC (Pyridine chloro chromate)

25. The conversion of acetophenone to acetanilide is best accomplished by using :

- (a) Backmann rearrangement  
(b) Curtius rearrangement  
(c) Lossen rearrangement  
(d) Hofmann rearrangement

26. Which of the following will not give iodoform test ? [UPSEAT 2004]

- (a) Isopropyl alcohol (b) Ethanol  
(c) Ethanal (d) Benzyl alcohol

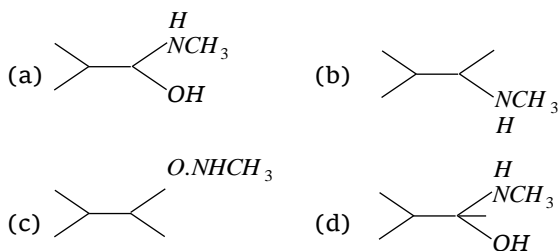
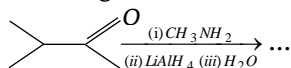


The compound (X) is [IIT-JEE 2005]

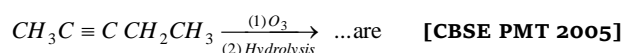
- (a)  $CH_3COOH$  (b)  $BrCH_2 - COOH$

(c)  $(CH_3CO)_2O$  (d)  $CHO - COOH$ 

28. The major organic product formed from the following reaction [CBSE PMT 2005]



29. Products of the following reaction



- (a)  $CH_3CHO + CH_3CH_2CHO$   
 (b)  $CH_3COOH + CH_3CH_2CHO$   
 (c)  $CH_3COOH + HOOCCH_2CH_3$   
 (d)  $CH_3COOH + CO_2$
30. A compound, containing only carbon, hydrogen and oxygen, has a molecular weight of 44. On complete oxidation it is converted into a compound of molecular weight 60. The original compound is [KCET 2005]
- (a) An aldehyde (b) An acid  
 (c) An alcohol (d) an ether

## Assertion & Reason

For AIIMS Aspirants

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.

1. Assertion : Acetic acid does not undergo haloform reaction.  
 Reason : Acetic acid has no alpha hydrogens. [IIT 1998]
2. Assertion : Benzoinitrile is prepared by the reaction of chlorobenzene with potassium cyanide.

Reason : Cyanide ( $CN^-$ ) is a strong nucleophile.

[IIT 1998]

3. Assertion : Lower aldehyde and ketones are soluble in water but the solubility decreases as molecular mass increases.

Reason : Aldehydes and ketones can be distinguished by Tollen's reagent. [AIIMS 1994]

4. Assertion : Acetaldehyde on treatment with alkaline gives aldol.

Reason : Acetaldehyde molecules contains  $\alpha$  hydrogen atom. [AIIMS 1997]

5. Assertion : Acetylene on treatment with alkaline  $KMnO_4$  produce acetaldehyde.

Reason : Alkaline  $KMnO_4$  is a reducing agent.

[AIIMS 2000]

6. Assertion : Acetophenone and benzophenone can be distinguished by iodoform test.

Reason : Acetophenone and benzophenone both are carbonyl compounds. [AIIMS 2002]

7. Assertion : Isobutanal does not give iodoform test

Reason : It does not have  $\alpha$ -hydrogen. [AIIMS 2004]

8. Assertion : Benzaldehyde is more reactive than ethanol towards nucleophilic attack.

Reason : The overall effect of  $-I$  and  $+R$  effect of phenyl group decreases the electron density on the carbon atom of  $>C=O$  group in benzaldehyde.

9. Assertion : Aldol condensation can be catalysed both by acids and bases.

Reason :  $\beta$ -Hydroxy aldehydes or ketones readily undergo acid catalysed dehydration.

10. Assertion : Ketones are less reactive than aldehydes.

Reason : Ketones do not give schiff's test.

11. Assertion : Oximes are less acidic than hydroxyl amine.

Reason : Oximes of aldehydes and ketones show geometrical isomerism.

12. Assertion : The bond energy of  $>C=O$  is less than

$>C=C<$  in alkenes.

Reason : The carbon atom in carbonyl group is  $sp^2$  hybridised.

13. Assertion :  $R-C \equiv O^+$  is more stable than  $R-C^+=O$ .

Reason : Resonance in carbonyl compound provides  $C^+$  and  $O^-$ .

14. Assertion : Formaldehyde cannot be prepared by Rosenmund's reduction.

## 1294 Aldehydes and Ketones

Reason : Acid chlorides can be reduced into aldehydes with hydrogen in boiling xylene using palladium or platinum as a catalyst supported on barium sulphate. This is known as Rosenmund's reduction.

15. Assertion :  $CH_3CHO$  reacts with  $NH_3$  to form urotropine.

Reason : Urotropine is used as medicine in case of urinary troubles.

16. Assertion :  $\alpha$ -Hydrogen atoms in aldehydes and ketones are acidic.

Reason : The anion left after the removal of  $\alpha$ -hydrogen is stabilized by inductive effect.

17. Assertion : 2, 2-Dimethyl propanal undergoes Cannizzaro reaction with concentrated  $NaOH$ .

Reason : Cannizzaro is a disproportionation reaction.

18. Assertion : Benzaldehyde undergoes aldol condensation.

Reason : Aldehydes that do not have  $\alpha$ -hydrogen undergo aldol condensation.

# Answers

## Introduction

1	a	2	b	3	a	4	c	5	a
6	c	7	b	8	b	9	a	10	b
11	b	12	d	13	d	14	b	15	a
16	c	17	c	18	c				



## Aldehydes and Ketones 1293

### Preparation

1	c	2	c	3	d	4	b	5	b,c
6	c	7	c	8	d	9	c	10	c
11	c	12	a	13	a	14	d	15	d
16	c	17	a	18	d	19	c	20	b
21	c	22	a	23	c	24	c	25	c
26	d	27	c	28	b	29	a	30	b
31	c	32	d	33	b	34	b	35	a
36	d	37	d	38	c	39	b	40	c
41	d	42	a	43	a				

### Properties

1	c	2	c	3	a	4	a	5	c
6	d	7	a	8	c	9	c	10	b
11	c	12	a	13	a	14	b	15	d
16	b	17	c	18	c	19	abd	20	abcd
21	b	22	a	23	a	24	b	25	d
26	b	27	d	28	c	29	b	30	b
31	c	32	c	33	d	34	d	35	c
36	b	37	a	38	b	39	d	40	c
41	d	42	a	43	d	44	d	45	a
46	c	47	c	48	a	49	b	50	b
51	b	52	c	53	d	54	b	55	c
56	d	57	c	58	a	59	c	60	c
61	b	62	b	63	a	64	b	65	a
66	d	67	a	68	a	69	c	70	a
71	c	72	d	73	a	74	a	75	a
76	d	77	c	78	b	79	a	80	b
81	c	82	c	83	c	84	a	85	d
86	a	87	d	88	a	89	d	90	d
91	b	92	b	93	a	94	c	95	c
96	a	97	b	98	d	99	a	100	c
101	c	102	d	103	d	104	d	105	a
106	e	107	b	108	c	109	a	110	c
111	a	112	a	113	c	114	b	115	d
116	c	117	b	118	a	119	c	120	c
121	d	122	d	123	d	124	c	125	c
126	d	127	c	128	a	129	a	130	a
131	c	132	a	133	a	134	b	135	b
136	a	137	b	138	b	139	d	140	a
141	a	142	b	143	b	144	d	145	b
146	d	147	b	148	b	149	b	150	c
151	a	152	a	153	c	154	c	155	b
156	a	157	d	158	d	159	c	160	a
161	c	162	c	163	d	164	d	165	c

166	d	167	a	168	b	169	c	170	a
171	a	172	c	173	b	174	a	175	a
176	e	177	b						

### Critical Thinking Questions

1	d	2	bc	3	b	4	c	5	a
6	a	7	b	8	b	9	b	10	b
11	a	12	b	13	a	14	a,d	15	c
16	d	17	b,d	18	d	19	c	20	a
21	b	22	b	23	d	24	d	25	a
26	d	27	c	28	b	29	c	30	a

### Assertion & Reason

1	c	2	d	3	b	4	a	5	d
6	b	7	c	8	a	9	b	10	b
11	e	12	e	13	b	14	b	15	e
16	c	17	b	18	d				

# AS Answers and Solutions

### Introduction

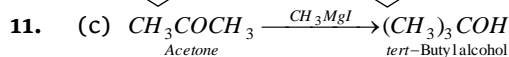
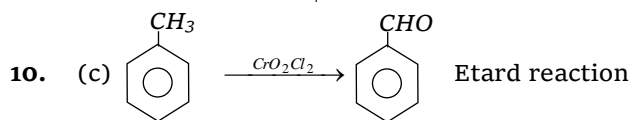
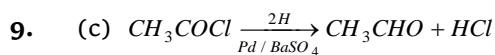
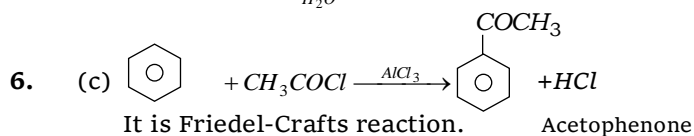
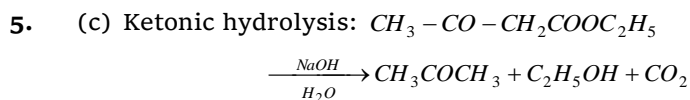
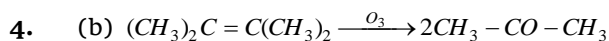
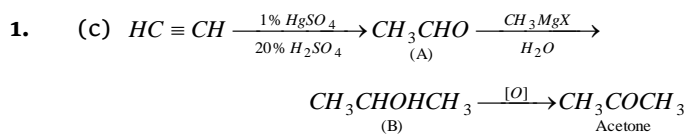
- (a) 
$$\text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} - \text{H} + \text{HCN} \longrightarrow \text{CH}_3 - \overset{\text{OH}}{\underset{\text{CN}}{\mid}}{\text{C}} - \text{H}$$
Acetaldehyde      Hydrogen Cyanide      Acetaldehyde Cynohydrin (optically active)
- (b)  $> \text{C} = \text{O}$   
 $sp^2$  hybridised
- (b)  $\text{CH}_3 \overset{\text{O}}{\parallel} \text{CCH}_3$   
2 propanone
- (b)  $\text{CHOCHO}$
- (b)  $\text{R} \overset{\sigma}{\searrow} \text{C} \overset{\pi}{=} \text{O}$   
 $\sigma$        $\sigma$
- (d)  $\text{Cl} - \overset{\text{Cl}}{\underset{\text{Cl}}{\mid}}{\text{C}} - \overset{\text{O}}{\parallel}{\text{C}} - \text{H}$   
2, 2, 2, trichloroethanal
- (c) Among Carbonyl Compounds, reactivity decrease with increase in alkyl groups as alkyl groups (+I effect) decrease positive character on C-atom. Thus, the correct order of reactivity is



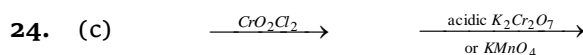
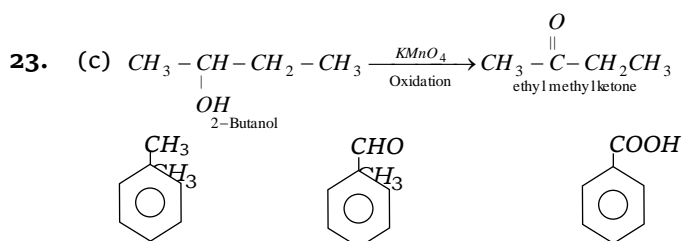
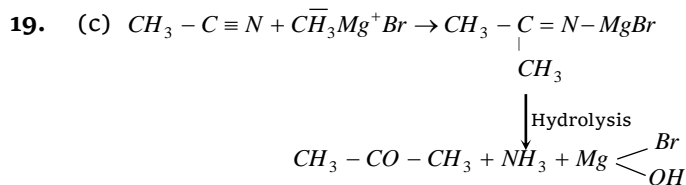
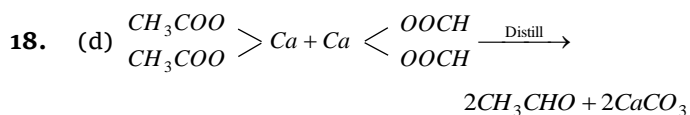
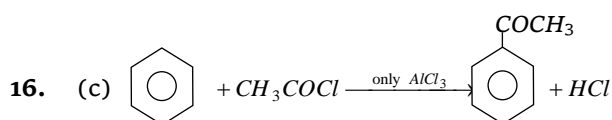
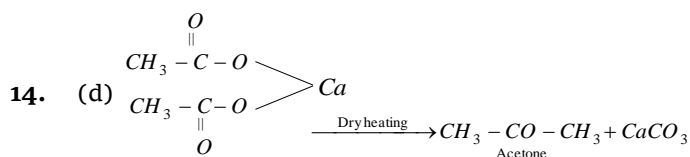
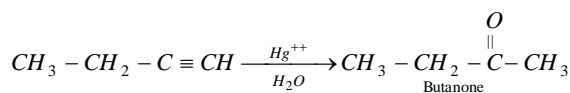
## 1294 Aldehydes and Ketones



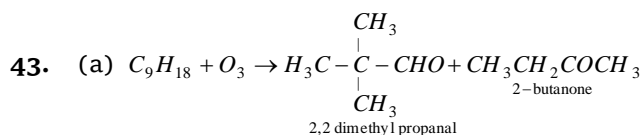
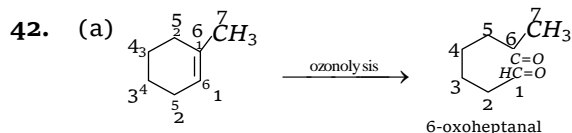
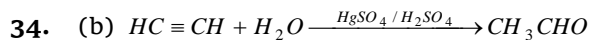
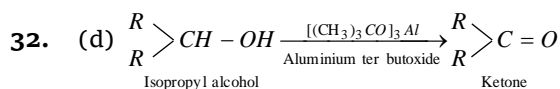
### Preparation



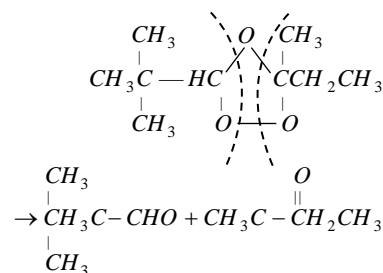
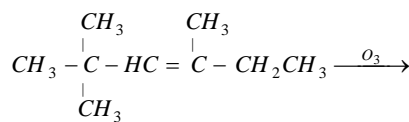
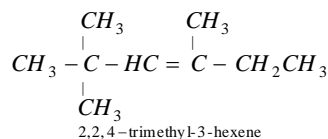
13. (a) It is hydration of alkynes.



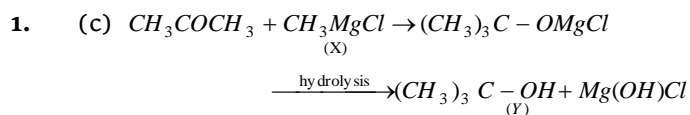
This is Etard's reaction



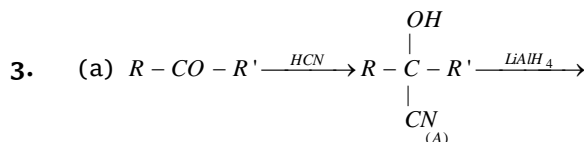
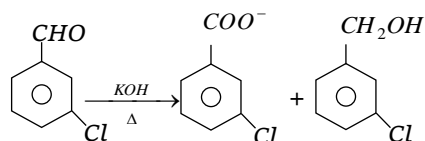
On the basis of product formation, it would be alkene

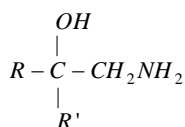


### Properties

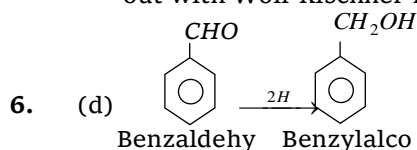


2. (c) It is cannizzaro reaction -2

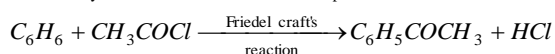




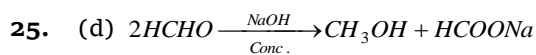
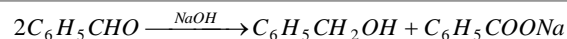
5. (c) Reduction of  $>\text{C}=\text{O}$  to  $\text{CH}_2$  can be carried out with Wolf Kischner reduction.



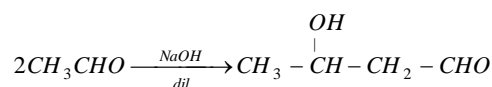
- on reduction it gives benzylalcohol and not phenol.



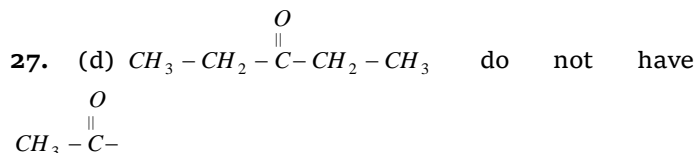
10. (b) Wolf-Kishner reduction does not convert  $>\text{CO}$  to  $\text{CHOH}$  but converts it to  $>\text{CH}_2$ .
11. (c) Although both  $\text{CH}_3\text{CH}_2\text{COCH}_3$  and  $(\text{CH}_3)_3\text{CCOCH}_3$  contain  $\alpha$ -hydrogen, yet  $(\text{CH}_3)_3\text{CCOCH}_3$  does not undergo Aldol condensation due to steric hindrance.
12. (a)  $\text{C}_6\text{H}_5\text{CHO} \xrightarrow[\text{H}^+ / \text{H}_2\text{O}]{\text{CH}_3\text{MgBr}}$   $\text{C}_6\text{H}_5\text{CH}(\text{OH})\text{CH}_3$   
 Benzaldehyde 2°Alcohol
13. (a) Chloral  $\text{CCl}_3\text{CHO}$ , has no  $\alpha$ -hydrogen atom and hence does not undergo aldol condensation.
14. (b) Among the given compounds only acetone gives crystalline coloured derivative with 2, 4 DNP.
15. (d) Ethanal among the given compounds gives positive iodoform test.
17. (c)  $2\text{CH}_3\text{CHO} \xrightarrow[\text{NaOH}]{\text{dil.}}$   $\text{CH}_3-\overset{\text{OH}}{\text{C}}-\text{CH}_2\text{CHO}$
18. (c)  $\text{C}_2\text{H}_5\text{CHO} + 2\text{Cu}^{+2} + 5\text{OH}^- \rightarrow \text{Cu}_2\text{O} + 3\text{H}_2\text{O} + \text{C}_2\text{H}_5\text{COO}^-$   
 Red ppt
19. (abd) Deuterium behaves like  $\text{H}$  and hence trideuteroacetaldehyde also undergoes aldol condensation but benzaldehyde does not since it has no  $\alpha$ -hydrogen.
21. (b)  $1^\circ$  Primary alcohol  $\xrightarrow{\text{ZnCl}_2 / \text{HCl}}$  White turbidity only heating  
 $2^\circ$  Alcohol  $\xrightarrow{\text{ZnCl}_2 / \text{HCl}}$  White turbidity after 5 min heating  
 $3^\circ$  Alcohol  $\xrightarrow{\text{ZnCl}_2 / \text{HCl}}$  easily in seconds
24. (b) Benzaldehyde on treatment with 50% aqueous or ethanolic alkali solution undergoes Cannizzaro's reaction like  $\text{HCHO}$  (no  $\alpha$ -hydrogen atom) i.e., one molecule is oxidised and one is reduced with the formation of benzoic acid and benzyl alcohol respectively.



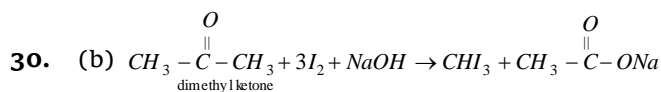
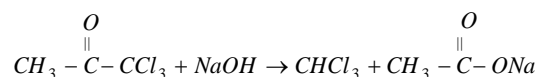
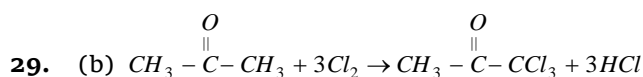
It is a Cannizzaro's reaction.



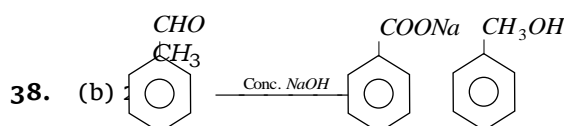
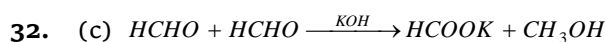
It is aldol condensation reaction.



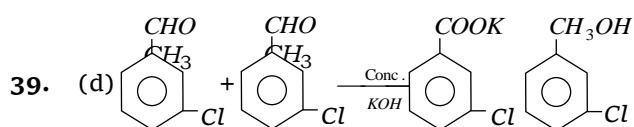
group



31. (c)  $\text{CHI}_3$  is yellow compound when iodine reacts with  $\text{NaOH}$  and ketone.

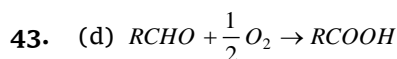


This reaction is called as Cannizzaro's reaction.



41. (d) The solution represented is fehling's and it has no tendency to oxidise benzaldehyde.

42. (a) Increasing alkyl group the reactivity decreases.



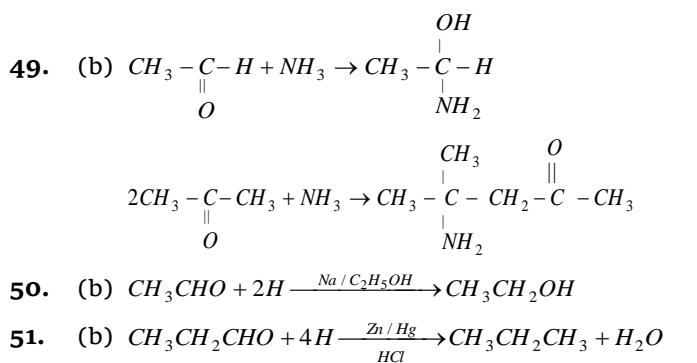
44. (d) All test for Aldehyde because ketone require strong oxidising agent.



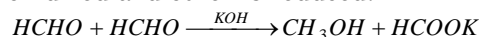
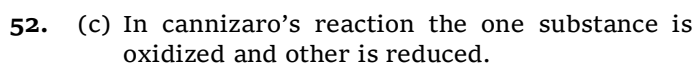
45. (a) Silver mirror test is the test of aldehyde.



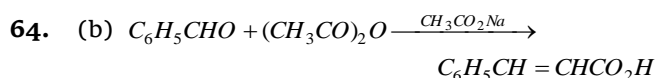
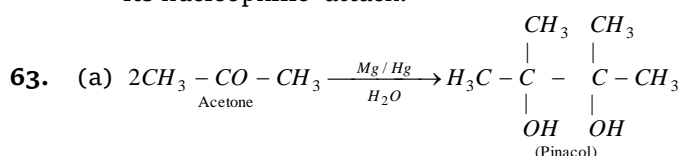
## 1296 Aldehydes and Ketones



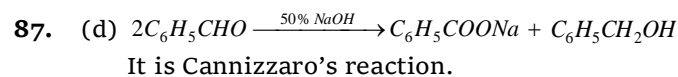
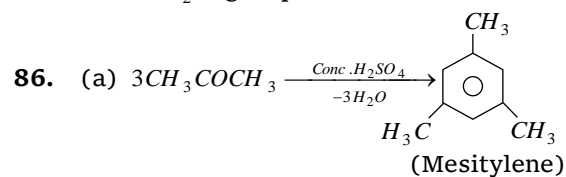
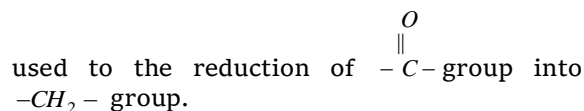
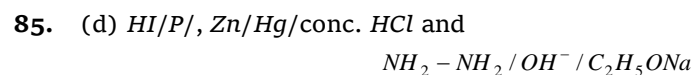
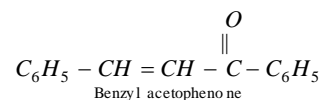
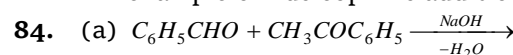
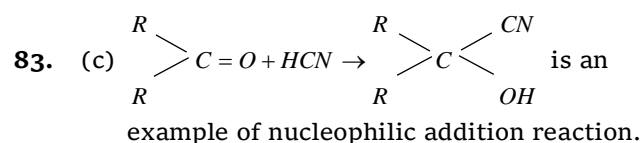
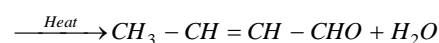
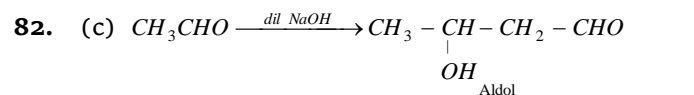
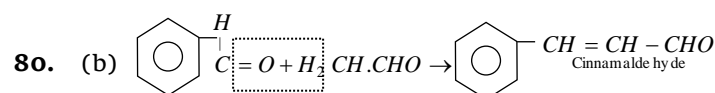
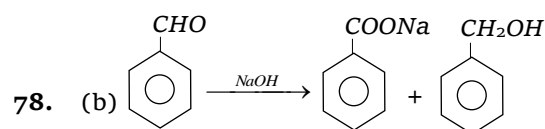
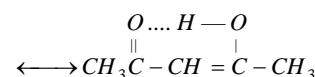
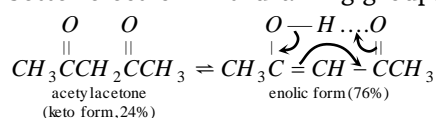
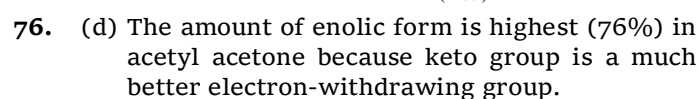
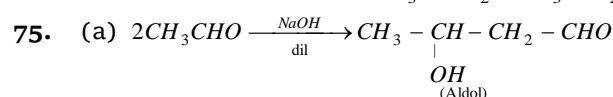
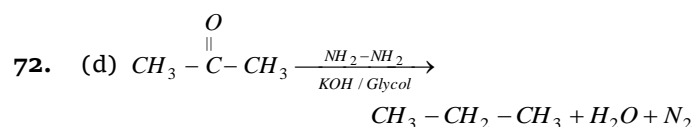
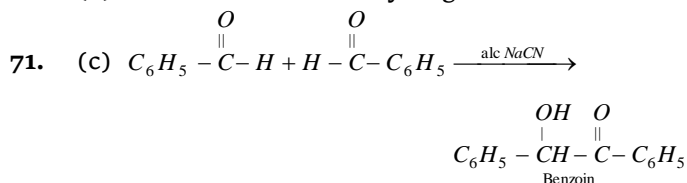
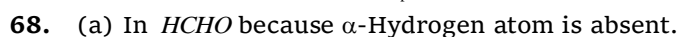
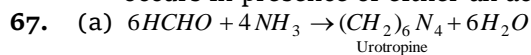
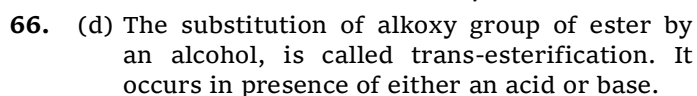
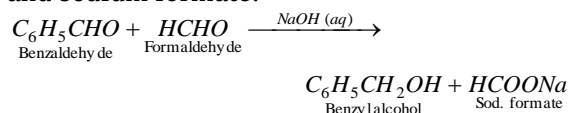
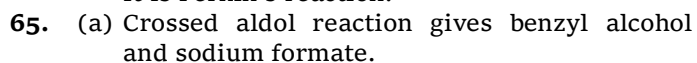
This reaction is called Clemmenson's reduction.



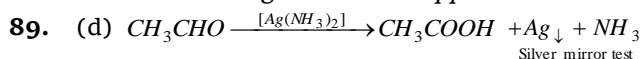
55. (c) Nucleophilic addition of  $HCN, NaHSO_3$  etc.
57. (c) Addition of  $HCN$  to carbonyl compounds is an example of nucleophilic addition.
58. (a) Acetone forms sodium bisulphate adduct but acetophenone does not. Aromatic ketones do not give addition product with  $NaHSO_3$ .
59. (c)  $C_6H_5CHO + Cl_2 \rightarrow C_6H_5COCl + HCl$   
Benzaldehyde Benzoyl chloride
60. (c)  $CH_3 \rightarrow \overset{\cdot\cdot}{O} \leftarrow CH_3$  The electron density of oxygen is highly increased therefore resistant to its nucleophilic attack.



It is Perkin's reaction.

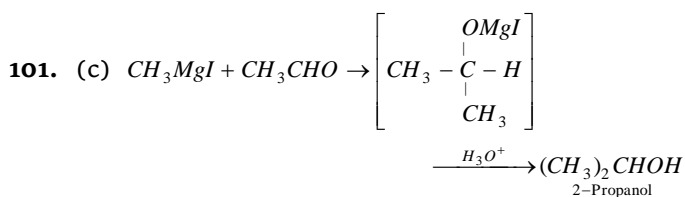
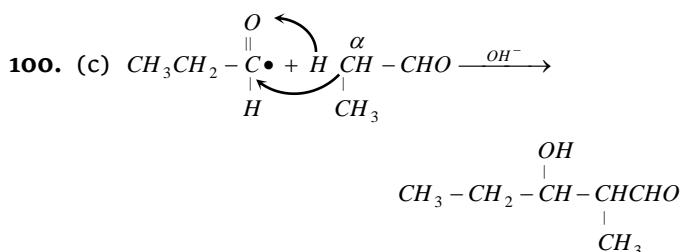
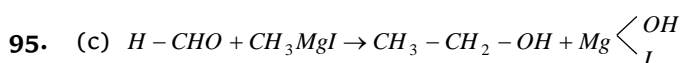
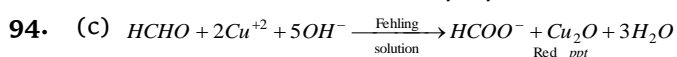
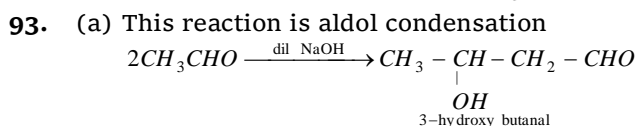
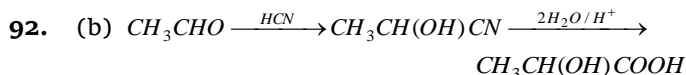
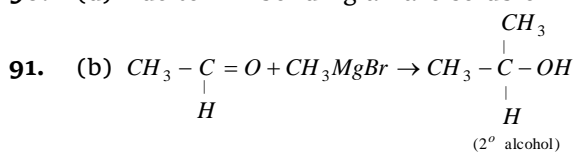


88. (a) Because acetone require stronger oxidising agent and hence not oxidized with Fehling solution to give brick red ppt.

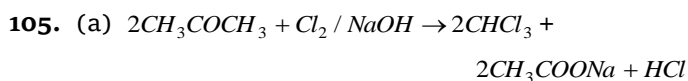
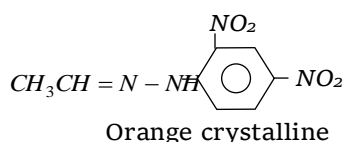
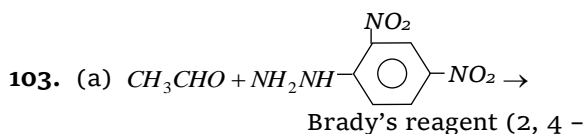


While acetone do not react.

90. (d) Due to H-bonding all are soluble in water.



102. (d) Cannizzaro's reaction involve self oxidation and self reduction.



106. (e) Fehling solution  $\Rightarrow$  Alkaline  $CuSO_4 + Na - K$  tartarate

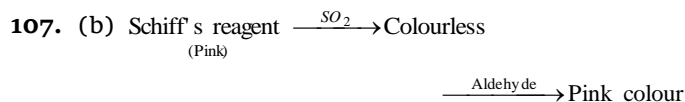
Tollen's reagent  $\Rightarrow NH_4OH + AgNO_3$

Schiff's reagent  $\Rightarrow$  P-rosaniline hydrochloride or magenta

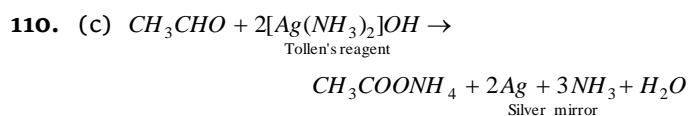
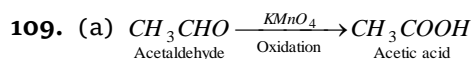
Benedict's solution  $\Rightarrow$  Alkaline  $CuSO_4 +$  Citrate

ions

All these reagents are used to distinguish between aldehydes and ketones. Aldehydes reacts with all these reagents while ketones do not react.

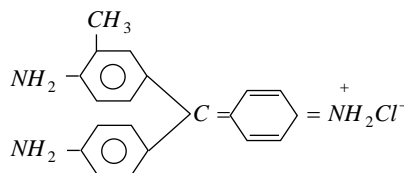


108. (c)  $CH_3 - \overset{\beta}{CH_2} - \overset{\alpha}{CHO}$  aldehydes having  $\alpha - H$  atom can participate in aldol condensation. The H-atom attached to  $\alpha$  carbon atom are called  $\alpha$ -hydrogen.

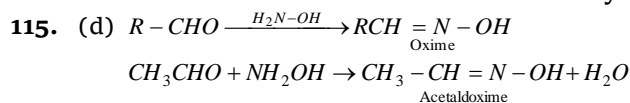


112. (a) It is used as a medicine to treat urinary infections.

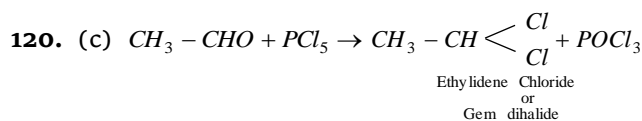
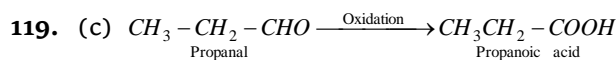
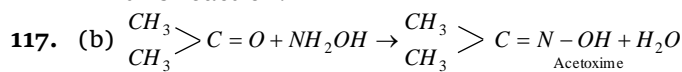
113. (c) p-rosaniline hydrochloride.



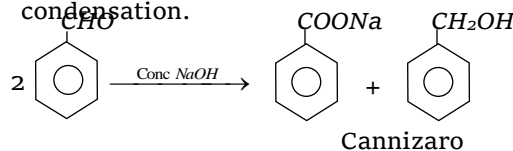
It is used for the identification of aldehydes.



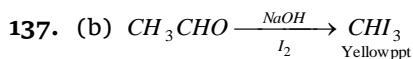
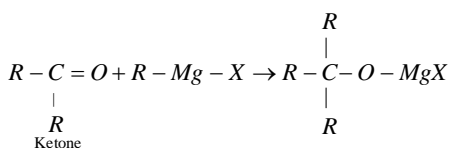
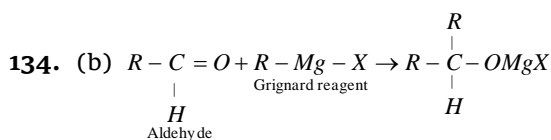
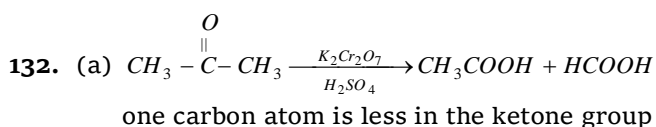
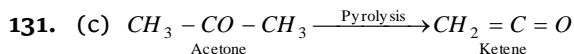
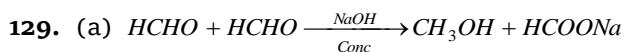
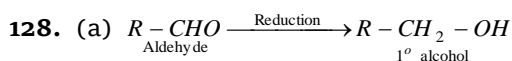
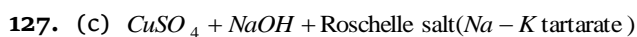
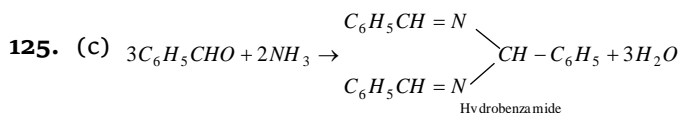
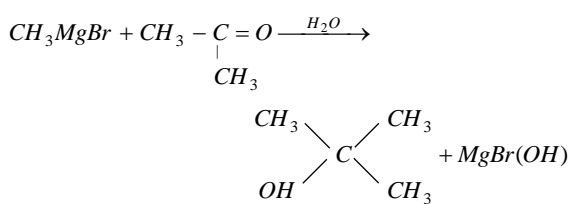
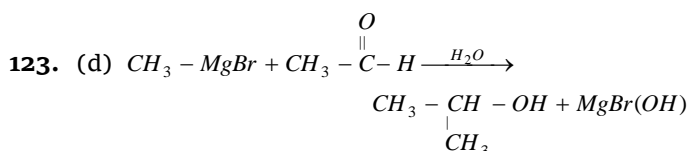
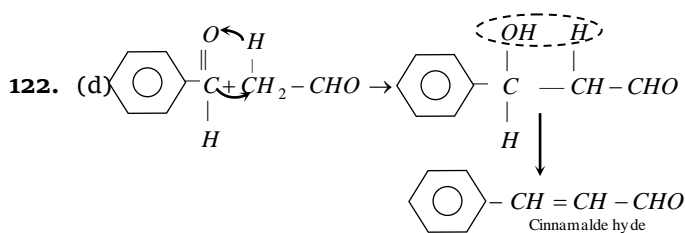
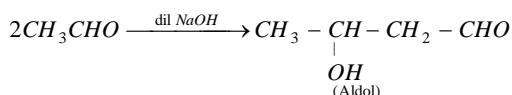
116. (c) Cannizzaro's reaction is shown by aldehydes in which  $\alpha - H$  atom is absent.  $CH_3CHO$  contains 3,  $\alpha - H$  atoms thus, does not show this reaction.



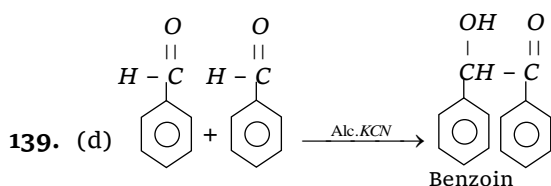
121. (d) Benzaldehyde gives cannizzaro's reaction whereas acetaldehyde gives aldol condensation.



## 1298 Aldehydes and Ketones



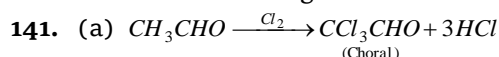
138. (b) Fehling solution is a weak oxidising agent therefore unable to oxidise benzaldehyde.



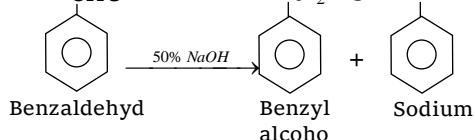
This reaction is called benzoin condensation.



Ketone do not give this test.

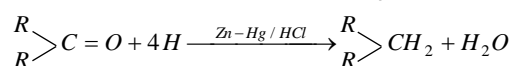
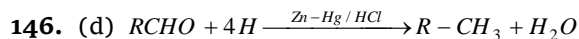
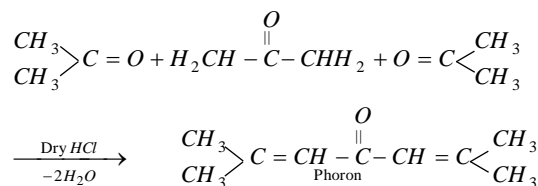


143. (b) Benzaldehyde will undergo Cannizzaro's reaction on treatment with 50% NaOH to produce benzyl alcohol and benzoic acid as it does not contain  $\alpha$ -hydrogen

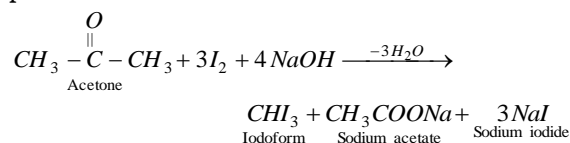


144. (d) Butane 2-one will get reduced into butane when treated with Zinc and hydrochloric acid following Clemmensen reduction, whereas Zn/HCl do not reduce ester, acid, amide

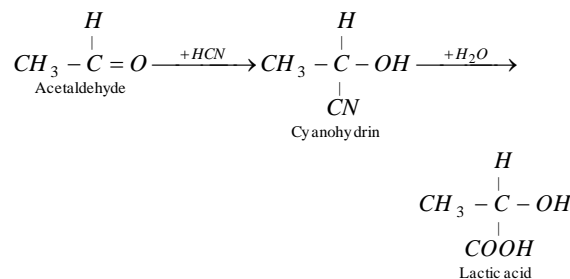
145. (b) Phoron



147. (b) Acetone on iodination gives iodoform in the presence of NaOH

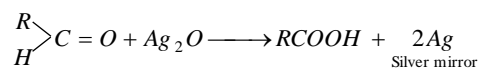


148. (b) We know that



Thus Lactic acid is formed.

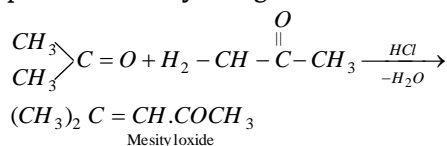
149. (b) Tollen's reagent is used to detect aldehydes. Aldehyde reduce Tollen's reagent to give Silver mirror while these are oxidised to acid.



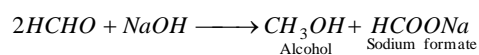
150. (c) Only aliphatic aldehyde reduce fehling solution. Hence, acetaldehyde give red ppt. with fehling solution.



151. (a) Two molecules of acetone condense in presence of dry  $HCl$  gas to form mesityl oxide.



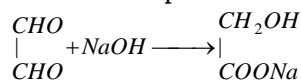
152. (a) Formaldehyde and  $NaOH$  reacts to produce alcohol and sodium salt of an acid.



This reaction is Cannizzaro's reaction

153. (c) Acetaldehyde reduces Fehling solution giving red ppt. while acetone do not.

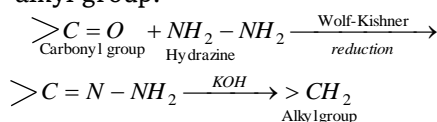
154. (c) It is an example of Cannizzaro reaction



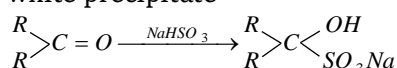
155. (b)  $R-\overset{+\delta}{\text{C}}-\overset{\ominus\delta}{\text{H}}$ ; Susceptibility of nucleophilic attack

on aldehyde is decreased by electron releasing effect of  $R$  group. Decreasing order of aldehyde towards nucleophilic attack is  $1^\circ > 2^\circ > 3^\circ R$  group.

156. (a) Wolf kischner reduction : Hydrazine ( $NH_2-NH_2$ ) followed by reaction with strong base like  $KOH$  reduce carbonyl group into alkyl group.



157. (d) Ketones and Aldehyde add to  $NaHSO_3$  to give white precipitate



158. (d) Fehling's solution is the solution of  $CuSO_4 + NaOH +$  Roschel salt (Sodium potassium tartarate). Aldehyde give red precipitate with Fehling's solution.

159. (c) It reduce  $-CHO$  group into hydrocarbon.

160. (a) Molecular weight of the compound

$$= 2 \times \text{Vapour density}$$

$$= 2 \times 29 = 58$$

Molecular weight of  $CH_3CH_2CHO$ ,  $CH_3CHOHCH_3$ ,  $CH_3COCH_3$  and  $CH_3CH_2COOH$  are 58, 60, 58 and 74 respectively. Both  $CH_3CH_2CHO$  and  $CH_3COCH_3$  have molecular weight 58 but only aldehyde i.e.,  $CH_3CH_2CHO$  on warming with aqueous alkali gives yellow precipitate.

161. (c)  $CH_3-CH_2-\overset{\text{OH}}{\text{CH}}-CH_3$  contain  $CH_3-\overset{\text{OH}}{\text{CH}}$  group

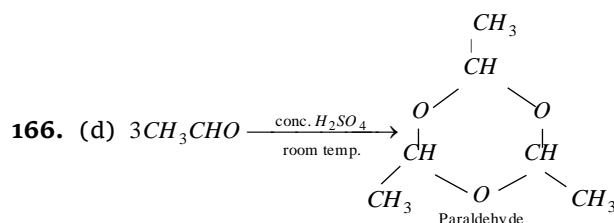
by which it give +ve iodoform test.

162. (c) In nucleophilic addition reaction, the carbonyl compound will respond in preference which is sterically more exposed and electronically have intact positive charge over carbonyl carbon. So reactivity order towards reaction with  $phMgBr$  is (II) > (III) > (I).

163. (d) Tollen's reagent oxidizes the compound having aldehyde group like glucose and also oxidizes  $\alpha$ -hydroxy ketones having  $-COCH_2OH$  group as in fructose.

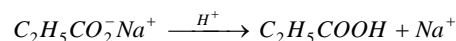
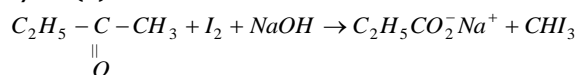
164. (d) Acetaldehyde have  $CH_3CO-$  group so it give positive iodoform test with  $I_2$  and  $NaOH$  while formaldehyde does not have  $-CH_3CO$  group so it will not give the positive haloform test.

165. (c) Aldehyde reduce silver mirror whereas acid do not reduce silver mirror.

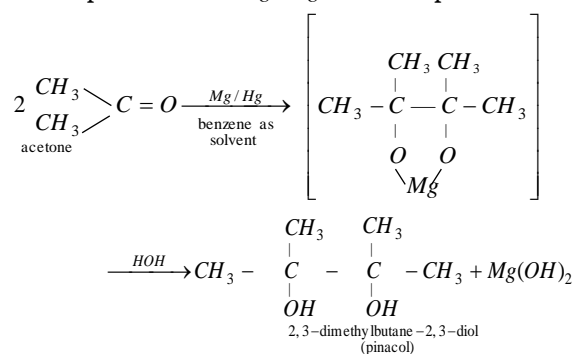


168. (b) Formaline contains 40%  $HCHO$ , 8%  $CH_3OH$  and 52% water. It is used as biological preservative.

172. (c)

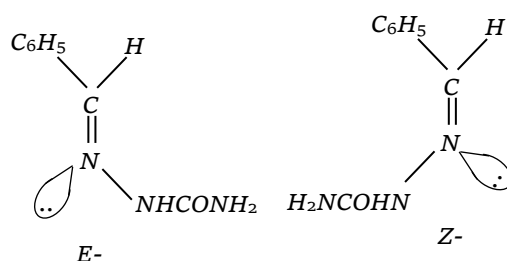


173. (b) Two molecules of ketones undergo reduction in the presence of  $Mg/Hg$  to form pinacol.

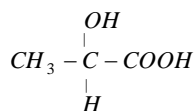
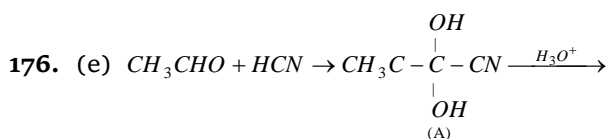
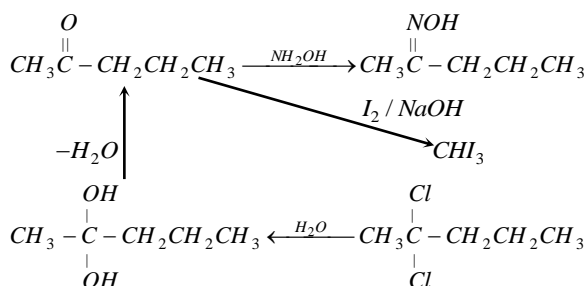


174. (a)  $C_6H_5CH=O + H_2NNHCONH_2 \rightarrow C_6H_5CH=NNHCONH_2$
- semicarbazone

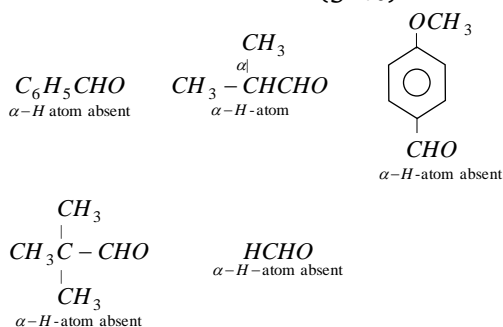
The product shows  $E$  and  $Z$  configuration



175. (a) As A reacts with hydroxylamine it means A may be aldehyde or ketone. but it does not react with fehling solution hence A must be a ketone. Secondly it forms iodoform which is a characteristic reaction of methyl ketone.

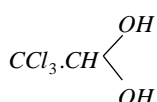


177. (b) Aldehyde, which does not have the  $\alpha$ -H atom, gives cannizzaro's reaction on heating with conc. alkali solution (50%)

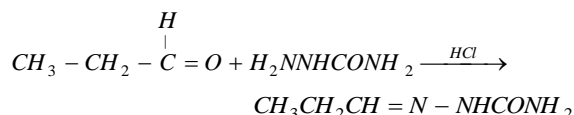
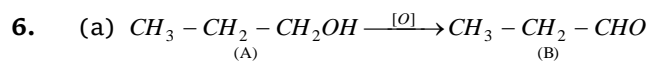
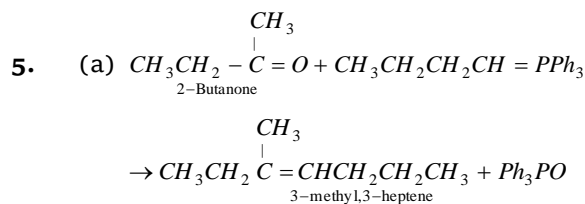


### Critical Thinking Questions

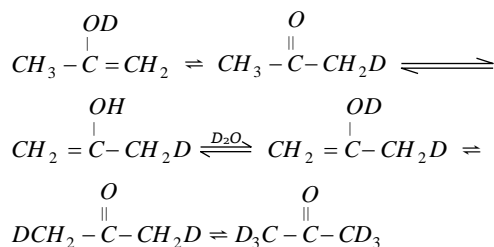
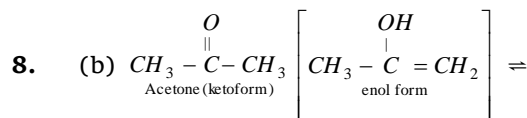
- (d) Acetone oxidise by  $\text{K}_2\text{Cr}_2\text{O}_7$  & conc.  $\text{H}_2\text{SO}_4$  into carboxylic acid. It is not oxidised by dilute  $\text{H}_2\text{SO}_4$ .
- (b) Acetaldehyde react with tollens's reagent while ketone do not react with tollens's reagent.
- (b)  $\text{CCl}_3-\text{CHO} + \text{H}_2\text{O} \rightarrow \text{CCl}_3\cdot\text{CHO}\cdot\text{H}_2\text{O} \rightarrow$   
(Chloral hydrate)



- (c) The compound A with formula  $\text{C}_3\text{H}_6\text{O}$  gives iodoform test, it is propanone forms a compound B having carbon atoms three times, the number of carbon atoms in propanone, it is 2, 6-dimethyl-2, 5-heptadien-4-one.

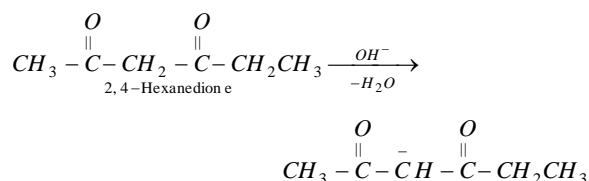


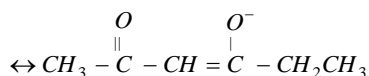
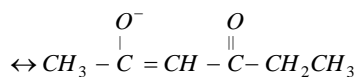
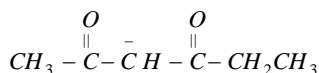
- (b) Acetophenone is a ketone and does not react with Tollen's reagent to give silver mirror.



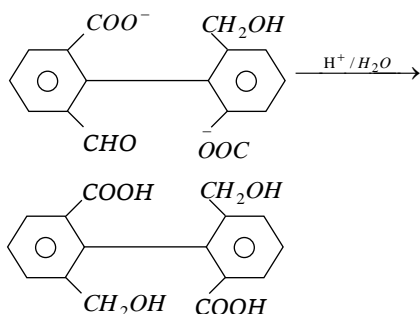
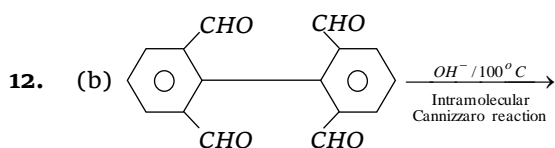
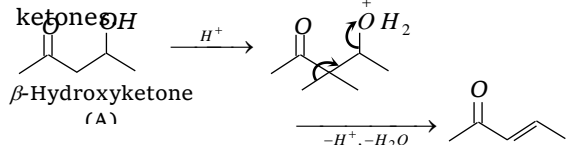
The enol form of acetone on treatment with  $\text{D}_2\text{O}$  undergoes enolisation, deuteration (addition of  $\text{D}_2\text{O}$ ) and dehydration (removal of  $\text{H}_2\text{O}$ ). The repeated enolisation, deuteration and dehydration ultimately gives  $\text{CD}_3\cdot\text{COCD}_3$  (B).

- (b) Both  $\text{Zn}(\text{Hg}), \text{HCl}$  and  $\text{NH}_2\text{NH}_2, \text{OH}^-$  can reduce  $-\text{COCH}_3$  group to  $-\text{CH}_2-\text{CH}_3$  group, but  $\text{HCl}$  will also bring about dehydration of alcohol to form alkene. Therefore, appropriate reagent for the conversion is  $\text{NH}_2\text{NH}_2, \text{OH}^-$ .
- (b) 2, 4-hexanedione (a 1, 3-diketone) has the most acidic hydrogen. This is because the carbanion left after the removal of  $\text{H}^+$  is resonance stabilised in this case.

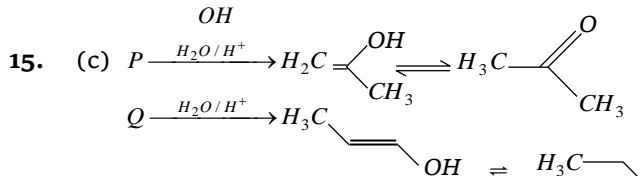
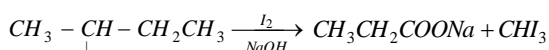
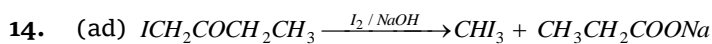




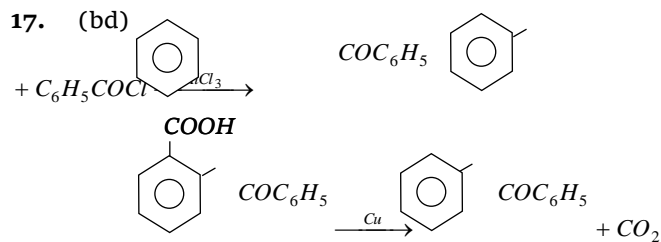
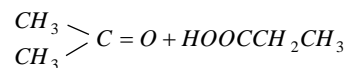
11. (a) Aldols ( $\beta$ -hydroxy aldehydes or  $\beta$ -hydroxyketones) readily undergo dehydration to form  $\alpha, \beta$ -unsaturated aldehydes or ketones.



13. (a) Amongst aldehyde & the acid derivatives, acid chloride are the most susceptible to nucleophilic attack due to strong  $-I$  effect & weak  $+R$  effect of the  $Cl$ -atom as a result of which carbonyl carbon has the highest electron deficiency. The actual order is  $MeCOCl > MeCOOCOMe > MeCOOMe > MeCHO$ .

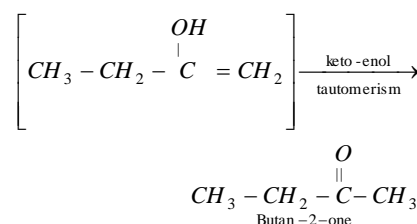
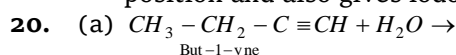


Ketone (non-reducing) and aldehyde (reducing) can be distinguished by Fehling solution.



18. (d) Aldehyde & ketone are colourless & stable compound

19. (c) It undergoes electrophilic substitution at  $m$ -position and also gives iodoform test.

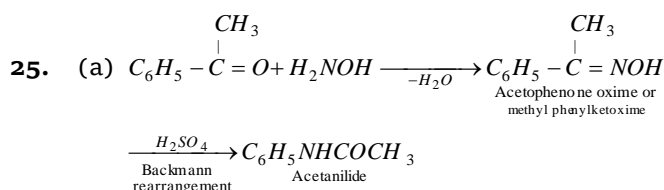


21. (b) Due to electron withdrawing nature of  $NO_2$  group, the partial  $+ve$  charge on the carbon atom of the  $>C=O$  group in  $p$ -nitrobenzaldehyde increases and hence becomes more susceptible to nucleophilic attack by  $CN^-$  ion.

22. (b) Cannizzaro reaction is an example of hydride ion ( $H^-$ ) transfer reaction.

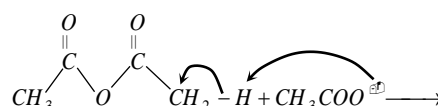
23. (d) Except  $Na_2CO_3$  benzophenone react with rest of option.

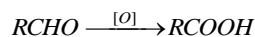
24. (d) The alcohol can be converted to aldehyde group by treating with oxidising agent Pyridinium chloro chromate ( $C_6H_5N^+HCrO_3Cl^-$ ) it is abbreviated as  $PCC$  and is called Collins' reagent. This reagent is used in non aqueous solvent like  $CH_2Cl_2$ . It is a very good reagent because it checks the further oxidation of aldehyde to carboxylic acid while rest oxidising agent oxidise aldehyde into carboxylic acid.



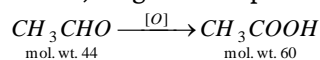
26. (d) Benzyl alcohol does not have the  $CH_3CO-$  group or  $CH_3CH_2O^-$  so it will not give the positive iodoform test.

27. (c) This is perkin reaction





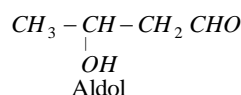
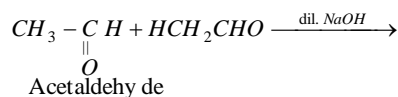
Hence, original compound must be



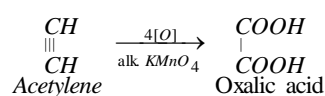
### Assertion & Reason

3. (b) It is true that lower aldehyde and ketones are soluble in water but as the molecular mass increases their solubility decreases. On adding Tollen's reagent to a solution of Carbonyl compound if silver mirror is obtained then it is aldehyde. Therefore Tollen's reagent is used for the identification of aldehydes and ketones. Here, assertion and reason both are true but the reason is not the correct explanation of assertion.

4. (a) Carbonyl compounds having  $\alpha$ -hydrogen atom condenses to produce aldol in presence of alkali.



5. (d) Acetylene, on treatment with alkaline  $KMnO_4$  is oxidised to produce oxalic acid.



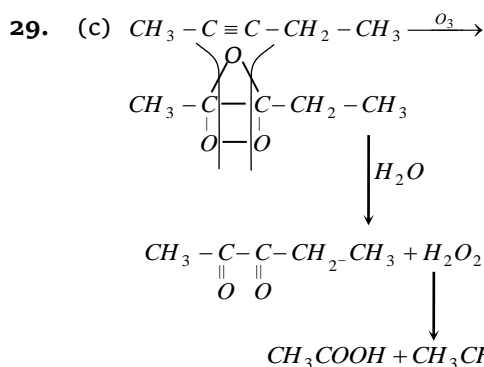
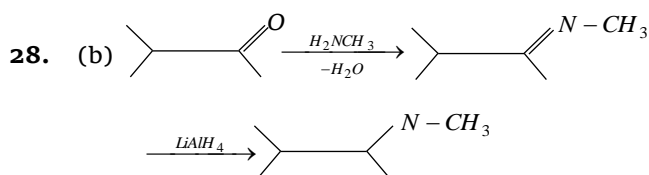
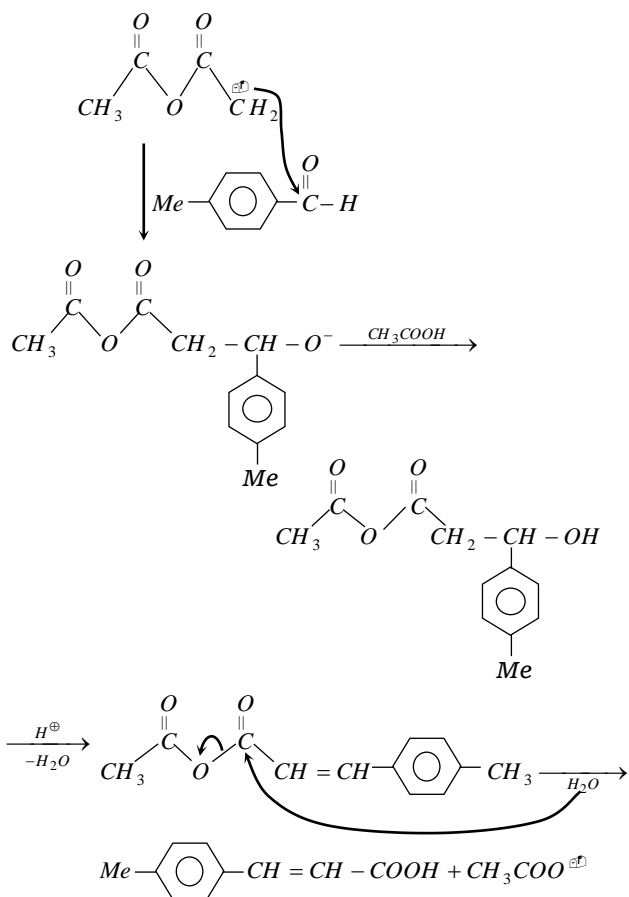
Therefore, both assertion and reason are false.

6. (b) Acetophenone and benzophenone can be distinguished by iodoform test. Both are carbonyl compounds. Assertion and reason both are true but reason is not the correct explanation of assertion.

7. (c)  $\begin{array}{l} CH_3 \\ \diagdown \\ CH \\ \diagup \\ CH_3 \end{array} - CHO$

Isobutanol has  $\alpha$ -hydrogen atom.

Acetaldehyde, acetone and methyl ketones having  $CH_3CO$  group undergo haloform reaction. The halogen atoms of the methyl group are first replaced by hydrogen atoms. This reaction is used as a test of  $CH_3CO-$

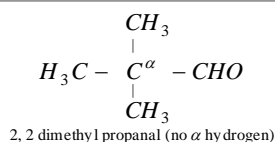


30. (a) On complete oxidation the obtained compound shows increment in molecular weight of only 16. It means only one oxygen atom is added here. This condition is fulfilled by only aldehyde which on oxidation gives acid.

group. Due to absence of  $CH_3CO$ -group isobutanal does not give iodoform test.

8. (a) Benzaldehyde is less reactive than ethanol towards nucleophilic attack. The combined effect of  $-I$  and  $+R$  effect of phenyl group is electron donating which increases the electron density on the carbon atom of the  $C=O$  in benzaldehyde.

9. (b) Both carbanions (formed in presence of base) and enol form (formed in presence of an acid) act as nucleophiles and hence add on the carbonyl group of aldehydes and ketones to give aldols.
10. (b) The positive inductive effect of two alkyl groups in ketones makes the carbon atom less positive and makes it less reactive in comparison to aldehydes.
11. (e) Oximes are more acidic because, there is a delocalisation of  $\pi$  electrons (*i.e.*, resonance) and it stabilises it and its conjugate acid. But no such resonance exists in hydroxyl amine base ( $NH_2O^-$ )
12. (e) The bond energy of carbonyl group is  $179 \text{ Kcal mol}^{-1}$  and in  $<C=C$  the bond energy is  $145.8 \text{ Kcal}$ . The carbonyl group shows resonance and thus possesses higher bond energy.  $C=O$   
 $C^+ - O^-$
13. (b) Both carbon and oxygen are nonmetals and try to complete their octet. In  $R-C \equiv O^+$  each has complete octet whereas in  $R-C^+ = O$ , carbon atom has incomplete octet.
14. (b)  $HCHO$  cannot be prepared by Rosenmund's reduction because formyl chloride is unstable at room temperature.
15. (e)  $HCHO$  reacts with  $NH_3$  to form urotropine  
 $6HCHO + 4NH_3 \rightarrow (CH_2)_6N_4 + 6H_2O$
16. (c) The anion left after the removal of  $\alpha$ -hydrogen is stabilized by resonance effect.
17. (b) Aldehydes which do not contain  $\alpha$ -hydrogens undergo Cannizzaro reaction.



18. (d) Aldehydes having a methyl or methylene group in the  $\alpha$ -position or more correctly having at least one hydrogen atom in the  $\alpha$ -position undergo dimerisation in presence of a base at low temperature to form  $\beta$ -hydroxy aldehydes called aldols.

