# 30. Aldehydes and Ketones - Multiple Choice Questions

## 1. Introduction

**1.** Glyoxal is

(a) $CH_2O-CH_2O$ (b) $\begin{matrix}CH_2OH\\|\\CH_2OH\end{matrix}$

(c) $\begin{matrix}CHO\\|\\CHO\end{matrix}$ (d) $\begin{matrix}CH_2OH\\|\\CHO\end{matrix}$

**2.** Which factor/s will increase the reactivity of $>C=O$ group

(i) Presence of a group with positive inductive effect

(ii) Presence of a group with negative inductive effect

(iii) Presence of large alkyl group

(a) Only (i) (b) Only (ii)

(c) (i) and (iii) (d) (ii) and (iii)

**3.** Which of the aldehyde is most reactive

(a) $C_6H_5-CHO$ (b) $CH_3CHO$

(c) $HCHO$ (d) All the equally reactive

**4.** 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) $2^\circ > 3^\circ > 1^\circ$

**5.** Arrange the following compounds in increasing order of their reactivity in nucleophilic addition reactions

Ethanal (I), Propanal (II), Propanone (III), Butanone (IV)

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

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

**6.** Which of the following is called Bayer's reagent

(a) Alk $KMnO_4$ (b) Acidic $KMnO_4$

(c) $K_2HgI_4$ (d) Red $P/HF$

**7.** Fehling A and Fehling B are

(a) $CuSO_4$ solution and $NH_4OH$ solution

(b) $CuSO_4$ solution and alkaline solution of sodium potassium tartarate

(c) $CuSO_4$ solution and alkaline solution of sodium citrate

(d) $CuSO_4$ solution and $NaOH$

**8.** The correct order of reactivity of aldehydes and ketones towards hydrogen cyanide is

(a) $CH_3COCH_3 > CH_3CHO > HCHO$

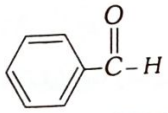
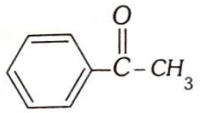
(b) $CH_3COCH_3 > HCHO > CH_3CHO$

(c) $CH_3CHO > CH_3COCH_3 > HCHO$

(d) $HCHO > CH_3CHO > CH_3COCH_3$

**9.** Which of the following compounds is most reactive towards nucleophilic addition reaction

(a) $CH_3-\overset{O}{\overset{\|}{C}}-H$ (b) $CH_3-\overset{O}{\overset{\|}{C}}-CH_3$

(c)  (d) 

## 2. Preparation of Aldehydes and Ketones

**1.** $CH_3COCl \xrightarrow[Pd/BaSO_4]{2H} CH_3CHO + HCl$;

The above reaction is called

(a) Reimer-Tiemann reaction

(b) Cannizzaro reaction

(c) Rosenmund reaction

(d) Reformatsky reaction

**2.** $CH_3-CH_2-C\equiv CH \xrightarrow[H_2O]{R}$ Butanone, $R$ is

(a) $Hg^{++}$ (b) $KMnO_4$

(c) $KClO_3$ (d) $K_2Cr_2O_7$

**3.** The oxidation of benzyl chloride with lead nitrate gives

(a) Benzyl alcohol (b) Benzoic acid

(c) Benzaldehyde (d) *p*-chlorobenzaldehyde

**4.** $R-CH=CH_2+CO+H_2 \xrightarrow[\text{high Pressure}]{\text{high Temp}} RCH_2CH_2CHO$

The above reaction is

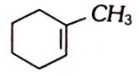
(a) Mendius reaction (b) Oxo process

(c) Sandorn's reaction (d) Stephen's reaction

**5.** The reagent used in Gatterman Koch aldehyde synthesis is

(a) $Pb/BaSO_4$ (b) Alkaline $KMnO_4$

(c) Acidic $KMnO_4$ (d) $CO+HCl$

**6.**  On reductive ozonolysis yields

(a) 6-oxoheptanal (b) 6-oxoheptanoic acid

(c) 6-hydroxyheptanal (d) 3-hydroxypentanal

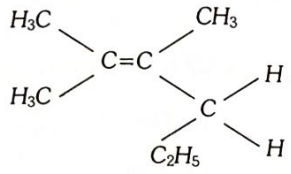
**7.** In the following reaction

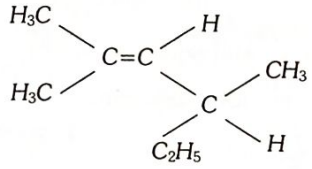
$C_2H_2 \xrightarrow[HgSO_4/H_2SO_4]{H_2O} X \rightleftharpoons CH_3CHO$ What is $X$

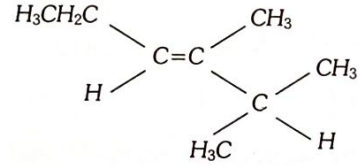
(a) $CH_3CH_2OH$ (b) $CH_3-O-CH_3$

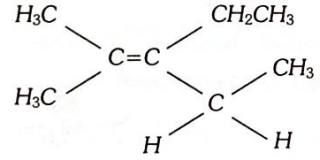
(c) $CH_3CH_2CHO$ (d) $CH_2=CHOH$

**8.** An optically active compound having molecular formula $C_8H_{16}$ on ozonolysis gives acetone as one of the products. The structure of the compound is

(a) 

(b) 

(c) 

(d) 

**9.** $R-C\equiv N+2(H) \xrightarrow[(ii)H_3O^+]{(i)SnCl_2/dil\ HCl} RCHO+NH_4Cl$ this reaction is known as

(a) Etard reaction

(b) Stephen reaction

(c) Hell-Vohlard- Zelinsky reaction

(d) Balz-Schiemann reaction

**10.** Addition of water to alkynes occurs in acidic medium and in the presence of $Hg^{2+}$ ions as a catalyst. Which of the following products will be formed on addition of water to but-1-yne under these conditions

(a) $CH_3-CH_2-CH_2-\overset{O}{\overset{\|}{C}}-H$

(b) $CH_3-CH_2-\overset{O}{\overset{\|}{C}}-CH_3$

(c) $CH_3-CH_2-\overset{O}{\overset{\|}{C}}-OH+CO_2$

(d) $CH_3-\overset{O}{\overset{\|}{C}}-OH+H-\overset{O}{\overset{\|}{C}}-H$

**11.** $CH_3-C\equiv CH \xrightarrow[1\%HgSO_4]{40\%H_2SO_4} A \xrightarrow{\text{Isomerisation}} CH_3-\overset{O}{\overset{\|}{C}}-CH_3$

Structure of 'A' and type of isomerism in the above reaction are respectively

(a) Prop – 1 – en – 2 – ol, metamerism

(b) Prop – 1 – en – 1 – ol, tautomerism

(c) Prop – 2 – en – 2 – ol, geometrical isomerism

(d) Prop – 1 – en – 2 – ol, tautomerism

**12.** The end product in the following sequence of reaction is

$HC\equiv CH \xrightarrow[20\%H_2SO_4]{1\%HgSO_4} A \xrightarrow{CH_3MgX} B \xrightarrow{[O]}$

(a) Acetic acid (b) Isopropyl alcohol

(c) Acetone (d) Ethanol

**13.** Identify the product $C$ in the series

$CH_3CN \xrightarrow{Na/C_2H_5OH} A \xrightarrow{HNO_2} B \xrightarrow{Cu/573K} C$

(a) $CH_3COOH$ (b) $CH_3CH_2NHOH$

(c) $CH_3CONH_2$ (d) $CH_3CHO$

**14.** On heating calcium acetate and calcium formate, the product formed is

(a) $CH_3COCH_3$ (b) $CH_3CHO$

(c) $HCHO+CaCO_3$ (d) $CH_3CHO+CaCO_3$

**15.** Which of the following compound gives a ketone with Grignard reagent

(a) Formaldehyde (b) Ethyl alcohol

(c) Methyl cyanide (d) Methyl iodide

**16.** When a mixture of calcium benzoate and calcium acetate is dry distilled, the resulting compound is

(a) Acetophenone (b) Benzaldehyde

(c) Benzophenone (d) Acetaldehyde

**17.** Amongst the following compounds, the one that will not respond to Cannizzaro reaction upon treatment with alkali is

(a) $Cl_3CCHO$ (b) $Me_3CCHO$

(c) $C_6H_5CHO$ (d) $HCHO$

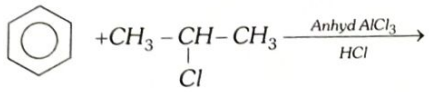
**18.** Select the reagent for the following reaction

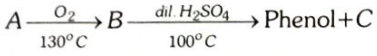
 $\rightarrow OHC-(CH_2)_4-CHO$

(a) $SeO_2$ (b) $O_3, Zn/H_2O$

(c) $O_3, H_2O_2-CH_3COOH$ (d) $PCC$

**19.** Identify 'C' in the following





(a) Water (b) Ethanol

(c) Propanone (d) Cumene hydroperoxide

**20.** Reimer-Tiemann reaction involves a

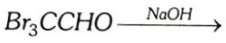
(a) Carbonium ion intermediate

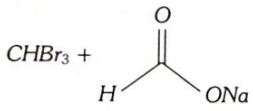
(b) Carbene intermediate

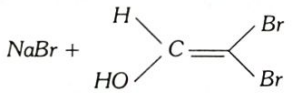
(c) Carbanion intermediate

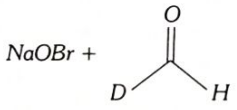
(d) Free radical intermediate

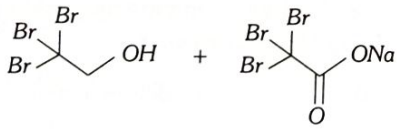
**21.** The major products in the reaction

 are

(a) 

(b) 

(c) 

(d) 

## 3. Properties of Aldehydes and Ketones

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

(a) Phenyl hydrazine (b) Hydroxylamine

(c) Fehling solution (d) Sodium bisulphate

**2.** Haloform test is given by the following substance

(a) $HCHO$ (b) $(CH_3)_2CO$

(c) $CH_3OCH_3$ (d) $CH_3CH_2Cl$

**3.** Which one of the following reagents is used to reduce an aldehyde to primary alcohol

(a) $N_2H_4 / KOH$

(b) $Zn / Hg$ and conc. $HCl$

(c) $LiAlH_4$

(d) Alkaline $CuSO_4$ containing Rochelle salt

(e) $Ag_2O / OH^-$

**4.** Which of the following does not turn Schiff's reagent to pink

(a) Formaldehyde (b) Benzaldehyde

(c) Acetone (d) Acetaldehyde

**5.** Upon treatment with $I_2$ and aqueous $NaOH$, which of the following compounds will form iodoform

(a) $CH_3CH_2CH_2CH_2CHO$

(b) $CH_3CH_2COCH_2CH_3$

(c) $CH_3CH_2CH_2CH_2CH_2OH$

(d) $CH_3CH_2CH_2CH(OH)CH_3$

**6.** For making distinction between 2-pentanone and 3-pentanone the reagent to be employed is

(a) $K_2Cr_2O_7 / H_2SO_4$ (b) $Zn - Hg / HCl$

(c) $SeO_2$ (d) Iodine / $NaOH$

**7.** Aldehydes and ketones can be reduced to hydrocarbon by using

(a) $LiAlH_4$ (b) $H_2 / Pd - BaSO_4$

(c) $Na - Hg / HCl$ (d) $NH_2 - NH_2 / C_2H_5ONa$

**8.** Which gives lactic acid on hydrolysis after reacting with $HCN$

(a) $HCHO$ (b) $CH_3CHO$

(c) $C_6H_5CHO$ (d) $CH_3COCH_3$

**9.** Reaction of butanone with methylmagnesium bromide followed by hydrolysis gives

(a) 2-methyl-2-butanol (b) 2-butanol

(c) 3-methyl-2-butanol (d) 2, 2-dimethyl-1-butanol

(e) 2-pentanol

**10.** The reaction of an aldehyde with hydroxylamine gives a product which is called

(a) Aminohydroxide (b) Hydrazone

(c) Semicarbazone (d) Oxime

**11.** Compound $A$ undergoes Cannizzaro reaction and $B$ undergoes positive iodoform test. Therefore

(a) $A$ = Acetaldehyde ; $B$ = 1-Pentanal

(b) $A = C_6H_5CH_2CHO$ ; $B$ = 3-Pentanone

(c) $A$ = Formaldehyde ; $B$ = 2-Pentanone

(d) $A$ = Propionaldehyde ; $B$ = 1-Pentanol

**12.** 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) $CH_3CH_2COOH$

**13.** Which responds to +ve iodoform test

(a) Butanol (b) Butan-1-al

(c) Butanol-2 (d) 3-pentanone

**14.** $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CHO$ shows Cannizaro's reaction due to

(a) Carbon is bounded by 3 methyl groups

(b) Absence of α-hydrogen atom

(c) Due to steric effect

(d) None of these

**15.** The formation of cyanohydrin from a ketone is an example of

(a) Electrophilic addition (b) Nucleophilic substitution

(c) Electrophilic substitution (d) Nucleophilic addition

**16.** Which of the following statements is not correct

(a) Aldehydes and ketones undergo nucleophilic additions

(b) Aldehydes and ketones undergo electrophilic substitutions

(c) Aldehydes and ketones contains polar carbonyl groups

(d) Lower members of aldehydes and ketones are soluble in water due to hydrogen bonding

**17.** When Grignard reagent reacts with ketone it yields

(a) 1° alcohol (b) 2° alcohol

(c) 3° alcohol (d) Ethanol

**18.** The reagent which does not react with both, acetone and benzaldehyde

(a) Sodium hydrogen sulphite

(b) Phenyl hydrazine

(c) Fehling's solution

(d) Grignard reagent

**19.** In Clemmensen reduction, carbonyl compound is treated with.....

(a) Zinc amalgam $+HCl$

(b) Sodium amalgam $+HCl$

(c) Zinc amalgam + nitric acid

(d) Sodium amalgam $+HNO_3$

**20.** A compound does not react with 2, 4 di-nitrophenyl hydrazine and $Na$, compound is

(a) Acetone (b) Acetaldehyde

(c) $CH_3OH$ (d) $CH_2 = CHOCH_3$

**21.** Which one of the following pairs is not correctly matched

(a) $>C=O \xrightarrow{\text{Clemensen's reduction}} >CH_2$

(b) $>C=O \xrightarrow{\text{Wolff-Kishner reduction}} >CHOH$

(c) $-COCl \xrightarrow{\text{Rosenmund's reduction}} CHO$

(d) $-C\equiv N \xrightarrow{\text{Stephen's reduction}} CHO$

**22.** Which of the following reagents is used to distinguish acetone and acetophenone

(a) $NaHSO_3$ (b) Grignard reagent

(c) $Na_2SO_4$ (d) $NH_4Cl$

**23.** An aromatic compound 'X' with molecular formula $C_9H_{10}O$ gives the following chemical tests

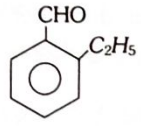
(i) Forms 2,4-DNP derivative

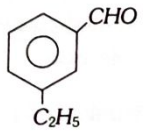
(ii) Reduces Tollen's reagent

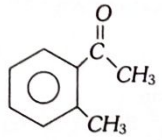
(iii) Undergoes Cannizzaro reaction and

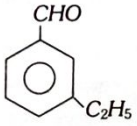
(iv) On vigorous oxidation 1,2-benzenedicarboxylic acid is obtained

X is

(a) 


(b) 


(c) 


(d) 

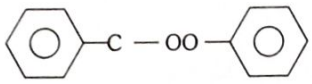

**24.** $OCH-CHO \xrightarrow{OH^-} HOH_2C-COOH$

The reaction given is

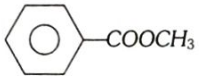
(a) Aldol condensation (b) Knovenegel reaction

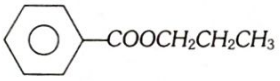
(c) Cannizzaro reaction (d) None of these

**25.** Claisen condensation is not given by

(a) 

(b) $CH_3CH_2COO$ 

(c) 

(d) 

**26.** Ketones react with *Mg-Hg* over water gives

(a) Pinacolone (b) Pinacols

(c) Alcohols (d) None of these

**27.** A compound $A \rightarrow C_5H_{10}Cl_2$ on hydrolysis gives $C_5H_{10}O$ which reacts with $NH_2OH$, forms iodoform but does not give Fehling test. $A$ is

(a) $CH_3-\underset{\underset{Cl}{|}}{\overset{\overset{Cl}{|}}{C}}-CH_2-CH_2-CH_3$

(b) $CH_3CH_2-\underset{\underset{Cl}{|}}{\overset{\overset{Cl}{|}}{C}}-CH_2CH_3$

(c) $CH_3CH_2CH_2CH_2\overset{\overset{Cl}{|}}{\underset{\underset{Cl}{|}}{CH}}$

(d) $CH_3-\overset{\overset{Cl}{|}}{CH}-\overset{\overset{Cl}{|}}{CH}-CH_2-CH_3$

**28.** Which of the following compound does not react with concentrated alkali to give corresponding alcohol and salt of carboxylic acid

(a) Benzaldehyde (b) Trimethyl acetaldehyde

(c) Dimethyl acetaldehyde (d) Formaldehyde

**29.** 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)

**30.** $CH \equiv CH \xrightarrow[dil.H_2SO_4]{HgSO_4} A \xrightarrow[NaOH]{dilute} B$. The compound $B$ is

(a) $CH_3-\underset{\underset{OH}{|}}{CH}-CH_2-CHO$

(b) $CH_3-\underset{\underset{OH}{|}}{CH}-CH_2-COONa$

(c) $CH_3-\underset{\underset{OH}{|}}{CH}-CH_2-\overset{\overset{O}{||}}{C}-CH_3$

(d) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{OH}{|}}{CH}}-CH_2-\overset{\overset{O}{||}}{C}-CH_3$

**31.** In which of the following reactions, the product obtained is chiral

(a) $CH_3COCH_3 \xrightarrow{NaBH_4}$

(b) $CH_3COCl \xrightarrow{\text{Rosenmund's reduction}}$

(c) $CH_3CH_2CO_2CH_2CH_3 \xrightarrow{Sn,\ HCl}$

(d) $CH_3CH_2COCH_3 \xrightarrow{LiAlH_4}$

**32.** Which of the following reactions will not result in the formation of carbon–carbon bonds

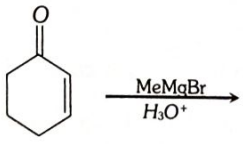
(a) Cannizzaro reaction

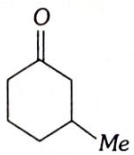
(b) Wurtz reaction

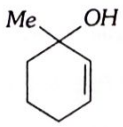
(c) Reimer-Tiemann reaction

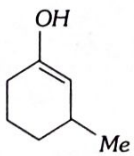
(d) Friedel-Crafts acylation

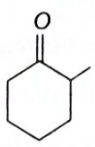
**33.** Predict the product




(a) 


(b) 


(c) 


(d) 

**34.** Which of the following will form two isomers with semi carbazide

(a) Benzaldehyde (b) Acetone

(c) Benzoquinone (d) Benzophenone

**35.** Identify the correct statement

(a) Aldehydes on reduction give secondary alcohols

(b) Ketones on reduction gives primary alcohols

(c) Ketones reduce Fehling's solution and give red cuprous oxide

(d) Ketones do not react with alcohols

**36.** When $NH_2OH$ reacts with unsymmetrical ketone then number of products formed is

(a) 1 (b) 2

(c) 3 (d) 4

**37.** The correct sequence of steps involved in the mechanism of cannizzaro's reaction is .....

(a) Nucleophilic attack, transfer of $H^-$ and transfer of $H^+$

(b) Transfer of $H^-$, transfer of $H^+$ and nucleophilic attack

(c) Transfer of $H^+$, nucleophilic attack and transfer of $H^-$

(d) Electrophilic attack by $OH^-$, transfer of $H^+$ and transfer of $H^-$

**38.** On hydrolysis of a "compound", two compounds, are obtained. One of which on treatment with sodium nitrite and hydrochloric acid gives a product which does not respond to iodoform test. The second one reduces Tollen's reagent and Fehling's solution. The "Compound" is

(a) $CH_3CH_2CH_2NC$

(b) $CH_3CH_2CH_2CN$

(c) $CH_3CH_2CH_2ON=O$

(d) $CH_3CH_2CH_2CON(CH_3)_2$

**39.** Consider the following reactions

I. $H_3CCI_3 \xrightarrow{OH^\ominus}$

II. $H_3CCHO \xrightarrow{[Ag(NH_3)_2]^+OH^\ominus}$

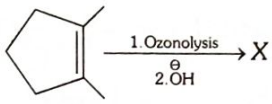
III. $H_3CCO_2C_2H_5 \xrightarrow{OH^\ominus}$

Carboxylic acid is the final product only in the reaction (s)

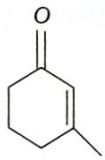
(a) I, II (b) II, III

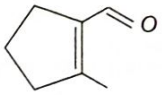
(c) II (d) III

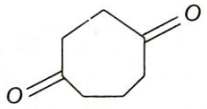
**40.** In the following reaction

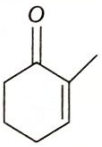



The major product $X$ is

(a) 


(b) 


(c) 


(d) 


**41.** The reddish brown precipitate formed in the Fehling's test for aldehydes ($RCHO$) is due to the formation of

(a) $Cu$ (b) $Cu_2O$

(c) $CuO$ (d) $(RCOO)_2Cu$

**42.** Upon reaction with $CH_3MgBr$ followed by protonation, the compound that produces ethanol is

(a) $CH_3CHO$ (b) $HCOOH$

(c) $HCHO$ (d) $(CHO)_2$

## 4. Formaldehyde

**1.** Hexamethylene tetramine is used as

(a) Analgesic (b) Antipyretic

(c) Urinary antiseptic (d) All of these

**2.** $3\underset{aq.}{HCHO} \overset{\text{cooled}}{\rightleftharpoons} X$. $X$ is

(a) Formalin (b) Paraformaldehyde

(c) Paraldehyde (d) Metaformaldehyde

## 5. Acetaldehyde

**1.** Reaction of acetaldehyde with $HCN$ followed by hydrolysis gives a compound which shows

(a) Optical isomerism (b) Geometrical isomerism

(c) Metamerism (d) Tautomerism

**2.** Which of the following is the industrial method of preparation of acetaldehyde

(a) $CH_3CN \xrightarrow[HCl]{SnCl_2} CH_3CH = NH \xrightarrow{H_3O^+} CH_3CHO$

(b) $CH_3COCl + H_2 \xrightarrow[BaSO_4]{Pd} CH_3CHO + HCl$

(c) $CH_2 = CH_2 + H_2O \xrightarrow{Pd^{++}} CH_3CHO$

(d) None of these

**3.** Acetaldehyde cannot show

(a) Iodoform test (b) Lucas test

(c) Benedict's test (d) Tollen's test

**4.** Identify the product $Y$ in the sequence $CH_3CHO + CH_3MgI \xrightarrow{\text{ether}} X \xrightarrow{H_2O/H^+} Y$

(a) $CH_3OH$ (b) $CH_3CH_2OH$

(c) $(CH_3)_2CHOH$ (d) $(CH_3)_3COH$

**5.** The most appropriate reagent to distinguish between acetaldehyde and formaldehyde is

(a) Fehling's solution

(b) Tollen's reagent

(c) Schiff's reagent

(d) Iodine in presence of base

**6.** Upon treatment with $Al(OEt)_3$ followed by usual reactions (work up), $CH_3CHO$ will produce

(a) Only $CH_3COOCH_2CH_3$

(b) A mixture of $CH_3COOH$ and $EtOH$

(c) Only $CH_3COOH$

(d) Only $EtOH$

**7.** Compounds $A$ and $C$ in the following reaction are.....

$$CH_3CHO \xrightarrow[(ii)\ H_2O]{(i)} (A) \xrightarrow{H_2SO_4,\Delta} (B) \xrightarrow[\text{oxidation}]{\text{Hydroboration}} (C)$$

(a) Identical (b) Positional isomers

(c) Functional isomers (d) Optical isomers

## 6. Acetone

**1.** Compound which gives acetone on ozonolysis

(a) $CH_3 - CH = CH - CH_3$ (b) $(CH_3)_2C = C(CH_3)_2$

(c) $C_6H_5CH = CH_2$ (d) $CH_3CH = CH_2$

**2.** Identify the reactant $X$ and the product $Y$

$$CH_3 - CO - CH_3 + X \rightarrow (CH_3)_3C - OMg - Cl$$

$$\downarrow \text{hydrolysis}$$

$$Y + Mg(OH)Cl$$

(a) $X = MgCl_2;\ Y = CH_3CH = CH_2$

(b) $X = CH_3MgCl;\ Y = C_2H_5COCH_3$

(c) $X = CH_3MgCl;\ Y = (CH_3)_3C - OH$

(d) $X = C_2H_5MgCl;\ Y = (CH_3)_3C - OH$

**3.** An important reaction of acetone is autocondensation in presence of concentrated sulphuric acid to give the aromatic compound

(a) Mesitylene (b) Mesityl oxide

(c) Trioxan (d) Phorone

**4.** Reduction of acetone in the presence of sodium borohydride gives

(a) 1-propanol (b) 2-propanol

(c) Propene (d) *n*-propane

**5.** An organic compound $X$ is oxidised by using acidified $K_2Cr_2O_7$. The product obtained reacts with phenyl hydrazine but does not answer silver mirror test. The possible structure of $X$ is

(a) $CH_3COCH_3$ (b) $(CH_3)_2CHOH$

(c) $CH_3CHO$ (d) $CH_3CH_2OH$

## 7. Benzaldehyde

**1.** 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

**2.** Cinnamic acid is formed when $C_6H_5 - CHO$ condenses with $(CH_3CO)_2O$ in presence of

(a) Conc. $H_2SO_4$ (b) Sodium acetate

(c) Sodium metal (d) Anhydrous $ZnCl_2$

**3.** The reaction

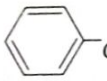
$$C_6H_5CHO + CH_3CHO \rightarrow C_6H_5CH = CH - CHO$$

is known as

(a) Perkin's reaction (b) Claisen condensation

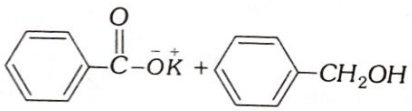
(c) Benzoin condensation (d) Cannizzaro's reaction

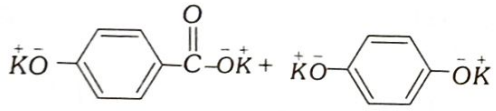
**4.** Which products are formed when the compound

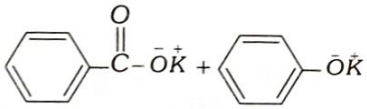


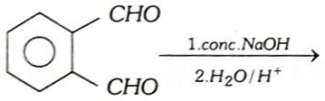
is treated with concentrated aqueous $KOH$ solution

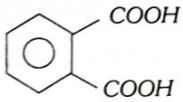
(a) 

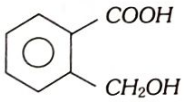
(b) 

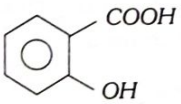
(c) 

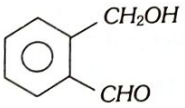
(d) 

**5.** 

(a) 

(b) 

(c) 

(d) 

**6.** In the presence of a dilute base $C_6H_5CHO$ and $CH_3CHO$ react together to give a product. The product is

(a) $C_6H_5CH_3$ (b) $C_6H_5CH_2CH_2OH$

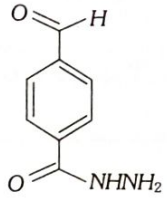
(c) $C_6H_5CH_2OH$ (d) $C_6H_5CH=CHCHO$

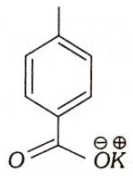
**7.** The most reactive compound towards formation of cyanohydrin on treatment with $KCN$ followed by acidification is

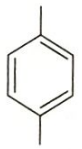
(a) Benzaldehyde (b) *p*-nitrobenzaldehyde

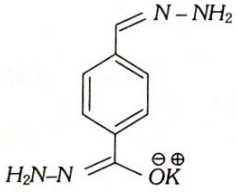
(c) Phenyl acetaldehyde (d) *p*-hydroxybenzaldehyde

**8.** 4 – formylbenzoic acid on treatment with one equivalent of hydrazine followed by heating with alcoholic $KOH$ gives the major product

(a) 

(b) 

(c) 

(d) 

## 8. Acetophenone and Benzophenone

**1.** Which can undergo haloform reaction

(a) $(CH_3)_3C-OH$ (b) $(C_2H_5)_2C=0$

(c) Acetophenone (d) Benzophenone

**2.** Consider the following statement Acetophenone can be prepared by

(1) Oxidation of 1-phenylethanol

(2) Reaction of benzalthanol with methyl magnesium bromide

(3) Friedel craft's reaction of benzene with acetyl chloride

(4) Distillation of calcium benzoate

(a) 1 and 2 (b) 1 and 4

(c) 1 and 3 (d) 3 and 4

**3.** Which is not true about acetophenone

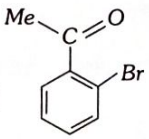
(a) Reacts to form 2, 4-dinitrophenyl hydrazine

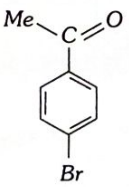
(b) Reacts with Tollen's reagent to form silver mirror

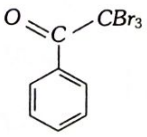
(c) Reacts with $I_2 / NaOH$ to form iodoform

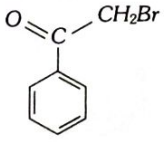
(d) On oxidation with alkaline $KMnO_4$ followed by hydrolysis gives benzoic acid

**4.** Bromination of $PhCOMe$ in acetic acid medium produces mainly

(a) 

(b) 

(c) 

(d) 

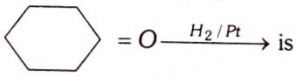
**5.** A compound that shows positive iodoform test is

(a) 2 – pentanone (b) 3 – pentanone

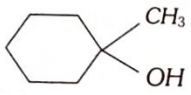
(c) 3 – pentanol (d) 1 – pentanol

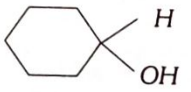
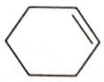
## 9. Unsaturated Cyclic and Di-aldehydes and Ketones

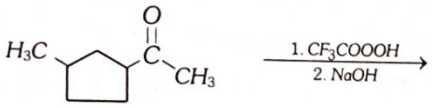
**1.** The product of following reaction



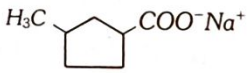
is

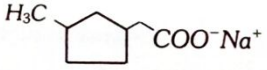
(a)  (b) 

(c)  (d) 

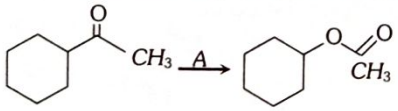
**2.** 

Find the organic acid produced from the above reaction

(a) $CH_3COO^-Na^+$ (b) 

(c)  (d) None of the above

**3.** The most suitable reagent *A*, for the reaction

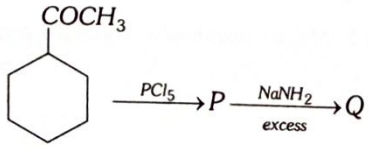


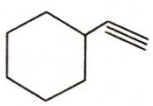
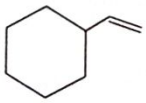
is (are)

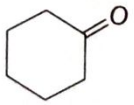
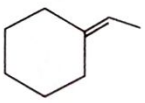
(a) $O_3$ (b) $H_2O_2$

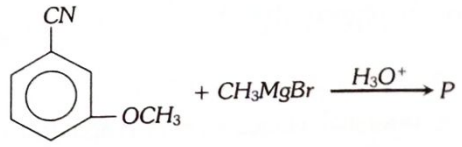
(c) $NaOH - H_2O_2$ (d) *m*-chloroperbenzoic acid

**4.** Identify 'Q' in the following sequence of reactions

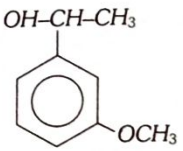
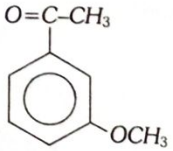


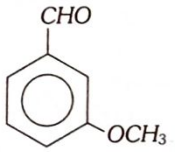
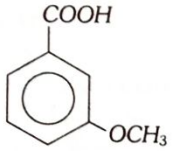
(a)  (b) 

(c)  (d) 

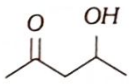
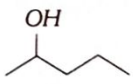
**5.** 

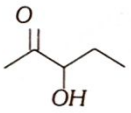
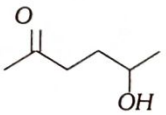
Product *P* in the above reaction is

(a)  (b) 

(c)  (d) 

**6.** Which of the following will be most readily dehydrated in acidic conditions

(a)  (b) 

(c)  (d) 

**7.** The reaction of ethyl methyl ketone with $Cl_2$ / excess $OH^-$ gives the following major product

(a) $ClCH_2CH_2COCH_3$ (b) $CH_3CH_2COCCl_3$

(c) $ClCH_2CH_2COCH_2Cl$ (d) $CH_3CCl_2COCH_2Cl$

## 10. IIT-JEE/ AIEEE

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

(a) MeCOCl (b) MeCHO

(c) MeCOOMe (d) MeCOOCOMe

**2.** Methyl ethyl ketone is prepared by the oxidation of **[1987]**

(a) 2-propanol (b) 1-butanol

(c) 2-butanol (d) *t*-butyl alcohol

**3.** The most suitable reagent for the conversion of $RCH_2OH \rightarrow RCHO$ is **[2014]**

(a) $KMnO_4$

(b) $K_2Cr_2O_7$

(c) $CrO_3$

(d) *PCC* (Pyridine chloro chromate)

**4.** In the following sequence of reactions

$$\text{Toluene} \xrightarrow{KMnO_4} A \xrightarrow{SOCl_2} B \xrightarrow[BaSO_4]{H_2/Pd} C,$$

the product $C$ is **[2015]**

(a) $C_6H_5COOH$ (b) $C_6H_5CH_3$

(c) $C_6H_5CH_2OH$ (d) $C_6H_5CHO$

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

(a) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle OH}{\underset{|}{\overset{|}{C}}}}-\underset{|}{\overset{|}{CH}}-CH_2CH_3$ (OH, OH)

(b) $\begin{matrix}CH_3\\CH_3\end{matrix}\!\!>CHCO_2H + CH_3COOH$

(c) $\begin{matrix}CH_3\\CH_3\end{matrix}\!\!>CHOH + CH_3CH_2CH_2OH$

(d) $\begin{matrix}CH_3\\CH_3\end{matrix}\!\!>C=O + CH_3CH_2CH_2COOH$

**6.** Reaction $\begin{matrix}R\\R\end{matrix}\!\!>CO + HCN \rightarrow R-\underset{\displaystyle CN}{\overset{\displaystyle R}{\underset{|}{\overset{|}{C}}}}-OH$ is **[1990]**

(a) Electrophilic substitution

(b) Electrophilic addition

(c) Nucleophilic addition

d) Nucleophilic substitution

**7.** Cannizzaro reaction is not shown by **[1983]**

(a) $HCHO$ (b) $C_6H_5CHO$

(c) $CH_3CHO$ (d) All of these

**8.** Which one of the following is reduced with zinc and hydrochloric acid to give the corresponding hydrocarbon **[2004]**

(a) Acetamide (b) Acetic acid

(c) Ethyl acetate (d) Butan–2–one

**9.** The increasing order of the rate of $HCN$ addition to compounds A-D is

(A) $HCHO$ (B) $CH_3COCH_3$

(C) $PhCOCH_3$ (D) $PhCOPh$ **[2006]**

(a) A < B < C < D (b) D < B < C < A

(c) D < C < B < A (d) C < D < B < A

**10.** Trichloroacetaldehyde was subjected Cannizzaro's reaction by using $NaOH$. The mixture of the products contains sodium trichloroacetate ion and another compound. The other compound is **[2011]**

(a) 2,2,2-trichloroethanol (b) Trichloromethanol

(c) 2,2,2-trichloropropanol (d) Chloroform

**11.** Base catalysed aldol condensation occurs with **[1991]**

(a) Benzaldehyde

(b) 2, 2-dimethyl propionaldehyde

(c) Acetaldehyde

(d) Formaldehyde

**12.** The pair of compounds in which both the compounds give positive test with Tollen's reagent is **[2004]**

(a) Glucose and Sucrose

(b) Fructose and Sucrose

(c) Acetophenone and Hexanal

(d) Glucose and Fructose

**13.** How will you convert butan–2–one to propanoic acid **[2005]**

(a) Tollen's reagent (b) Fehling's solution

(c) $NaOH/I_2/H^+$ (d) $NaOH/NaI/H^+$

**14.** The major product $H$ in the given reaction sequence is

$$CH_3-CH_2-CO-CH_3 \xrightarrow{\ominus CN} G \xrightarrow[Heat]{95\%H_2SO_4} H$$

**[2012]**

(a) $CH_3-CH=\underset{\displaystyle CH_3}{\overset{|}{C}}-COOH$ (b) $CH_3-CH=\underset{\displaystyle CH_3}{\overset{|}{C}}-CN$

(c) $CH_3-CH_2-\underset{\displaystyle CH_3}{\overset{\displaystyle OH}{\underset{|}{\overset{|}{C}}}}-COOH$ (d) $CH_3-CH=\underset{\displaystyle CH_3}{\overset{|}{C}}-CO-NH_2$

**15.** Which of the following will react with water **[1998]**

(a) $CHCl_3$ (b) $Cl_3CCHO$

(c) $CCl_4$ (d) $ClCH_2CH_2Cl$

**16.** 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 $H_2NCONHNH_2.HCl$ and sodium acetate gives a product '*C*'. Identify the structure of '*C*' **[2002]**

(a) $CH_3CH_2CH = NNHCONH_2$

(b) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} = NNHCONH_2$

(c) $CH_3CH = \underset{\displaystyle CH_3}{\underset{|}{N}}CONHNH_2$

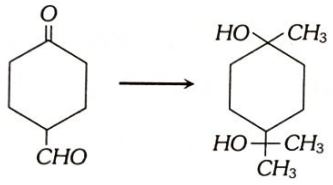
(d) $CH_3CH_2CH - NCONHNH_2$

**17.** Which of the following has the most acidic hydrogen **[2000]**

(a) 3-hexanone (b) 2, 4-hexanedione

(c) 2, 5-hexanedione (d) 2, 3-hexanedione

**18.** The correct sequence of reagents for the following conversion will be




**[2017]**

(a) $CH_3MgBr, H^+ / CH_3OH, [Ag(NH_3)_2]^+OH^-$

(b) $CH_3MgBr, [Ag(NH_3)_2]^+OH^-, H^+ / CH_3OH$

(c) $[Ag(NH_3)_2]^+OH^-, CH_3MgBr, H^+ / CH_3OH$

(d) $[Ag(NH_3)_2]^+OH^-, H^+ / CH_3OH, CH_3MgBr$

**19.** Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of **[2011]**

(a) Two ethylenic double bonds

(b) A vinyl group

(c) An isopropyl group

(d) An acetylenic triple bond

**20.** When acetaldehyde is heated with Fehling solution, it gives a red precipitate of **[1982]**

(a) $Cu$ (b) $CuO$

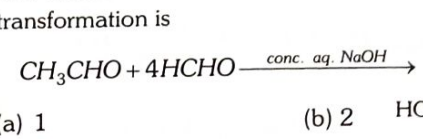
(c) $Cu_2O$ (d) $Cu(OH)_2$

**21.** Which of the following on heating with aqueous $KOH$, produces acetaldehyde **[2009]**

(a) $CH_3COCl$ (b) $CH_3CH_2Cl$

(c) $CH_2ClCH_2Cl$ (d) $CH_3CHCl_2$

**22.** The number of aldol reaction(s) that occurs in the given transformation is **[2012]**




(a) 1 (b) 2

(c) 3 (d) 4

**23.** The enol form of acetone, after treatment with $D_2O$, gives **[1999]**

(a) $CH_3 - \underset{\displaystyle OD}{\underset{|}{C}} = CH_2$ (b) $CD_3 - \overset{\displaystyle O}{\overset{||}{C}} - CD_3$

(c) $CH_2 = \underset{\displaystyle OH}{\underset{|}{C}} - CH_2D$ (d) $CD_2 = \underset{\displaystyle OD}{\underset{|}{C}} - CD$

**24.** *m*-chlorobenzaldehyde on reaction with conc. $KOH$ at room temperature gives **[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

**25.** A mixture of benzaldehyde and formaldehyde on heating with aqueous $NaOH$ solution gives **[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

**26.** In Cannizzaro reaction given below

$2PhCHO \xrightarrow{:\overset{\ominus}{O}H} PhCH_2OH + PhC\dot{O}\dot{\bar{2}}$ the slowest step is **[2009]**

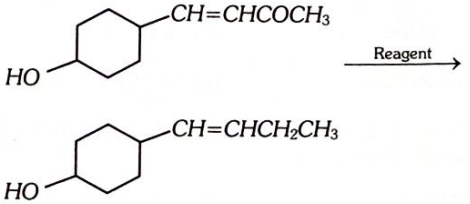
(a) The attack of $:\overset{\ominus}{O}H$ at the carboxyl group

(b) The transfer of hydride to the carbonyl group

(c) The abstraction of proton from the carboxylic group

(d) The deprotonation of $PhCH_2OH$

**27.** In the given transformation, which the following is the most appropriate reagent

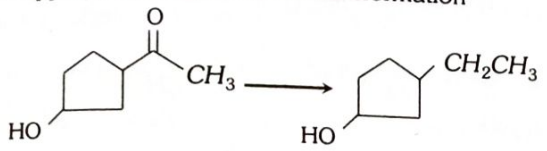



**[2012]**

(a) $NH_2NH_2 / \overset{\ominus}{O}H$ (b) $Zn - Hg / HCl$

(c) $Na, Liq.NH_3$ (d) $NaBH_4$

**28.** The appropriate reagent for the transformation

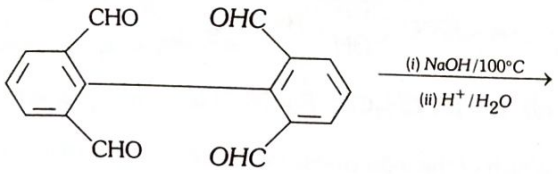


[2000]

(a) $Zn(Hg), HCl$ (b) $NH_2NH_2 / OH^-$

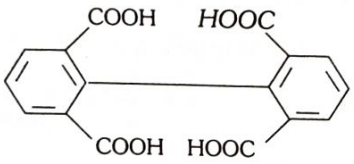
(c) $H_2 / Ni$ (d) $NaBH_4$

**29.**

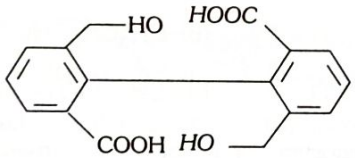


Major Product is [2003]

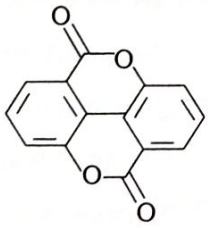
(a)



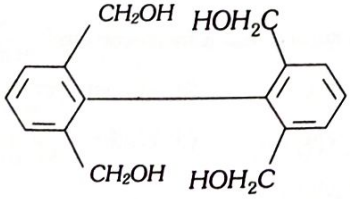
(b)



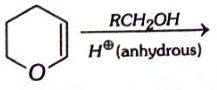
(c)



(d)



**30.** The major product of the following reaction is

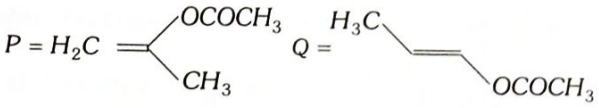


[2011]

(a) A hemiacetal (b) An acetal

(c) An ether (d) An ester

**31.** The product of acid hydrolysis of $P$ and $Q$ can be distinguished by

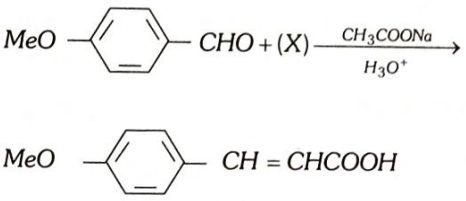


[2003]

(a) Lucas reagent (b) 2,4-DNP

(c) Fehling's solution (d) $NaHSO_3$

**32.**



The compound (X) is [2005]

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

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

## 11. NEET/ AIPMT/ CBSE-PMT

**1.** A strong base can abstract an $\alpha$-hydrogen from [2008]

(a) Ketone (b) Alkane

(c) Alkene (d) Amine

**2.** The correct statement regarding a carbonyl compound with a hydrogen atom on its alphacarbon, is [2016]

(a) A carbonyl compound with a hydrogen atom on its alpha-carbon never equilibrates with its corresponding enol

(b) A carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as aldehyde-ketone equilibraction

(c) A carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as carbonylation

(d) A carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as keto-enol tautomerism

**3.** The general order of reactivity of carbonyl compounds for nucleophilic addition reactions is [1995]

(a) $H_2C=O > RCHO > ArCHO > R_2C=O > Ar_2C=O$

(b) $ArCHO > Ar_2C=O > RCHO > R_2C=O > H_2C=O$

(c) $Ar_2C=O > R_2C=O > ArCHO > RCHO > H_2C=O$

(d) $H_2C=O > R_2C=O > Ar_2C=O > RCHO > ArCHO$

**4.** In the following reaction, product $P$ is $R-\overset{\overset{O}{\|}}{C}-Cl \xrightarrow[Pd-BaSO_4]{H_2} P$ **[1991, 2000, 02]**

(a) $RCH_2OH$ (b) $RCOOH$

(c) $RCHO$ (d) $RCH_3$

**5.** Ketones $(R-\underset{\underset{O}{\|}}{C}-R_1)$ where $R = R_1$ = alkyl group. It can be obtained in one step by **[1997]**

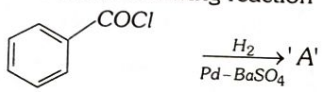
(a) Hydrolysis of esters

(b) Oxidation of primary alcohol

(c) Oxidation of secondary alcohol

(d) Reaction of acid halide with alcohols

**6.** Consider the following reaction



The product 'A' is **[2012]**

(a) $C_6H_5CHO$ (b) $C_6H_5OH$

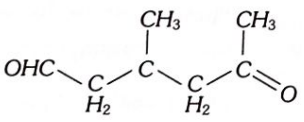
(c) $C_6H_5COCH_3$ (d) $C_6H_5Cl$

**7.** Predict the product '$B$' in the sequence of reaction $HC \equiv CH \xrightarrow[HgSO_4]{30\%H_2SO_4} A \xrightarrow{NaOH} B$ **[2001]**

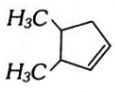
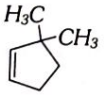
(a) $CH_3COONa$ (b) $CH_3COOH$

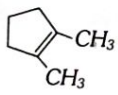
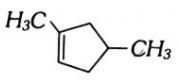
(c) $CH_3CHO$ (d) $CH_3-\underset{\underset{OH}{|}}{CH}-CH_2CHO$

**8.** A single compound of the structure



is obtainable from ozonolysis of which of the following cyclic compounds **[2015]**

(a)  (b) 

(c)  (d) 

**9.** $A$ and $B$ in the following reactions are

$$R-\underset{\underset{O}{\|}}{C}-R' \xrightarrow[KCN]{HCN} A \xrightarrow{B} \begin{matrix} R \\ R \end{matrix}\!\!>C\!<\!\begin{matrix} OH \\ CH_2NH_2 \end{matrix}$$ **[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) $A = RR'CH_2CN$, $B = NaOH$

**10.** Which of the following is incorrect **[2001]**

(a) $FeCl_3$ 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) $NaHSO_3$ is used in the detection of carbonyl compounds

**11.** Which of the following compound will undergo self-aldol condensation in the presence of cold dilute alkali **[1994]**

(a) $C_6H_5CHO$ (b) $CH_3CH_2CHO$

(c) $CH \equiv C-CHO$ (d) $CH_2=CH-CHO$

**12.** Clemmensen reduction of a ketone is carried out in the presence of which of the following **[2003, 11]**

(a) $H_2$ and $Pt$ as catalyst (b) Glycol with $KOH$

(c) $Zn-Hg$ with $HCl$ (d) $LiAlH_4$

**13.** Aldol condensation will not take place in **[1996, 99]**

(a) $HCHO$ (b) $CH_3CH_2CHO$

(c) $CH_3CHO$ (d) $CH_3COCH_3$

**14.** Which one of the following reactions is a method for the conversion of a ketone into a hydrocarbon **[1989]**

(a) Aldol condensation (b) Reimer-Tiemann reaction

(c) Cannizzaro reaction (d) Wolf-Kishner reduction

**15.** Consider the reaction

$$RCHO + NH_2NH_2 \rightarrow RCH=N-NH_2$$

What sort of reaction is it **[2012]**

(a) Electrophilic addition – elimination reaction

(b) Free radical addition – elimination reaction

(c) Electrophilic substitution – elimination reaction

(d) Nucleophilic addition – elimination reaction

**16.** Reduction of aldehydes and ketones into hydrocarbons using zinc amalgam and conc. $HCl$ is called **[2009]**

(a) Clemmensen reduction (b) Cope reduction

(c) Dow reduction (d) Wolff–Kishner reduction

**17.** A carbonyl compound reacts with hydrogen cyanide to form cyanohydrin which on hydrolysis forms a racemic mixture of $\alpha$ -hydroxy acid. The carbonyl compound is **[2006]**

(a) Diethyl ketone (b) Formaldehyde

(c) Acetaldehyde (d) Acetone

**18.** Acetaldehyde reacts with **[1991]**

(a) Electrophiles only

(b) Nucleophiles only

(c) Free radicals only

(d) Both electrophiles and nucleophiles

**19.** Which of the following compound is resistant to nucleophilic attack by hydroxyl ions **[1998]**

(a) Methyl acetate (b) Acetonitrile

(c) Dimethyl ether (d) Acetamide

**20.** In which of the following reactions new carbon-carbon bond is not formed **[2010]**

(a) Cannizzaro reaction (b) Wurtz reaction

(c) Aldol condensation (d) Friedel-Crafts reaction

**21.** Reaction of a carbonyl compound with one of the following reagents involves nucleophilic addition followed by elimination of water. The reagent is **[2015]**

(a) A grignard reagent

(b) Hydrazine in presence of feebly acidic solution

(c) Hydrocyanic acid

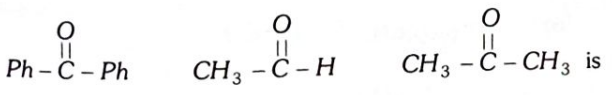
(d) Sodium hydrogen sulphite

**22.** Which one of the following undergoes reaction with 50% sodium hydroxide solution to give the corresponding alcohol and acid **[2004; 2007]**

(a) Butanal (b) Benzaldehyde

(c) Phenol (d) Benzoic acid

**23.** The correct order of reactivity of $PhMgBr$ with



(I) (II) (III) **[2011]**

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

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

**24.** The product formed in Aldol condensation is **[2007]**

(a) A beta–hydroxy acid

(b) A beta–hydroxy aldehyde or a beta–hydroxy ketone

(c) An alpha–hydroxy aldehyde or ketone

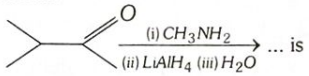
(d) An alpha, beta unsaturated ester

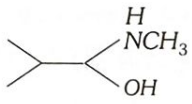
**25.** An organic compound 'X' having molecular formula $C_5H_{10}O$ yields phenyl hydrazone and gives negative response to the iodoform test and Tollen's test. It produces *n*-pentane on reduction. 'X' could be **[2015]**

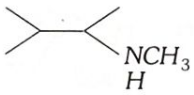
(a) 2-pentanone (b) 3-pentanone

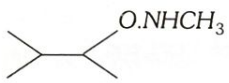
(c) *n*-amyl alcohol (d) Pentanal

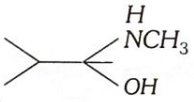
**26.** The major organic product formed from the following reaction **[2005]**



(a) 

(b) 

(c) 

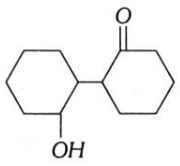
(d) 

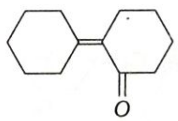
**27.** Which of the following reagents would distinguish cis-cyclopenta – 1, 2- diol from the trans-isomer **[2016]**

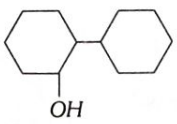
(a) Acetone (b) Ozone

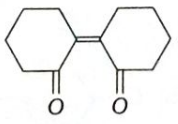
(c) $MnO_2$ (d) Aluminium isopropxide

**28.** Of the following, which is the product formed when cyclohexanone undergoes aldol condensation followed by heating **[2017]**

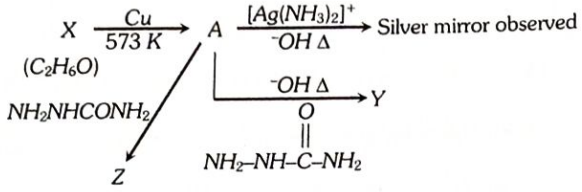
(a) 

(b) 

(c) 

(d) 

**29.** Consider the reaction




Identify $A, X, Y$ and $Z$ **[2017]**

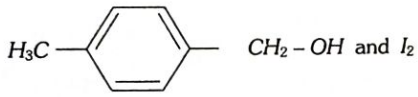
(a) A – Methoxymethane, X – Ethanoic acid, Y – Acetate ion, Z – hydrazine

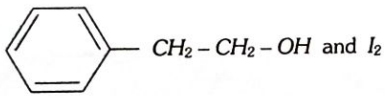
(b) A – Methoxymethane, X – Ethanol, Y – Ethanoic acid, Z – Semicarbazide

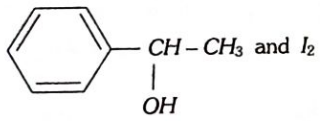
(c) A – Ethanal, X – Ethanol, Y – But–2–enal, Z – semicarbazone

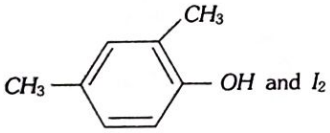
(d) A – Ethanol, X – Acetaldehyde, Y – Butanone, Z – Hydrazone

**30.** Compound $A$, $C_8H_{10}O$, is found to react with $NaOI$ (produced by reacting $Y$ with $NaOH$) and yields a yellow precipitate with characteristic smell. $A$ and $Y$ are respectively **[2018]**

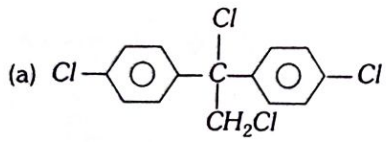
(a)  $CH_2-OH$ and $I_2$

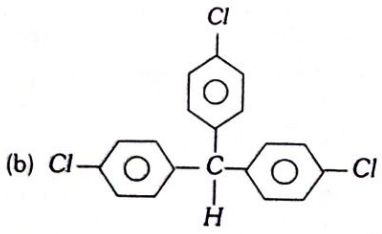
(b)  $CH_2-CH_2-OH$ and $I_2$

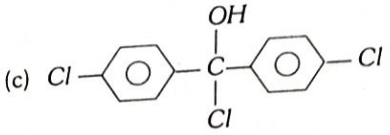
(c)  $CH-CH_3$ and $I_2$

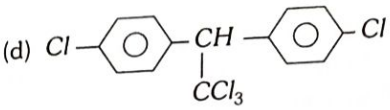
(d)  $OH$ and $I_2$

**31.** Trichloroacetaldehyde, $CCl_3CHO$ reacts with chlorobenzene in presence of sulphuric acid and produces **[2009]**

(a) 

(b) 

(c) 

(d) 

**32.** Paraldehyde is used as a **[1989]**

(a) Medicine (b) Poison

(c) Polymer (d) Dye

**33.** $C_2H_5OH$ and $RCOOC_2H_5$ can be separated from $CH_3CHO$ using **[2006]**

(a) Tollen's reagent (b) $I_2$ / $NaOH$

(c) $NH_2NH_2$ (d) $NaHSO_3$

**34.** In this reaction

$$CH_3CHO + HCN \downarrow$$
$$CH_3CH(OH)CN \xrightarrow{H^+/OH^-} CH_3CH(OH)COOH$$

an asymmetric centre is generated. The acid obtained would be **[2003]**

(a) 20% $D$ + 80% $L$-isomer

(b) $D$-isomer

(c) $L$-isomer

(d) 50% $D$ + 50% $L$-isomer

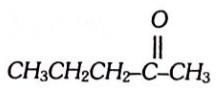
**35.** $3CH_3COCH_3 \xrightarrow{HCl} (CH_3)_2C=CH-CO-CH=C(CH_3)_2$

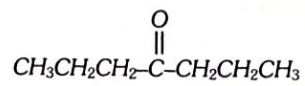
This polymer ($B$) is obtained when acetone is saturated with hydrogen chloride gas, $B$ can be **[1989]**

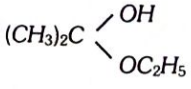
(a) Phorone (b) Formose

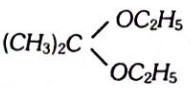
(c) Diacetone alcohol (d) Mesityl oxide

**36.** Acetone is treated with excess of ethanol in the presence of hydrochloric acid. The product obtained is **[2012]**

(a) 

(b) 

(c) 

(d) 

**37.** Phenylmethanol can be prepared by reducing the benzaldehyde with **[1997]**

(a) $CH_3Br$ (b) $Zn$ and $HCl$

(c) $CH_3Br$ and $Na$ (d) $CH_3I$ and $Mg$

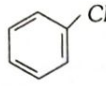
**38.** $CH_3CHO$ and $C_6H_5CH_2CHO$ can be distinguished chemically by **[2012]**

(a) Benedict test (b) Iodoform test

(c) Tollen's reagent test (d) Fehling solution test

**39.** Reaction by which Benzaldehyde cannot be prepared **[2013]**

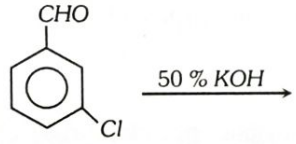
(a)  $+ Zn/Hg$ and conc. $HCl$

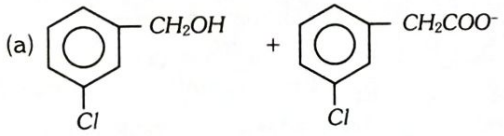
(b)  $+ CrO_2Cl_2$ in $CS_2$ followed by $H_3O^+$

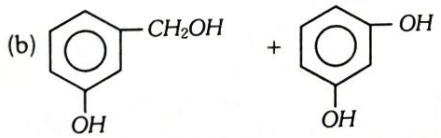
(c)  $+ H_2$ in presence of $Pd + BaSO_4$

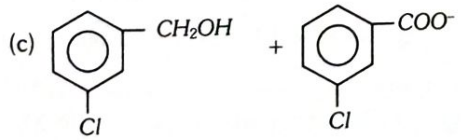
(d)  $+ CO + HCl$ in presence of anhydrous $AlCl_3$

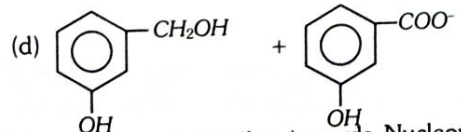
**40.** Predict the product in the given reaction **[2012]**



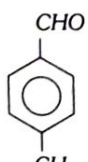
(a) 

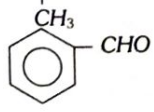
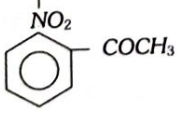
(b) 

(c) 

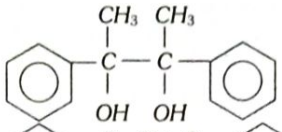
(d) 

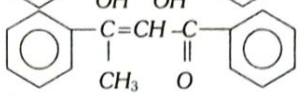
**41.** Which one is most reactive towards Nucleophilic addition reaction **[2014]**

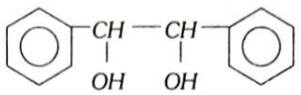
(a)  (b) 

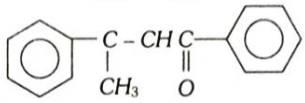
(c)  (d) 

**42.** Acetophenone when reacted with a base, $C_2H_5ONa$, yields a stable compound which has the structure **[2008]**

(a) 

(b) 

(c) 

(d) 

**43.** The reagent(s) which can be used to distinguish acetophenone from benzophenone is (are) **[1990]**

(a) 2, 4-dinitrophenyl hydrazine

(b) Aqueous solution of $NaHSO_3$

(c) Benedict reagent

(d) $I_2$ and $Na_2CO_3$

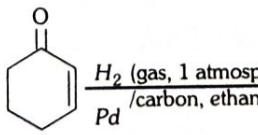
**44.** Match the compounds given in **List I** with **List II** and select the suitable option using the code given below

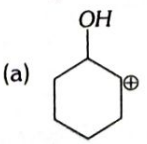
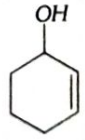
| ***List I*** | ***List II*** |
|---|---|
| (A) Benzaldehyde | (i) Phenolphthalein |
| (B) Phthalic anhydride | (ii) Benzoin condensation |
| (C) Phenyl benzoate | (iii) Oil of wintergreen |
| (D) Methyl salicylate | (iv) Fries rearrangement |

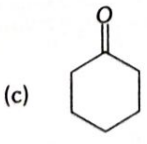
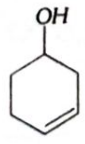
Code **[2011]**

| | **(A)** | **(B)** | **(C)** | **(D)** |
|---|---|---|---|---|
| (a) | (ii) | (iii) | (iv) | (i) |
| (b) | (ii) | (i) | (iv) | (iii) |
| (c) | (iv) | (i) | (iii) | (ii) |
| (d) | (iv) | (ii) | (iii) | (i) |

**45.** The correct structure of the product A formed in the reaction

 is **[2016]**

(a)  (b) 

(c)  (d) 

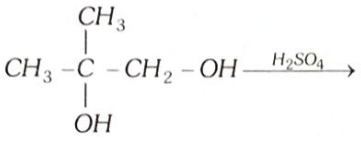
## 12. AIIMS

**1.** Dry heating of calcium acetate gives **[1996]**

(a) Acetaldehyde (b) Ethane

(c) Acetic acid (d) Acetone

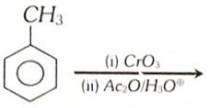
**2.** The major product of the following reaction is

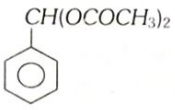


**[2007]**

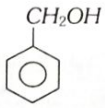
(a) $(CH_3)_2C = CH_2$ (b) Butan–2–one

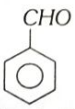
(c) $(CH_3)_2\underset{OH}{\underset{|}{C}} - CHO$ (d) Isobutyraldehyde

**3.**  A; Product *A* is **[2015]**

(a) 

(b) 

(c) 

(d) 

**4.** Which of the following does not give brick red precipitate with Fehling solution **[1996]**

(a) Acetone (b) Acetaldehyde

(c) Formalin (d) *D*-glucose

**5.** Acetaldehyde and acetone can be distinguished by **[1996]**

(a) Molisch test (b) Bromoform test

(c) Solubility in water (d) Tollen's test

**6.** Which one of the following gives iodoform test **[1996]**

(a) Formaldehyde (b) Ethyl alcohol

(c) Benzyl alcohol (d) Benzaldehyde

**7.** Formaldehyde reacts with ammonia to give urotropine. The formula of urotropine is **[1982]**

(a) $(CH_2)_6N_4$ (b) $(CH_2)_4N_3$

(c) $(CH_2)_6N_6$ (d) $(CH_2)_3N_3$

**8.** $CH_3CHO$ react with aqueous $NaOH$ solution to form **[2008]**

(a) 3-hydroxy butanal (b) 2-hydroxy butanal

(c) 4-hydroxy butanal (d) 3-hydroxy butanol

**9.** The reagent that gives an orange coloured precipitate with acetaldehyde **[1987]**

(a) $NH_2OH$ (b) $NaHSO_3$

(c) Iodine (d) 2, 4-*DNP*

**10.** The reaction of acetaldehyde with conc. $KMnO_4$ gives **[1996]**

(a) $CH_3COOH$ (b) $CH_3CH_2OH$

(c) $HCHO$ (d) $CH_3OH$

**11.** 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 **[2015]**

(a) A secondary alcohol (b) A primary alcohol

(c) Phenol (d) *tert*-Butyl alcohol

**12.** The reagent used for the separation of acetaldehyde from acetophenone is **[2004]**

(a) $NaHSO_3$ (b) $C_6H_5NHNH_2$

(c) $NH_2OH$ (d) $NaOH - I_2$

## 13. Assertion and Reason

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 : 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, 99]**

**2.** Assertion : Acetaldehyde on treatment with alkaline gives aldol.

Reason : Acetaldehyde molecules contains α hydrogen atom. **[AIIMS 1997]**

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

Reason : Alkaline $KMnO_4$ is a reducing agent. **[AIIMS 2000]**

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

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

**5.** Assertion : Isobutanal does not give iodoform test

Reason : It does not have α-hydrogen. **[AIIMS 2004]**

**6.** Assertion : α-Hydrogen atoms in aldehydes and ketones are acidic.

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

**7.** Assertion : Hydroxyketones are not directly used in Grignard reaction.

Reason : Grignard reagents react with hydroxyl group. **[AIIMS 2003]**

# 30. Aldehydes and Ketones – Answers Keys

## 1. Introduction

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | c | 2 | b | 3 | c | 4 | b | 5 | c |
| 6 | a | 7 | b | 8 | d | 9 | a | | |

## 2. Preparation of Aldehydes and Ketones

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | c | 2 | a | 3 | c | 4 | b | 5 | d |
| 6 | a | 7 | d | 8 | b | 9 | b | 10 | b |
| 11 | d | 12 | c | 13 | d | 14 | d | 15 | c |
| 16 | a | 17 | a | 18 | b | 19 | c | 20 | b |
| 21 | a | | | | | | | | |

## 3. Properties of Aldehydes and Ketones

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

## 4. Formaldehyde

| | | | |
|---|---|---|---|
| 1 | c | 2 | d |

## 5. Acetaldehyde

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | a | 2 | c | 3 | b | 4 | c | 5 | d |
| 6 | a | 7 | b | | | | | | |

## 6. Acetone

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | b | 2 | c | 3 | a | 4 | b | 5 | b |

## 7. Benzaldehyde

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | b | 2 | b | 3 | b | 4 | b | 5 | b |
| 6 | d | 7 | b | 8 | b | | | | |

## 8. Acetophenone and Benzophenone

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | c | 2 | c | 3 | b | 4 | d | 5 | a |

## 9. Unsaturated Cyclic, Di-aldehydes and Ketones

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | c | 2 | a | 3 | d | 4 | a | 5 | b |
| 6 | a | 7 | b | | | | | | |

## 10. IIT-JEE/ AIEEE

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

## 11. NEET/ AIPMT/ CBSE-PMT

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | a | 2 | d | 3 | a | 4 | c | 5 | c |
| 6 | a | 7 | d | 8 | d | 9 | a | 10 | c |
| 11 | b | 12 | c | 13 | a | 14 | d | 15 | d |
| 16 | a | 17 | c | 18 | b | 19 | c | 20 | a |
| 21 | b | 22 | b | 23 | c | 24 | b | 25 | b |
| 26 | b | 27 | a | 28 | b | 29 | c | 30 | c |
| 31 | d | 32 | a | 33 | d | 34 | d | 35 | a |
| 36 | d | 37 | b | 38 | b | 39 | a | 40 | c |
| 41 | b | 42 | b | 43 | d | 44 | b | 45 | c |

## 12. AIIMS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | d | 2 | d | 3 | d | 4 | a | 5 | d |
| 6 | b | 7 | a | 8 | a | 9 | d | 10 | a |
| 11 | a | 12 | a | | | | | | |

## 13. Assertion and Reason

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | b | 2 | a | 3 | d | 4 | b | 5 | c |
| 6 | c | 7 | a | | | | | | |