CHEMISTRY

BOOKS - MTG CHEMISTRY (ENGLISH)

ALDEHYDES, KETONES AND CARBOXYLIC ACIDS

Mcqs Nomenclature And Structure Of Carbonyl Group

1. Which of the following structures is not correctly matched ?

A. α- Methoxypropionaldehyde - $H_3C-\overset{H_3CO}{\overset{|}{C}}H-\overset{O}{\overset{||}{C}}-H$

B. 3 - Hydroxybutanal - $CH_3-\overset{OH}{\overset{|}{C}}H-CH_2CHO$

C. 4 - Oxopentanal - $CH_3CH_2CH_2-\overset{O}{\overset{||}{C}}-CHO$

D. Di-sec. - butylketone - $CH_3CH_2-\overset{CH_3}{\overset{|}{C}}H-\overset{O}{\overset{||}{C}}-\overset{CH_3}{\overset{|}{C}}H-CH_2CH_3$

Answer: C

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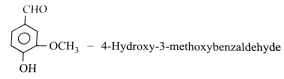
2. Which of the following names of the organic compounds is not correctly written ?

A. 

– 4-Hydroxy-3-methoxybenzaldehyde

B. 

– 5-Methylcyclohexanecarbaldehyde

C. 

– 2-(2-Chlorophenyl)ethanal

D. $CH_2 = CH - \overset{O}{\overset{\|}{C}} - CH = CH_2$ -Penta - 1, 4 - dien - 3 - one

Answer: B

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3. Which of the following carbonyl compounds is most polar ?

A. $C_2H_5 - \overset{\overset{O}{\|}}{C} - C_2H_5$

B. $CH_3 - \overset{\overset{O}{\|}}{C} - CH_3$

C. $CH_3 - \overset{\overset{O}{\|}}{C} - H$

D. $H - \overset{\overset{O}{\|}}{C} - H$

Answer: D

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Mcqs Preparation Of Aldehydes And Ketones

1. Ketones $\left(R - \overset{\overset{O}{\|}}{C} - R' \right)$ can be obtained in one step by (where R and R' are alkyl groups)

A. hydrolysis of esters

B. oxidation of primary alcohols

C. oxidation of secondary alcohols

D. reaction of alkyl halides with alcohols.

Answer: C

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2. Ozonolysis of an organic compound gives formaldehyde as one of products. This confirms the presence of

A. two ethylenic double bonds

B. an isopropyl group

C. an isopropyl group

D. an acetylenic triple bond.

Answer: B

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3. A diene, buta - 1, 3 - diene was subjected to ozonolysis to prepare aldehydes. Which of the following aldehydes will be obtained during the reaction ?

A. $\begin{matrix}\text{CHO}\\|\\\text{CHO}\end{matrix} + 2HCHO$

B. $CH_3CHO + 2HCHO$

C. $CH_3CH_2CHO + CH_3CHO$

D. $2CH_3CH_2CHO$

Answer: A

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4. An alkene 'X' (molecular formula C_5H_{10}) on ozonolysis gives a mixture of two compounds 'Y' and 'Z'. Compound 'Y' gives positive Fehling's test and also forms iodoform on treatement with I_2 and $NaOH$. Compound 'Z' does not give Fehling's test but forms iodoform. Identify

the compounds X, Y and Z. Write the reaction for ozonolysis and formation of iodoform from Y and Z.

A. $\overset{X}{C_6H_5COCH_3}\quad \overset{Y}{CH_3CHO}\quad \overset{Z}{CH_3COCH_3}$

B. $\overset{X}{CH_3-CH=\underset{\underset{CH_3}{|}}{C}-CH_3}\quad \overset{Y}{CH_3CHO}\quad \overset{Z}{CH_3COCH_3}$

C. $\overset{X}{CH_3CH_2CH=CH_2}\quad \overset{Y}{CH_3CH_2CHO}\quad \overset{Z}{HCHO}$

D. $\overset{X}{CH_3-CH=CH-CH_3}\quad \overset{Y}{CH_3CHO}\quad \overset{Z}{CH_3CHO}$

Answer: B

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5. Propanone can be prepared from ethyne by

A. passing a mixture of ethyne and steam over a catalyst, magnesium at $420^\circ C$

B. passing a mixture of ethyne and ethanol over a catalyst zinc chromite

C. boiling ethyne with water and H_2SO_4

D. treating ethyne with Iodine and NaOH.

Answer: A

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6. In the following reacton, product P is

$$R-\overset{\overset{O}{||}}{C}-Cl \xrightarrow[Pd-BaSO_4]{H_2} P$$

A. RCHO

B. RCH_3

C. RCOOH

D. RCH_2OH

Answer: A

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7. The reduction of benzoyl chloride with $H_2 / Pd - BaSO_4$ produces

A. benzoic acid

B. benzyl alcohol

C. benzoyl sulphate

D. benzaldehyde.

Answer: D

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8. The oxidation of toluene to benzaldehyde by chromyl chloride is called

A. Etard reaction

B. Riemer-Tiemann reaction

C. Wurtz reaction

D. Cannizzaro's reaction

Answer: A

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9. Benzaldehyde can be prepared from benzene by passing vapours of ..... and ..... in its solution in presence of catalyst mixture of aluminium chloride and cuprous chloride. The reaction is known as ..... .

A. HCl, $SnCl_4$, Rosenmund reduction

B. CO, HCl, Gattermann-Koch reaction

C. CO_2, H_2SO_4, Clemmensen reduction

D. O_3, alcohol, Wolff-Kishner reduction

Answer: B

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10. Benzophenone can be obtained by

I. Benzoyl chloride +Benzene+$AlCl_3$

II. Benzoyl chloride + Diphenyl cadmium ltbr. III. Benzoyl chloride+Phenyl magnesium chloride ltbr. IV. Benzene+ Carbon monoxide+ $ZnCl_2$

Select an appropirate option

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iii)

D. (i), (ii) and (iii)

Answer: C

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Mcqs Physical Properties

1. There is a large difference in the boiling points of butanal and butan - 1 - ol due to

A. intermolecular hydrogen bonding in butan -1-ol

B. intramolecular hydrogen bonding in butanal

C. higher molecular mass of butan-1-ol

D. resonance shown by butanal .

Answer: A

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2. Choose the correct statement regarding the physical properties of carbonyl compound.

A. All aldehydes are insoluble in benzene.

B. Higher aldehydes are more fragrant.

C. n - Butane has more boiling point than acetone.

D. Methanal and propanone are immiscible with water in all proportions.

Answer: B

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Mcqs Chemical Reactions

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

Ethanal, Propanal, Propanone, Butanone

A. Butanone lt Propanone lt Propanal lt Ethanal

B. Propanone lt Butanone lt Ethanal gt Propanal

C. Propanal lt Ethanal lt Propanone lt Butanone

D. Ethanal lt Propanal lt Propanone lt Butanone

Answer: A

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2. Which among the following is most reactive to give nucleophilic addition?

A. FCH_2CHO

B. $ClCH_2CHO$

C. $BrCH_2CHO$

D. ICH_2CHO

Answer: A

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3. The addition of HCN to carbonyl compounds is an example of

A. nucleophilic addition

B. electrophilic addition

C. free radical addition

D. elimination addition.

Answer: A

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4. Which of the following compounds does not react with $NaHSO_3$?

A. $HCHO$

B. $C_6H_5COCH_3$

C. CH_3COCH_3

D. CH_3CHO

Answer: B

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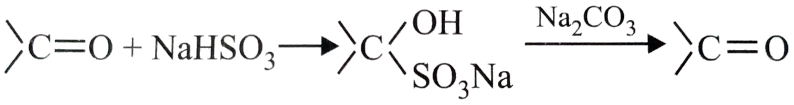
5. Study the given reaction and identify the process which is carried out.



A. It is used for purification of aldehydes and ketones .

B. It is used to distinguish aldehydes from ketones.

C. It is used to prepare cyclic aldehydes and ketones.

D. It is used to study polar nature of aldehydes and ketones.

Answer: A

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6. Aldehydes other than formaldehyde react with Grignard reagent to give addition products which on hydrolysis give

A. tertiary alcohols

B. secondary alcohols

C. primary alcohols

D. carboxylic acids.

Answer: B

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7. Identify reactant (X) in the given reaction sequence.

$$CH_3COCH_3 + X \rightarrow (CH_3)_3C - OMg - Cl \xrightarrow{H_2O} (CH_3)_3C - OH + Mg$$

A. CH_3MgCl

B. $CH_3COCl + Mg$

C. $MgCl_2$

D. CH_3CH_2MgCl

Answer: A

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8. An organic compound (X) with molecular formula C_3H_6O is not readily oxidised. On reduction it gives C_3H_8O (Y) which reacts with HBr to give alkyl bromide (Z) which is converted to Grignard reagent. Grignard reagent reacts with (X) to give 2 , 3-dimethylbutan-2-ol. (X), (Y) and (Z) repectively are.

A. $CH_3COCH_3, CH_3CH_2CH_2OH, CH_3CH(Br)CH_3$

B. $CH_3CH_2CHO, CH_3CH=CH_2, CH_3CH(Br)CH_3$

C. $CH_3COCH_3, CH_3CH(OH)CH_3, CH_3CH(Br)CH_3$

D. $CH_3CH_2CHO, CH_3CH_2CH_2OH, CH_3CH_2CH_2Br$

Answer: C

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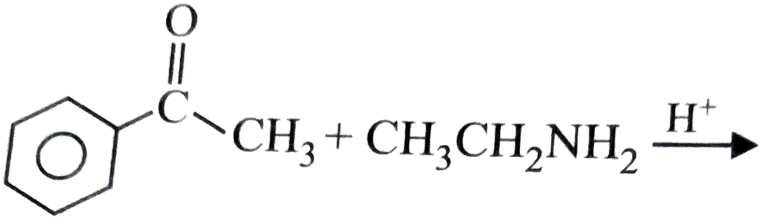
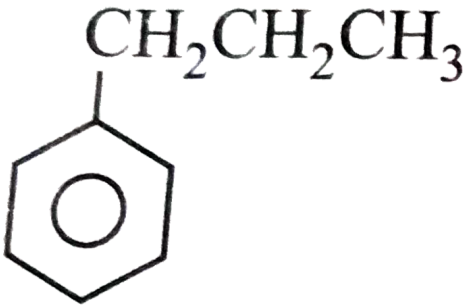
9. Find the product of the given reaction.



A.



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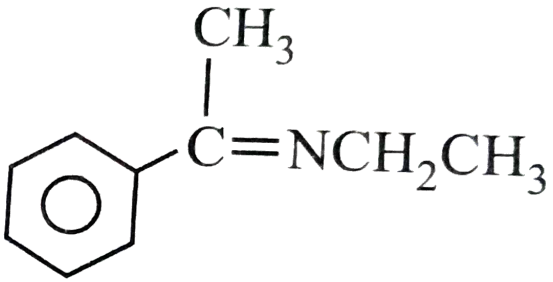
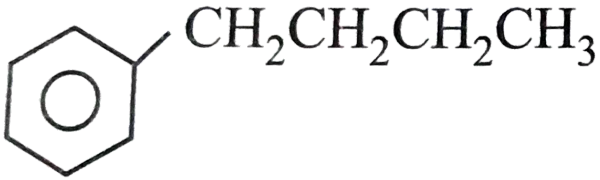
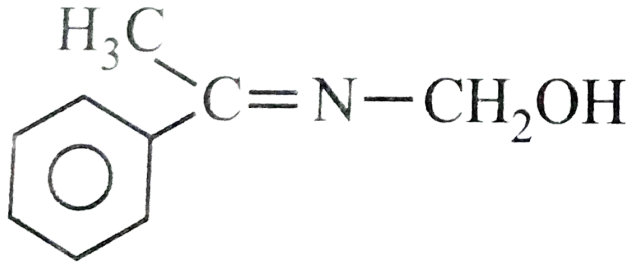


C.



D. 

Answer: B

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10. The best method to purify impure acetone is

A. $CH_3COCH_3 + HCl \rightarrow CH_3 - \underset{Cl}{\overset{OH}{\underset{|}{\overset{|}{C}}}} - CH_3 \xrightarrow{\text{heat}} CH_3COCH_3$

B. $CH_3COCH_3 + NaHSO_3 \rightarrow CH_3 - \underset{CH_3}{\overset{OH}{\underset{|}{\overset{|}{C}}}} - SO_3Na \xrightarrow{Na_2CO_3} CH_3COC$

C. $CH_3COCH_3 + HCN \rightarrow CH_3 - \underset{CN}{\overset{OH}{\underset{|}{\overset{|}{C}}}} - CH_3 \xrightarrow{HOH} CH_3COCH_3$

D.

$$CH_3COCH_3 + H_2SO_4 \rightarrow CH_3 - \underset{\underset{OSO_3H}{|}}{\overset{\overset{OH}{|}}{C}} - CH_3 \rightarrow \xrightarrow{\text{heat}} CH_3C$$

Answer: B

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11. $R - CH = CH - CHO + NH_2 - \overset{\overset{O}{||}}{C} - NHNH_2 \xrightarrow{H^+} X$

(X) in the above reaction is

A. $R - CH = CH - \overset{\overset{OH}{|}}{CH} - NH_2CONHNH_2$

B. $R - CH = CH - CH = N - NH - \overset{\overset{O}{||}}{C} - NH_2$

C. $R - CH = NH_2CONH_2$

D. $R - CH = CH - \underset{\underset{OH}{|}}{CH} - NH_2COCH = NHNH_2$

Answer: B

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12. Hydrocarbons are formed when aldehydes and ketones are reacted with amalgamated zinc and conc. HCl. The reaction is called

A. Cannizzaro reaction

B. Clemmensen reduction

C. Rosenmund reduction

D. Wolff-Kishner reduction.

Answer: B

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13. Which of the following statements is incorrect ?

A. $FeCl_3$ is used in the detection of phenols.

B. Fehling solution is used in the detection of glucose.

C. Tollens' reagent is used in the detection of unsaturation.

D. $NaHSO_3$ is used in the detection of carbonyl compounds.

Answer: C

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14. What is the test to differentiate between pentan - 2- one and pentan - 3 -one ?

A. Iodoform test

B. Benedict's test

C. Fehling's test

D. Aldol condensation

Answer: A

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15. The best oxidising agent for oxidation of

$CH_3 - CH = CH - CHO$ to $CH_3 - CH = CH - COOH$ is

A. Baeyer's reagent

B. Tollens' reagent

C. Schiff's reagent

D. acidified dichromate.

Answer: B

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16. Which of the following statements is not correct ?

A. Aldehydes and ketones are functional isomers.

B. Formaldehyde reacts with ammonia to form hexamethyleneteramine.

C. $LiAlH_4$ converts ketones into sec- alcohols.

D. Ethanal and propanal give positive iodoform test.

Answer: D

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17. In the following sequence of reaction, the final product (Z) is

$$CH \equiv CH \xrightarrow[H_2SO_4]{Hg^{2+}} X \xrightarrow[H_2O]{CH_3MgX} Y \xrightarrow{[O]} Z$$

A. ethanal

B. propan - 2 - ol

C. propanone

D. propane - 1 - ol

Answer: C

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18. Which of the following reagents are not correctly matched with the reaction ?

A.

$$CH_3CH = CHCHO \rightarrow CH_3CH = CHCOOH: \quad \text{Ammoniacal} \quad Ag$$

B. $CH_3CH = CHCHO \rightarrow CH_3CH = CHCH_2OH: H_2 / Pt$

C. $R - COOH \rightarrow R - CH_2OH: NaBH_4$

D. $CH_3CH_2COCl \rightarrow CH_3CH_2CHO: H_2Pd / BaSO_4$

Answer: B

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19. Identify (X), (Y) and (Z) in the given reaction.

$$CH_3COCH_3 \xrightarrow[\text{heat}]{I_2 + NaOH} X \xrightarrow[\text{heat}]{Ag} Y \xrightarrow[\text{heat}]{H_2SO_4 / HgSO_4} Z$$

A. $X = CHI_3, Y = CH_3CHO, Z = HCHO$

B. $X = CHI_3, Y = CH_3OH, Z = CH_3CHO$

C. $X = CHI_3, Y = CH \equiv CH, Z = CH_3CHO$

D. $X = CH_3COCI_3, Y = CH_2 = CH_2, Z = CH_3CHO$

Answer: C

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20. Identify (X), (Y) and (Z) reagents in the given sequence of reaction.

$$CH \equiv CH \xrightarrow{X} CH_3CHO \xrightarrow{Y} CH_3CH(OH)CH_3 \xrightarrow{Z} CH_3COCH_3$$

A. $X = H_2SO_4, Y = H_2\frac{\emptyset}{O}H^-, Z = PCl_5$, heat

B. $X = HNO_3, Y = Na_2CO_3, Z = H_2SO_4$, heat

C. $X = H_2SO_4 / Hg^{2+}, Y = PCl_5 / H_2O, Z = K_2Cr_2O_7 / OH^-$

D. $X = H_2SO_4 / Hg^{2+}, Y = CH_3MgBr / H_2O, Z = K_2CrO_7 / H^+$

Answer: D

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21. Which of the following does not answer iodoform test ?

A. n - Butyl alcohol

B. sec - Butyl alcohol

C. Acetophenone

D. Acetaldehyde

Answer: A

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22. A compound 'A' having the molecular formula $C_5H_{12}O$, on oxidation gives a compound 'B' with molecular formula $C_5H_{10}O$. Compound 'B' gave a 2, 4- dinitrophenylhydrazine derivative but did not answer haloform test or silver mirror test. The structure of compound 'A' is

A. $CH_3 - CH_2 - CH_2 - CH_2 - CH_2 - OH$

B. $CH_3 - CH_2 - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_3$

C. $CH_3 - CH_2 - \underset{\underset{|}{OH}}{CH} - CH_2 - CH_3$

D. $CH_3 - CH_2 - \underset{\underset{|}{CH_3}}{CH} - CH_2 - OH$

Answer: C

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23. To differentiate between pentan -2-one and pentan -3-one a test is carried out. Which of the following is the correct answer?

A. Pentan - 2 -one will give silver mirror test.

B. Pentan - 2 - one will give iodoform test.

C. Pentan - 3 - one will give iodoform test.

D. None of these.

Answer: B

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24. An organic compound of molecular formula C_3H_6O did not give a silver mirror with with Tollens' reagent but give an oxime with hydroxylamine. It may be

A. $CH_2 = CH - CH_2 - OH$

B. CH_3COCH_3

C. CH_3CH_2CHO

D. $CH_2 = CH - OCH_3$

Answer: B

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25. Which is the correct method of synthesising acetamide from acetone?

A.

$$CH_3COCH_3 \xrightarrow{Pd/BaSO_4} CH_3CHO \xrightarrow{NH_3} CH_3CH_2NH_2 \xrightarrow{H_2O} CH_3CON$$

B.

$$CH_3COCH_3 \xrightarrow[NaOH]{I_2} CH_3COONa \xrightarrow[NH_3]{H^+} CH_3COONH_4 \xrightarrow{\Delta} CH_3CON$$

C. $CH_3COCH_3 \xrightarrow{CrO_3} CH_3COOH \xrightarrow{NH_3} CH_3CONH_2$

D.

$$CH_3CONH_3 \xrightarrow[NaOH]{I_2} CH_3COOH \xrightarrow{HCl} CH_3COCl \xrightarrow{NH_3} CH_3CONH_2$$

Answer: B

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26. Compound (X) with molecular formula C_3H_8O is treated with acidified potassium dichromate to form a product (Y) with molecular formula C_3H_6O. (Y) does not form a shining silver mirror on warming with ammoniacal $AgNO_3$. (Y) when treated with an aqueous solution of $NH_2CONHNH_2$. HCl and sodium acetate, gives a product (Z). The structure of (Z) is

A. $CH_3CH_2CH = NNHCONH_2$

B. $(CH_3)_2C = NNHCONH_2$

C. $(CH_3)_2C = NCONHNH_2$

D. $CH_3CH_2CH = NCONHNH_2$

Answer: B

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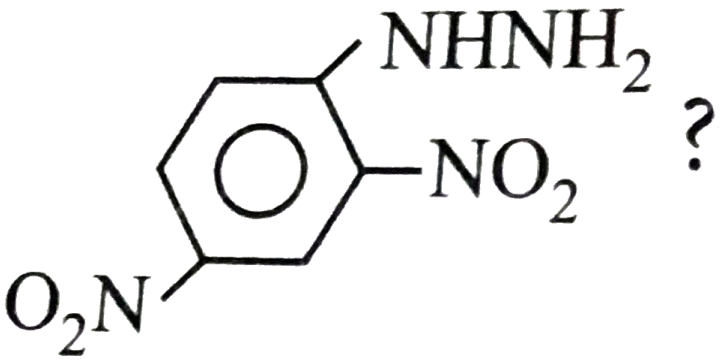
27. Which of the following compounds will give a coloured crystalline compound with



?

A. CH_3COCl

B. $CH_3COOC_2H_5$

C. CH_3COCH_3

D. CH_3CONH_2

Answer: C

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28. Match the column I with column II and mark the appropriate choice .

Column I		Column II	
(A)	$>C=O \xrightarrow{LiAlH_4}$	(i)	$-COONa$
(B)	$>C=O \xrightarrow[\text{conc. HCl}]{Zn/Hg}$	(ii)	$-COOH$
(C)	$>C=O \xrightarrow{Ag_2O/OH^-}$	(iii)	$>CH_2$
(D)	$>C=O \xrightarrow{NaOX}$	(iv)	$-CH_2OH$

A. $(A) \to (i), (B) \to (ii), (C) \to (iii), (D) \to (iv)$

B. $(A) \to (iv), (B) \to (iii), (C) \to (ii), (D) \to (i)$

C. $(A) \to (ii), (B) \to (iv), (C) \to (iii), (D) \to (i)$

D. $(A) \rightarrow (iii), (B) \rightarrow (i), (C) \rightarrow (ii), (D) \rightarrow (iv)$

Answer: B

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29. Few simple chemical tests are given below to differentiate between the pairs of compounds.Which of the following tests is not correct for differentiation ?

A. Propanal and propanone - Silver mirror test

B. Acetophenone and benzophenone - Iodoform test

C. Ethanal and propanal - Fehling's test

D. Benzoic acid and ethyl benzoate - Sodium bicarbonate test

Answer: C

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30. Which of the following will not give aldol condensation ?

A. Phenyl acetaldehyde

B. 2 - Methylpentanal

C. Benzaldehyde

D. 1 - Phenylpropanone

Answer: C

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31. The claisen schmidt condensation product of benzaldehyde and acetone is

A. $C_6H_5CH = C(CH_3)_2$

B. $C_6H_5CH_2 - \overset{O}{\overset{||}{C}} - CH = CH_2$

C. $C_6H_5 - \overset{O}{\overset{||}{C}} - CH = CH - CH_3$

D. $C_6H_5 - CH = CH - \overset{\overset{O}{\|}}{C} - CH_3$

Answer: D

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32. Study the following sequence of reaction and identify the product (Y).

$$CH_3CHO + HCHO \xrightarrow[\text{heat}]{\text{dil.}NaOH} X \xrightarrow[H_3O^+]{HCN} Y$$

A. $CH_2 = CH - \underset{\underset{OH}{|}}{CH} - COOH$

B. $CH_3 - \underset{\underset{OH}{|}}{\overset{\overset{CN}{|}}{C}} - COOH$

C. $CH_3CH_2 - \underset{\underset{OH}{|}}{CH} - COOH$

D. $CH_2 = CH - \underset{\underset{CN}{|}}{CH} - COOH$

Answer: A

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33. Identify (X), (Y) and (Z) in the given reaction.

$$X + Y \xrightarrow{Z} \underset{\text{3-Hydroxybutanal}}{CH_3 - \overset{OH}{\overset{|}{C}}H - CH_2 - CHO}$$

A. $\underset{HCHO}{X} \quad \underset{CH_3CHO}{Y} \quad \underset{KOH}{Z}$

B. $\underset{CH_3CHO}{X} \quad \underset{CH_3CHO}{Y} \quad \underset{NaOH}{Z}$

C. $\underset{CH_3CH_2OH}{X} \quad \underset{HCHO}{Y} \quad \underset{H_2SO_4}{Z}$

D. $\underset{CH_3CH_2CHO}{X} \quad \underset{HCHO}{Y} \quad \underset{\text{Dry ether}}{Z}$

Answer: B

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34. Propanal on treatment with dilute sodium hydroxide gives

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_2COOH

Answer: C

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35. Aldehydes that do not undergo aldol condensation are

(1) propanal (2) trichloroethanal (3) 2- phenylethanal (4) ethanal (5) benzaldehyde

A. 3 and 4 only

B. 2 and 5 only

C. 1, 2 and 3 only

D. 2, 3 and 5 only

Answer: B

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36. The order of reactivity of $CH_3CHO, CH_3COC_2H_5$ and CH_3COCH_3 is

A. $CH_3CHO > CH_3COCH_3 > CH_3COC_2H_5$

B. $C_2H_5COCH_3 > CH_3COCH_3 > CH_3CHO$

C. $CH_3COCH_3 > CH_3CHO > C_2H_2COCH_3$

D. $CH_3COCH_3 > C_2H_5COCH_3 > CH_3CHO$

Answer: A

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37. The final product (Y) in the following sequence of chemical reaction is

$$CH_3OH \xrightarrow[300^\circ C]{Cu} X \xrightarrow{NaOH} Y + CH_3OH$$

A. an alkene

B. a carboxylic acid

C. an aldehyde

D. sodium salt of carboxylic acid.

Answer: D

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38. Which of the following is a correct statement ?

A. $CCl_3 - CHO$ gives aldol condensation.

B. When mixture of ethanal and propanal is treated with aqueous NaOH, the product contains four aldols.

C. Mixture of HCHO and CH_3CHO will not give aldol condensation.

D. HCHO is least reactive towards oxidation.

Answer: B

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39. Which of the following is the most reactive isomer ?

A. $CH_3CH_2CH_2CH_2-\overset{\overset{O}{\|}}{C}-H$

B. $CH_3CH_2CH_2-\overset{\overset{O}{\|}}{C}-CH_3$

C. $CH_3CH_2-\overset{\overset{O}{\|}}{C}-CH_2CH_3$

D. $CH_3-\overset{\overset{O}{\|}}{C}-\underset{\underset{CH_3}{|}}{CH}-CH_3$

Answer: A

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40. When propanal reacts with 2- methylpropanal in presence of NaOH, four different products are formed. The reaction is known as

A. aldol condensation

B. cross aldol condensation

C. Cannizzaro reaction

D. HVZ condensation.

Answer: B

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41. Fill in the reagents for the given conversion :

$$CH_3COCl \xrightarrow{(X)} CH_3CHO \xrightarrow{(Y)} CH_3 - \overset{\overset{OH}{|}}{CH} - CH_2CHO \xrightarrow{(Z)} CH_3CH =$$

A. $\begin{matrix} X & Y & Z \\ H_2/Pd/BaSO_4 & \text{dil. } NaOH & \text{heat} \end{matrix}$

B. $\begin{matrix} X & Y & Z \\ NaOH & \text{Hydrolysis} & \text{heat} \end{matrix}$

C. $\begin{matrix} X & Y & Z \\ I_2/NaOH & LiAlH_4 & H_3O^+ \end{matrix}$

D. $\begin{matrix} X & Y & Z \\ CrO_3 & \text{Warm} & CO_2 \end{matrix}$

Answer: A

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42. Which compound is obtained when acetaldehyde is treated with dilute solution of caustic soda ?

A. Sodium acetate

B. Resinous mass

C. Aldol

D. Ethyl acetate

Answer: C

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43. Which of the following compounds will undergo self aldol condensation in the presence of cold dilute alkali ?

A. $CH \equiv C - CHO$

B. $CH_2 = CHCHO$

C. C_6H_5CHO

D. CH_3CH_2CHO

Answer: D

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44. Which of the following compounds will undergo Cannizzaro reaction ?

A. CH_3CHO

B. CH_3COCH_3

C. C_6H_5CHO

D. $C_6H_5CH_2CHO$

Answer: C

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45. Which of the following does not undergo Cannizzaro reaction?

A. Benzaldehyde

B. 2 - Methylpropanal

C. p - Methoxybenzaldehyde

D. 2, 2 - Dimethylpropanal

Answer: B

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46. Fill in the blanks by suitable choices.

The carbon atom in carbonyl group is ____ hybridised. The carbonyl group in aldehydes and ketone undergoes___. The carbonyl group in aldehydes and ketones undergoes _____ reactions. Aldehydes which have α-H atom undergo _____ reaction while aldehydes which have no α-H atom undergo _____ reaction.

A. sp^3 nucleophilic substitutions, aldol condensation, Cannizzaro

B. sp, electrophilic substitution, Cannizzro, aldol condensation

C. sp^2, nucleophilic addition, aldol condensation, Cannizaro

D. sp^3, electrophilic addition, Cannizzaro, aldol condensation

Answer: C

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47. Which of the following aldehydes will show Cannizzaro reaction ?

A. HCHO

B. C_6H_5CHO

C. $(CH_3)_3CCHO$

D. All of these.

Answer: D

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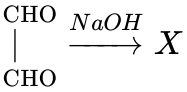
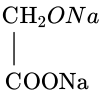
48. 

The product (X) will be

A. 

B. 

C. 

D. 

Answer: C

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49. An organic compound (X) with molecular formula $C_9H_{10}O$ gives positive 2, 4-DNP and Tollens'tests. It undergoes Cannizzaro reaction and on vigorous oxidation it gives 1, 4-benzenedicarboxylic acid. Compound (X) is

A. Benzaldehyde

B. o-methylbenzaldehyde

C. p-ethylbenzaldehyde

D. 2, 2-dimethylhexanal.

Answer: C

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50. What are correct steps to convert acetaldehyde to acetone?

A. CH_3MgBr, H_2O,Oxidation

B. Oxidation, $Ca(OH)_2$, Heat

C. Reduction, KCN, Hydrolysis

D. Oxidation C_2H_5ONa, heat

Answer: B

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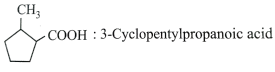
Mcqs Nomenclature And Structure Of Carboxyl Group

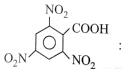
1. Which of the following IUPAC names is not correctly matched?

A. 

: 3-Cyclopentylpropanoic acid

B. $(CH_3)_2C = CHCOOH$: 3-Methylbut-2-enoic acid

C. $PhCH_2CH_2COOH$: 3-Phenylpropanoic acid

D. 

: 2, 4, 6-Trinitrobenzoic acid

Answer: A

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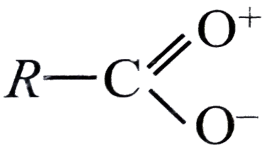
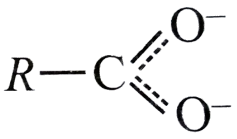
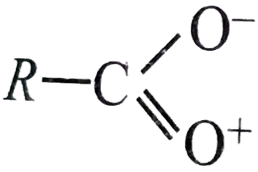
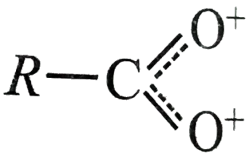
2. The correct structure representation of carboxylate ion is

A. 

B. 

C. 

D. 

Answer: B

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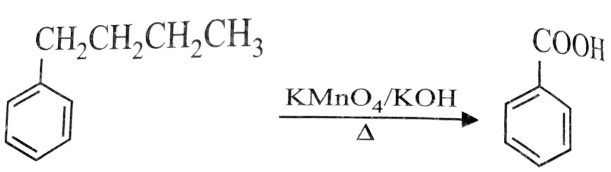
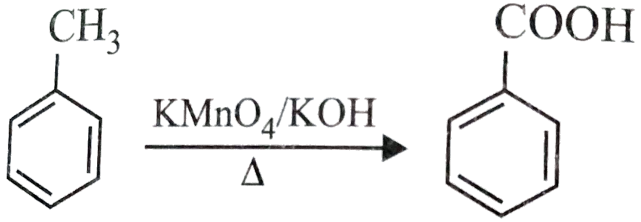
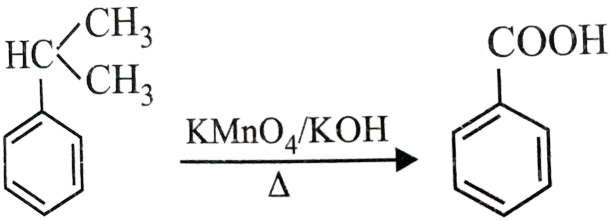
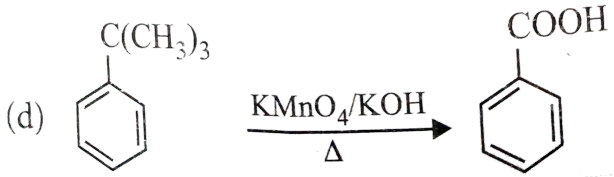
Mcqs Methods Of Preparation Of Carboxylic Acids

1. Which of the following reactions does not occur ?

A. 

B. 

C. 

D. 

Answer: D

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2. Which of the following will not yield acetic acid on strong oxidation ?

A. Butanone

B. Propanone

C. Ethyl ethanoate

D. Ethanol

Answer: C

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3. Various products formed on oxidation of 2, 5-dimethylhexan-3-one are

(i)$CH_3 - \underset{\underset{CH_3}{|}}{CH} - COOH$

(i) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - COOH$

(iii) CH_3COOH

(iv)HCOOH

A. (i) and (iii)

B. (i), (ii) and (iii)

C. (i) , (ii), (iii) and (iv)

D. (iii) and (iv)

Answer: C

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4. α-hydroxypropanoic acid can be prepared from ethanal by following the steps given in the sequence.

A. Treat with HCN followed by acidic hydrolysis.

B. Treat with $NaHSO_3$ followed by reaction with Na_2CO_3.

C. Treat with H_2SO_4 followed by hydrolysis.

D. Treat with $K_2Cr_2O_7$ in presence of suphuric acid.

Answer: A

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5. The end product (Z) in the given sequence of reaction is

$$CH_3CH=CHCHO \xrightarrow{NaBH_4} X \xrightarrow[ZnCl_2]{HCl} Y \xrightarrow[(ii)\,H+]{(i)\,KCN} Z$$

A. $CH_3CH = CHCH_2COOH$

B. $CH_3CH_2CH_2COOH$

C. $CH_3CH = CHCOOH$

D. $CH_3CH(Cl)CH_2COOH$

Answer: A

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6. Complete the reactions with appropriate products.

$CH_3CHO + NH_2OH \rightarrow X$

(i)$CH_3CHO + NH_2OH \rightarrow X$

(ii) $CH_2 = CH_2 + PdCl_2 + H_2O \xrightarrow{CuCl_2} Y$

(iii) $CH_3CH_2CH_2CH_2OH \xrightarrow{CrO_3 - H_2SO_4} Z$

A.

$$X = CH_3CH = NOH, Y = CH_3CHO, Z = CH_3CH_2CH_2COOH$$

B.

$X = CH_3CH_2NH_2, Y = CH_3CH_2CHO, Z = CH_3CH_2CH_2COOH$

C. $X = CH_3CONH_2, Y = HCHO, Z = CH_3COCH_3$

D. $X = CH_3C \equiv N, Y = CH_3CHO, Z = HCOOH$

Answer: A

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7. An aromatic compound (X) (C_8H_8O) gives positive 2, 4-DNP test. It gives a yellow precipitate of compound (Y) on reaction with iodine and sodium hydroxide solution. (X) does not give Tollens' test on oxidation under drastic conditions. It gives a carboxylic acid (Z) $(C_7H_6O_2)$.(Z) is also formed with (Y) during the reaction. (X), (Y) and (Z) respectively are

A. $C_6H_5COCH_3, CHI_3, C_6H_5COOH$

B. $CH_3COCH_3, CHI_3, CH_3COOH$

C. $C_6H_5COCH_3, CHI_3, CH_3COOH$

D. $CH_3CHO, CHI_3, C_6H_5COOH$

Answer: A

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Mcqs Physical Properties

1. Carboxylic acids dimerise due to

A. high molecular weight

B. coordinate bonding

C. intermolecular hydrogen bonding

D. covalent bonding.

Answer: C

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2. Which of the following carboxylic acids is highly insoluble in water

A. Propanoic acid

B. Butanoic acid

C. Pentanoic acid

D. Decanoic acid

Answer: D

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Mcqs Chemical Reactions

1. Which of the following compounds would have the smallest value for pK_a?

A. $CHF_2CH_2CH_2COOH$

B. $CH_3CH_2CF_2COOH$

C. $CH_2FCHFCH_2COOH$

D. $CH_3CF_2CH_2COOH$

Answer: B

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2. $-OH$ group present in alcohols is neutral white it is acidic in carboxylic acid because

A. in carboxylic acid -OH group is attached to electron withdrawing carbonyl group

B. in alcohols -OH group is attached to alkyl group which is elecron withdrawing

C. carboxylic group is an electron releasing group

D. alcoholic group is an electron withdrawing group.

Answer: A

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3. Which of the following is the correct order of relative strength of acids ?

A. $ClCH_2COOH > BrCH_2COOH > FCH_2COOH$

B. $BrCH_2COOH > ClCH_2COOH > FCH_2COOH$

C. $FCH_2COOH > ClCH_2COOH > BrCH_2COOH$

D. $ClCH_2COOH > FCH_2COOH > BrCH_2COOH$

Answer: C

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4. Which of the following orders is not correct for the decreasing order of acidic character ?

A.

$$CH_3CH_2CH(Cl)COOH > CH_3CH(Cl)CH_2COOH > CH_2(Cl)CH$$

B.

$$ICH_2COOH > BrCH_2COOH > ClCH_2COOHbtFCH_2COOH$$

C. $CCl_3COOH > CHCl_2COOH > CH_2ClCOOH > CH_3COOH$

D. $HCOOH > CH_3COOH > C_2H_5COOH > (CH_3)_2CHCOOH$

Answer: B

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5. In a set of the given reactions, acetic acid yielded a product iC.

$$CH_3COOH + PCl_5 \rightarrow A \xrightarrow[Anh.\,AlCl_3]{C_6H_6} B \xrightarrow[\text{ether}]{C_2H_5MgBr} C$$

Product C would be

A. $CH_3CH(OH)C_2H_5$

B. $CH_3COC_6H_5$

C. $CH_3CH(OH)C_6H_5$

D. $CH_3 - \overset{C_2H_5}{\underset{|}{C}}(OH)C_6H_5$

Answer: D

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6. Identify the compounds (X), (Y) and (Z) in the following reaction :

$$CH_3Br \xrightarrow{Mg/ether} X \xrightarrow[(ii)\,\text{water}]{(i)\,CO_2} Y \xrightarrow[\Delta]{CH_3OH,H^+} Z$$

A. $(X) = CH_3MgBr, (Y) = CH_3COOH, (Z) = CH_3COOCH_3$

B.

$(X) = CH_3CH_2Br, (Y) = CH_3CH_2OH, (Z) = CH_3CH_2CH_2CH_3$

C.

$(X) = CH_3CH_2MgBr, (Y) = CH_3CH_2COOH, (Z) = CH_3CH_2C$

D.

$(X) = CH_3COOH, (Y) = CH_3CH_2COCH_3, (Z) = CH_3COOCH_3$

Answer: A

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7. Identify (X), (Y) andc (Z) in the given reaction :

$$CH_3CHO \xrightarrow[H_2SO_4]{K_2Cr_2O_7} (X) \xrightarrow{PCl_5} (Y) \xrightarrow[anh.\,AlCl_3]{C_6H_6} (Z)$$

A. $(X) = HCOOH, (Y) = COCl_2, (Y) = COCl_2, (Z) = C_6H_5Cl$

B. $(X) = CH_3COOH, (Y) = CH_3COCl, (Z) = C_6H_5COCH_3$

C.

$(X) = CH_3COOH, (Y) = CH_3CH_2CH_2Cl, (Z) = C_6H_5CH_2CH_2C$

D.

$(X) = CH_3COCH_3, (Y) = CH_3CHClCH_3, (Z) = C_6H_5COCH_3$

Answer: B

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8. Complete the missing lnks (X), (Y) and (Z) by making an appropriate choice.

$$CH_3COOH \xrightarrow{PBr_3/Br_2} X \xrightarrow{KCN} Y \xrightarrow{H_3O^+} Z$$

A. $\underset{CH_3COBr}{\overset{X}{}} \quad \underset{CH_3COCN}{\overset{Y}{}} \quad \underset{CH_3COOH}{\overset{Z}{}}$

B. $\underset{BrCH_2COOH}{\overset{X}{}} \quad \underset{\begin{array}{c}C\,H_2COOH \\ | \\ CN\end{array}}{\overset{Y}{}} \quad \underset{HOOC-CH_2COOH}{\overset{Z}{}}$

C. $\underset{BrCH_2COOH}{\overset{X}{}} \quad \underset{CH_2(CN)COOH}{\overset{Y}{}} \quad \overset{Z}{\begin{array}{c}COOH \\ | \\ COOH\end{array}}$

D. $\underset{Br_2CHCOOH}{\overset{X}{}} \quad \underset{Br_2C(CN)COOH}{\overset{Y}{}} \quad \underset{CH_3CH_2COOH}{\overset{Z}{}}$

Answer: B

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9. What happens when a carboxylic acid is treated with lithium aluminum hydride ?

A. Aldehyde is formed.

B. Primary alcohol is formed.

C. Ketone is formed.

D. Grignard reagent is formed.

Answer: B

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10. A compound (X) having molecualr formula $C_4H_8O_2$ is hydrolysed by water in presence of an acid to give a carboxylic acid (Y) and an alcohol (Z). (Z) on oxidation with chromic acid gives (Y), (X), (Y) and (Z) are

A.
X	Y	Z
CH_3COOCH_3	CH_3COOH	CH_3OH

B.
X	Y	Z
$CH_3COOC_2H_5$	CH_3COOH	C_2H_5OH

C.
X	Y	Z
$C_2H_5COOCH_3$	C_2H_5COOH	C_2H_5OH

D.
X	Y	Z
$CH_3COOC_2H_5$	C_2H_5COOH	CH_3OH

Answer: B

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11. A compound (X) with a molecualr formula $C_5H_{10}O$ gives a positive 2, 4-DNP test but a negative Tollens' test. On oxidation it gives a carboxylic acid (Y) with a molecular formula $C_3H_6O_2$. Potassium salt of (Y) undergoes Kolbe's reaction and gives a hydrocarbon (Z). (X), (Y) and (Z) respectively are

A. pentan - 3 - one, propanoic acid, butane

B. pentanal, pentanoic acid, octane

C. 2 - methylbutanone, butanoic acid, hexane

D. 2, 2 - demethylpropanone, propanoic acid, hexane.

Answer: A

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12. Fill in the blanks.

In Hell-Volhard-Zelinsky reaction, the carboxylic acids are halogenated at

_____ position by using _____ and _____.

A. α, NaOH, iodine

B. α, phosphorus, halogen

C. β, phosphorus, H_2O

D. β, PCl_5, $NaOH$

Answer: B

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13. Acetic acid can be halogenated in presence of phosphorus and chlorine. Formic acid cannot be halogenated with same way because of

A. presence of α- H atom in formic acid

B. presence of α- H atom in acetic acid

C. absence of α - H atom in CH_3COOH

D. higher acidic strength of acetic acid than formic acid.

Answer: B

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14. Which of the following will not undergo HVZ reaction ?

A. Propanoic acid

B. Ethanoic acid

C. 2 - Methylpropanoic acid

D. 2, 2 - Demethylpropanoic acid

Answer: D

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15. Which of the following statements is correct regarding formic acid ?

A. It is a reducing agent.

B. It is a weaker acid than acetic acid.

C. It is an oxidising agent.

D. When its calcium salt is heated it forms acetone.

Answer: A

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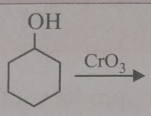
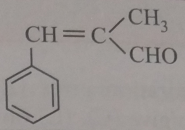
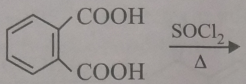
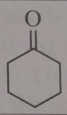
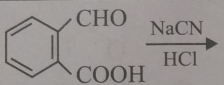
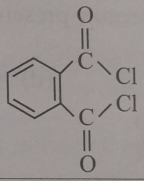
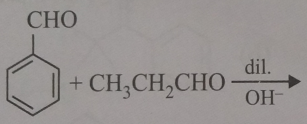
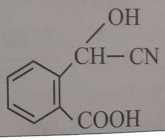
16. Match the column I with column II and mark the appropriate choice .

Column I		Column II	
(A)		(i)	
(B)		(ii)	
(C)		(iii)	
(D)		(iv)	

A. $(A) \rightarrow (i), (B) \rightarrow (ii), (C) \rightarrow (iii), (D) \rightarrow (iv)$

B. $(A) \rightarrow (iii), (B) \rightarrow (iv), (C) \rightarrow (i), (D) \rightarrow (ii)$

C. $(A) \rightarrow (iv), (B) \rightarrow (i), (C) \rightarrow (ii), (D) \rightarrow (iii)$

D. $(A) \rightarrow (ii), (B) \rightarrow (iii), (C) \rightarrow (iv), (D) \rightarrow (i)$

Answer: D

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17. The major product of the following reaction is:

$$CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{H}{|}}{C}} - CH\underset{\underset{Br}{|}}{CH_3} \xrightarrow{CH_3OH}$$

A. 1.

(A)	(B)	(C)	(D)
$(CH_3CO)_2O$	CH_3COOH	$CH_3COOC_2H_5$	C_2H_5OH

B. 2.

(A)	(B)	(C)	(D)
CH_3COCl	$HCOOH$	CH_3COOCH_3	CH_3OH

C. 3.

(A)	(B)	(C)	(D)
CH_3COOH	CH_3OH	CH_3COOCH_3	CH_3OH

D. 4.

(A)	(B)	(C)	(D)
CH_3NH_2	CH_3COOH	CH_3COOCH_3	C_2H_5OH

Answer: A

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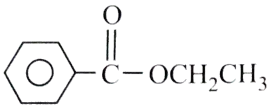
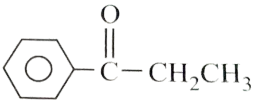
18. The final product (C) obtained in the reaction sequence is

$$CH_3CH_2COOH \xrightarrow{PCl_3} (A) \xrightarrow[AlCl_3]{C_6H_6} (B) \xrightarrow[\text{base, heat}]{NH_2NH_2} (C)$$

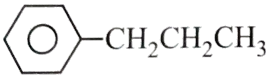
A.



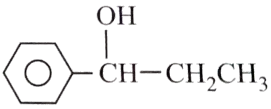
B.



C.



D.



Answer: C

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Higher Order Thinking Skills

1. An alcohol (A) on dehydration gives (B) which adds bromine molecule to give (C), (C) on heating with sodamide gives (D) which on hydration in the presence of Hg^{++}/H_2SO_4 gives (E). E on reduction by lithium aluminium hydride gives (A). (E) is also obtained on dry distillation of calcium salt of acetic acid. How many enolisable proton present in the product (E) ?

A. 2

B. 6

C. 3

D. 0

Answer: B

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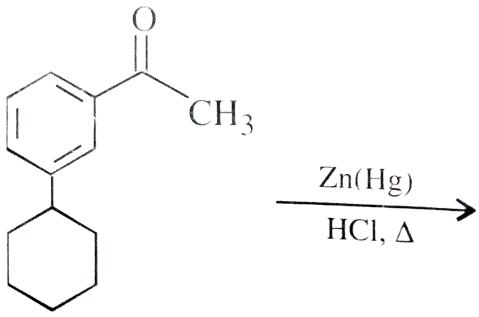
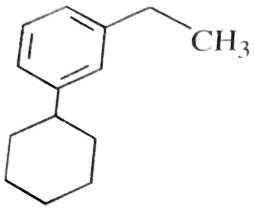
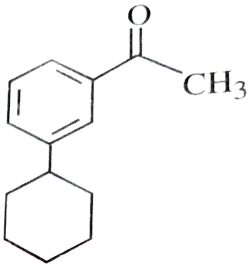
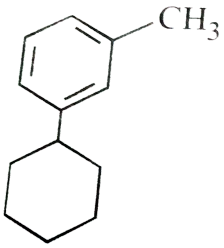
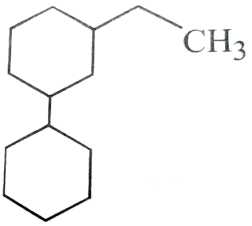
2. 

A. 

B. 

C. 

D. 

Answer: A

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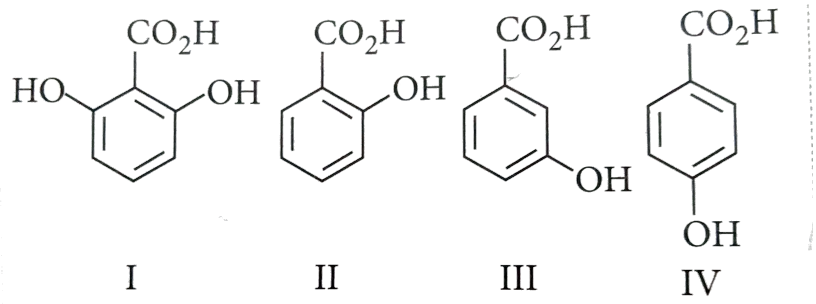
3. The correct order of acidity for the following compounds is



A. $I > II > III > IV$

B. $III > I > II > IV$

C. $III > IV > II > I$

D. $I > III > IV > II$

Answer: A

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4. The carbonyl compound producing an optically active product by reaction with $LiAlH_4$ is

A. propanone

B. butanone

C. 3-pentanone

D. benzophenone.

Answer: B

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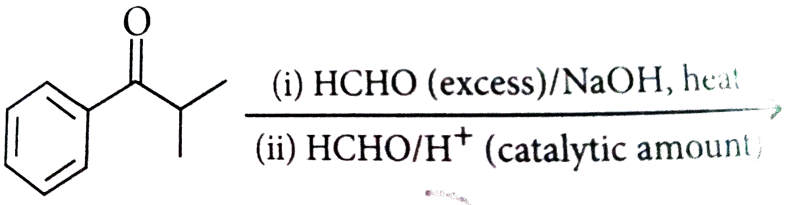
5. The major product of the following reaction sequence is



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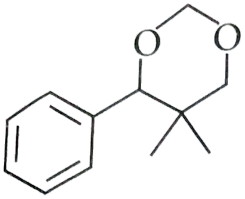

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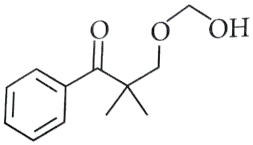

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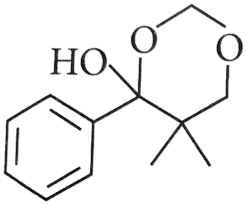

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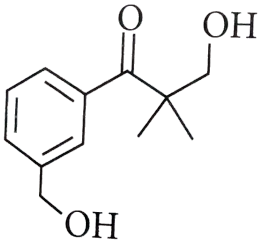

Answer: A

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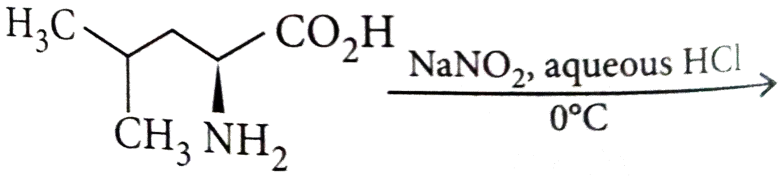
6. The major product of the reaction is



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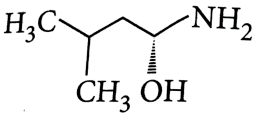

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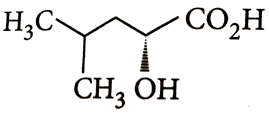

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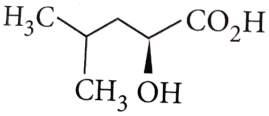

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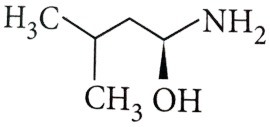

Answer: C

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Ncert Exemplar Problems

1. 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. $CH_3 - \overset{O}{\overset{\|}{C}} - OH + H - \overset{O}{\overset{\|}{C}} - H$

Answer: B

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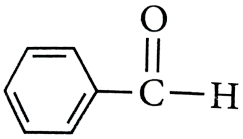
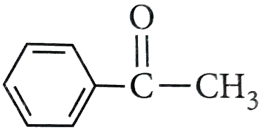
2. Which of the following compounds is most reactive towards nucleophilic addition reactions ?

A. $CH_3 - \overset{O}{\overset{\|}{C}} - CH_3$

B. $CH_3 - \overset{O}{\overset{\|}{C}} - H$

C. 

D. 

Answer: B

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3. The correct order of increasing acidic strength is ____.

A. phenol < ethanol < chloroacetic acid < acetic acid

B. ethanol < phenol < chloroacetic acid < acetic acid

C. ethanol < phenol < acetic acid < chloroacetic acid

D. chloroacetic acid < acetic acid < phenol < ethanol

Answer: C

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4. Compound $Ph-O-\overset{\overset{O}{\|}}{C}-Ph$ can be prepared by the reaction of _____ .

A. phenol and benzoic acid in the presence of NaOH

B. phenol and benzoyl chloride in the presence of pyridine

C. phenol and benzoyl chloride in the presence of $ZnCl_2$

D. phenol and benzaldehyde in the presence of palladium

Answer: B

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5. The reagent which does not react with both, acetone and benzaldehyde is _____ .

A. sodium hydrogensulphite.

B. phenyl hydrazine

C. Fehling's solution

D. Grignard reagent

Answer: C

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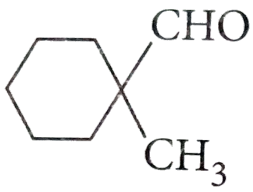
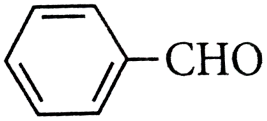
6. Cannizzaro's reaction is not given by _____ .

A. 



B.

C. HCHO

D. CH_3CHO

Answer: D

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7. $CH_3 - C \equiv CH \xrightarrow[1\,\%\,HgSO_4]{40\,\%\,H_2SO_4} A \xrightarrow{\text{Isomerisation}} CH_3 - \underset{\underset{O}{\|}}{C} - CH_3$

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.

Answer: D

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8. Compounds (A) and (C) in the following reactions are

$$CH_3CHO \xrightarrow[(ii)\, H_2O]{(i)\, CH_3MgBr} (A) \xrightarrow{H_2SO_4,\, \Delta} (B) \xrightarrow{\text{Hydroboration oxidation}} (C)$$

A. identical

B. positional isomers

C. functional isomers

D. optical isomers.

Answer: B

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9. Which is the most suitable reagent for the following conversion ?

$$CH_3 - CH = CH - CH_2 - \overset{O}{\overset{\|}{C}} - CH_3 \rightarrow CH_3 - CH = CH - CH_2 - \overset{O}{\overset{\|}{C}}$$

A. Tollens' reagent

B. Bonzoyl peroxide

C. I_2 and NaOH solution

D. Sn and NaOH solution

Answer: C

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10. Which of the following compound will give butanone on oxidation with alkaline $KMnO_4$ solution ?

A. Butan-1-ol

B. Butan-2-ol

C. Both of these

D. None of these.

Answer: B

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11. 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

Answer: A

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Assertion Reason

1. Assertion : In formaldehyde all the four atoms lie in one plane.

Reason : Carbonyl carbon forms a π-bond with oxygen by overlapping of p -orbitals.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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2. Assertion : Acetaldehyde can be prepared by addition of water to ethyne in the presence of H_2SO_4 and $HgSO_4$.

Reason : Higher alkynes give higher aldehydes.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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3. Assertion : Etard reaction helps to stop the oxidation of toluene at the aldehyde stage.

Reason : Chromyl chloride oxidises methyl group to a chromium complex, which on hydrolysis gives corresponding benzaldehyde.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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4. Assertion : The boiling points of given compounds follow the order :

$CH_3CH_2CH_2CHO \approx CH_3CH_2CH_2CH_2CH_3 < CH_3CH_2CH_2CH_2OH \approx$

Reason : Boiling point depends upon molecualr mass only.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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5. Assertion : Acetaldehyde is more reactive than acetone in nucleophilic addition reactions.

Reason Two alkyl groups in acetone reduce the electrophilicity of the carbon.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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6. Assertion : β- hydrogen atom of carbonyl compounds is acidic in nature.

Reason : β- hydrogen is directly attached to carbon next to carbonyl carbon.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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7. Assertion : Cross aldol condensation of ethanal and propanal gives a mixture of four products.

Reason : Ethanal and propanal, both contain α- hydrogen atom.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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8. Assertion : Aromatic aldehydes and formaldehyde undergo Cannizzaro reaction.

Reason : Those aldehydes which have α-H atom undergo Cannizzaro reaction.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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9. Assertion : Aromatic aldehydes and ketones undergo electrophilic substitution reaction at metaposition.

Reason : Carbonyl group activates the ring towards electrophilic substitution reactions.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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10. Assertion : In the presence of alkaline $KMnO_4$ 4-methylacetophenone is oxidised to benzoic acid.

Reason : Keto group is oxidised to $-COOH$ group.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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11. Assertion : Most carboxylic acids exist as dimers in the vapour phase or in aprotic solvents.

Reason : Higher carboxylic acids are practically insoluble in water due to the increased hydrophobic interaction of hydrocarbon part.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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12. Assertion : Phenol and benzoic acid can be distinguished by Na_2CO_3.

Reason : Benzoic acid is stronger acid than phenol, hence reacts with Na_2CO_3.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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13. Assertion : Direct attachment of groups such as phenyl or vinyl to the carboxylic acid, increases the acidity of the carboxylic acid.

Reason : Resonance effect always increases the acidity of carboxylic acids.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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14. Assertion : $(CH_3)_3CCOOH$ does not give HVZ reaction.

Reason : $(CH_3)_3CCOOH$ does not have α-hydrogen atom.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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15. Assertion : Carboxylic acids do not undergo Friedel - Crafts reaction.

Reason : Carboxyl group is meta-directing group.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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Nomenclature And Structure Of Carbonyl Group

1. Which of the following structures is not correctly matched ?

A. α- Methoxypropionaldehyde - $H_3C-\overset{H_3CO}{\overset{|}{C}}H-\overset{O}{\overset{||}{C}}-H$

B. 3 - Hydroxybutanal - $CH_3-\overset{OH}{\overset{|}{C}}H-CH_2CHO$

C. 4 - Oxopentanal - $CH_3CH_2CH_2-\overset{O}{\overset{||}{C}}-CHO$

D. Di-sec. - butylketone - $CH_3CH_2-\overset{CH_3}{\overset{|}{C}}H-\overset{O}{\overset{||}{C}}-\overset{CH_3}{\overset{|}{C}}H-CH_2CH_3$

Answer: C

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2. Which of the following names of the organic compounds is not correctly written ?

A.  – 4-Hydroxy-3-methoxybenzaldehyde

B.  – 5-Methylcyclohexanecarbaldehyde

C.  – 2-(2-Chlorophenyl)ethanal

D. $CH_2 = CH - \overset{\overset{O}{||}}{C} - CH = CH_2$ -Penta - 1, 4 - dien - 3 - one

Answer: B

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3. Which of the following carbonyl compounds is most polar ?

A. $C_2H_5 - \overset{\overset{O}{||}}{C} - C_2H_5$

B. $CH_3 - \overset{\overset{O}{||}}{C} - CH_3$

C. $CH_3 - \overset{\overset{O}{||}}{C} - H$

D. $H - \overset{\overset{O}{||}}{C} - H$

Answer: D

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Preparation Of Aldehydes And Ketones

1. Ketones $\left(R - \overset{O}{\overset{\|}{C}} - R' \right)$ can be obtained in one step by (where R and R' are alkyl groups)

A. hydrolysis of esters

B. oxidation of primary alcohols

C. oxidation of secondary alcohols

D. reaction of alkyl halides with alcohols.

Answer: C

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2. Ozonolysis of an organic compound gives formaldehyde as one of products. This confirms the presence of

A. two ethylenic double bonds

B. an isopropyl group

C. an isopropyl group

D. an acetylenic triple bond.

Answer: B

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3. A diene, buta - 1, 3 - diene was subjected to ozonolysis to prepare aldehydes. Which of the following aldehydes will be obtained during the reaction ?

A. $\begin{matrix}\text{CHO}\\|\\\text{CHO}\end{matrix} + 2HCHO$

B. $CH_3CHO + 2HCHO$

C. $CH_3CH_2CHO + CH_3CHO$

D. $2CH_3CH_2CHO$

Answer: A

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4. An alkene 'X' (molecular formula C_5H_{10}) on ozonolysis gives a mixture of two compounds 'Y' and 'Z'. Compound 'Y' gives positive Fehling's test and also forms iodoform on treatement with I_2 and $NaOH$. Compound 'Z' does not give Fehling's test but forms iodoform. Identify the compounds X, Y and Z. Write the reaction for ozonolysis and formation of iodoform from Y and Z.

A. $\underset{C_6H_5COCH_3}{\text{X}} \quad \underset{CH_3CHO}{\text{Y}} \quad \underset{CH_3COCH_3}{\text{Z}}$

B. $\underset{CH_3-CH=\underset{\underset{CH_3}{|}}{C}-CH_3}{\text{X}} \quad \underset{CH_3CHO}{\text{Y}} \quad \underset{CH_3COCH_3}{\text{Z}}$

C. $\underset{CH_3CH_2CH=CH_2}{\text{X}} \quad \underset{CH_3CH_2CHO}{\text{Y}} \quad \underset{HCHO}{\text{Z}}$

D. $\underset{CH_3-CH=CH-CH_3}{\text{X}} \quad \underset{CH_3CHO}{\text{Y}} \quad \underset{CH_3CHO}{\text{Z}}$

Answer: B

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5. Propanone can be prepared from ethyne by

A. passing a mixture of ethyne and steam over a catalyst, magnesium at $420^\circ C$

B. passing a mixture of ethyne and ethanol over a catalyst zinc chromite

C. boiling ethyne with water and H_2SO_4

D. treating ethyne with lodine and NaOH.

Answer: A

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6. In the following reacton, product P is

$$R - \overset{\overset{O}{||}}{C} - Cl \xrightarrow[Pd - BaSO_4]{H_2} P$$

A. RCHO

B. RCH_3

C. RCOOH

D. RCH_2OH

Answer: A

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7. The reduction of benzoyl chloride with $H_2 / Pd - BaSO_4$ produces

A. benzoic acid

B. benzyl alcohol

C. benzoyl sulphate

D. benzaldehyde.

Answer: D

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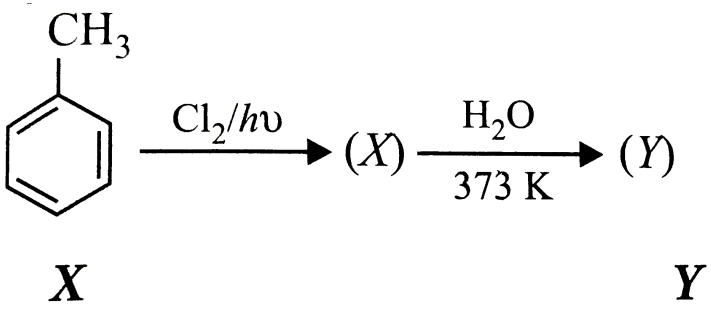
8. Study the following sequence of reaction and identify the compounds (X) and (Y).



A. X: Benzaldehyde, Y: Benzoic acid

B. X: 2-Chlorotoluene, Y: 2-Chlorobenzoic acid

C. X: 2,4-Dichlorobenzene, Y: Benzoic acid

D. X: Benzal chloride, Y: Benzaldehyde

Answer: D

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9. The oxidation of toluene to benzaldehyde by chromyl chloride is called

A. Etard reaction

B. Riemer-Tiemann reaction

C. Wurtz reaction

D. Cannizzaro's reaction

Answer: A

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10. Benzaldehyde can be prepared from benzene by passing vapours of ..... and ..... in its solution in presence of catalyst mixture of aluminium chloride and cuprous chloride. The reaction is known as ..... .

A. HCl, $SnCl_4$, Rosenmund reduction

B. CO, HCl, Gattermann-Koch reaction

C. CO_2, H_2SO_4, Clemmensen reduction

D. O_3, alcohol, Wolff-Kishner reduction

Answer: B

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11. Benzophenone can be obtained by

I. Benzoyl chloride +Benzene+$AlCl_3$

II. Benzoyl chloride + Diphenyl cadmium ltbr. III. Benzoyl chloride+Phenyl magnesium chloride ltbr. IV. Benzene+ Carbon monoxide+ $ZnCl_2$

Select an appropirate option

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iii)

D. (i), (ii) and (iii)

Answer: C

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Physical Properties

1. There is a large difference in the boiling points of butanal and butan - 1 - ol due to

A. intermolecular hydrogen bonding in butan -1-ol

B. intramolecular hydrogen bonding in butanal

C. higher molecular mass of butan-1-ol

D. resonance shown by butanal .

Answer: A

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2. Choose the correct statement regarding the physical properties of carbonyl compound.

A. All aldehydes are insoluble in benzene.

B. Higher aldehydes are more fragrant.

C. n - Butane has more boiling point than acetone.

D. Methanal and propanone are immiscible with water in all proportions.

Answer: B

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

Ethanal, Propanal, Propanone, Butanone

A. Butanone lt Propanone lt Propanal lt Ethanal

B. Propanone lt Butanone lt Ethanal gt Propanal

C. Propanal lt Ethanal lt Propanone lt Butanone

D. Ethanal lt Propanal lt Propanone lt Butanone

Answer: A

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4. Which among the following is most reactive to give nucleophilic addition?

A. FCH_2CHO

B. $ClCH_2CHO$

C. $BrCH_2CHO$

D. ICH_2CHO

Answer: A

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Chemical Reactions

1. The addition of HCN to carbonyl compounds is an example of

A. nucleophilic addition

B. electrophilic addition

C. free radical addition

D. elimination addition.

Answer: A

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2. Which of the following compounds does not react with $NaHSO_3$?

A. $HCHO$

B. $C_6H_5COCH_3$

C. CH_3COCH_3

D. CH_3CHO

Answer: B

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3. Aldehydes other than formaldehyde react with Grignard reagent to give addition products which on hydrolysis give

A. tertiary alcohols

B. secondary alcohols

C. primary alcohols

D. carboxylic acids.

Answer: B

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4. Identify reactant (X) in the given reaction sequence.

$$CH_3COCH_3 + X \rightarrow (CH_3)_3C - OMg - Cl \xrightarrow{H_2O} (CH_3)_3C - OH + Mg$$

A. CH_3MgCl

B. $CH_3COCl + Mg$

C. $MgCl_2$

D. CH_3CH_2MgCl

Answer: A

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5. An organic compound (X) with molecular formula C_3H_6O is not readily oxidised. On reduction it gives C_3H_8O (Y) which reacts with HBr to give alkyl bromide (Z) which is converted to Grignard reagent. Grignard reagent reacts with (X) to give 2 , 3-dimethylbutan-2-ol. (X), (Y) and (Z) repectively are.

A. $CH_3COCH_3, CH_3CH_2CH_2OH, CH_3CH(Br)CH_3$

B. $CH_3CH_2CHO, CH_3CH=CH_2, CH_3CH(Br)CH_3$

C. $CH_3COCH_3, CH_3CH(OH)CH_3, CH_3CH(Br)CH_3$

D. $CH_3CH_2CHO, CH_3CH_2CH_2OH, CH_3CH_2CH_2Br$

Answer: C

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6. The best method to purify impure acetone is

A. $CH_3COCH_3 + HCl \rightarrow CH_3 - \overset{\overset{OH}{|}}{\underset{\underset{Cl}{|}}{C}} - CH_3 \xrightarrow{\text{heat}} CH_3COCH_3$

B.

$$CH_3COCH_3 + NaHSO_3 \rightarrow CH_3 - \overset{\overset{OH}{|}}{\underset{\underset{CH_3}{|}}{C}} - SO_3Na \xrightarrow{Na_2CO_3} CH_3COC$$

C. $CH_3COCH_3 + HCN \rightarrow CH_3 - \overset{\overset{OH}{|}}{\underset{\underset{CN}{|}}{C}} - CH_3 \xrightarrow{HOH} CH_3COCH_3$

D.

$$CH_3COCH_3 + H_2SO_4 \rightarrow CH_3 - \underset{\displaystyle OSO_3H}{\overset{\displaystyle OH}{\overset{|}{\underset{|}{C}}}} - CH_3 \rightarrow \xrightarrow{\text{heat}} CH_3C$$

Answer: B

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7. Match the reagents in column I with products formed by reactions with acetone in column II and mark the appropriate choice.

Column I		Column II	
(A)	Hydrazine	(i)	$(CH_3)_2C=NNHCONH_2$
(B)	Semicarbazide	(ii)	$(CH_3)_2C=NOH$
(C)	Phenylhydrazine	(iii)	$(CH_3)_2C=NNH_2$
(D)	Hydroxylamine	(iv)	$(CH_3)_2C=NNHC_6H_5$

A. $(A) \rightarrow (i), (B) \rightarrow (ii), (C) \rightarrow (iii), (D) \rightarrow (iv)$

B. $(A) \rightarrow (iv), (B) \rightarrow (iii), (C) \rightarrow (ii), (D) \rightarrow (i)$

C. $(A) \rightarrow (iii), (B) \rightarrow (i), (C) \rightarrow (iv), (D) \rightarrow (ii)$

D. $(A) \rightarrow (ii), (B) \rightarrow (iv), (C) \rightarrow (i), (D) \rightarrow (iii)$

Answer: C

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8. $R - CH = CH - CHO + NH_2 - \overset{\overset{O}{\|}}{C} - NHNH_2 \xrightarrow{H^+} X$

(X) in the above reaction is

A. $R - CH = CH - \overset{\overset{OH}{|}}{CH} - NH_2CONHNH_2$

B. $R - CH = CH - CH = N - NH - \overset{\overset{O}{\|}}{C} - NH_2$

C. $R - CH = NH_2CONH_2$

D. $R - CH = CH - \underset{\underset{OH}{|}}{CH} - NH_2COCH = NHNH_2$

Answer: B

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9. Hydrocarbons are formed when aldehydes and ketones are reacted with amalgamated zinc and conc. HCl. The reaction is called

A. Cannizzaro reaction

B. Clemmensen reduction

C. Rosenmund reduction

D. Wolff-Kishner reduction.

Answer: B

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10. Which of the following statements is incorrect ?

A. $FeCl_3$ is used in the detection of phenols.

B. Fehling solution is used in the detection of glucose.

C. Tollens' reagent is used in the detection of unsaturation.

D. $NaHSO_3$ is used in the detection of carbonyl compounds.

Answer: C

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11. What is the test to differentiate between pentan - 2- one and pentan - 3 -one ?

A. Iodoform test

B. Benedict's test

C. Fehling's test

D. Aldol condensation

Answer: A

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12. The best oxidising agent for oxidation of

$CH_3 - CH = CH - CHO$ to $CH_3 - CH = CH - COOH$ is

A. Baeyer's reagent

B. Tollens' reagent

C. Schiff's reagent

D. acidified dichromate.

Answer: B

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13. Which of the following statements is not correct ?

A. Aldehydes and ketones are functional isomers.

B. Formaldehyde reacts with ammonia to form hexamethyleneteramine.

C. $LiAlH_4$ converts ketones into sec- alcohols.

D. Ethanal and propanal give positive iodoform test.

Answer: D

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14. In the following sequence of reaction, the final product (Z) is

$$CH \equiv CH \xrightarrow[H_2SO_4]{Hg^{2+}} X \xrightarrow[H_2O]{CH_3MgX} Y \xrightarrow{[O]} Z$$

A. ethanal

B. propan - 2 - ol

C. propanone

D. propane - 1 - ol

Answer: C

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15. Which of the following reagents are not correctly matched with the reaction ?

A.

$$CH_3CH = CHCHO \rightarrow CH_3CH = CHCOOH: \quad \text{Ammoniacal} \quad Ag$$

B. $CH_3CH = CHCHO \rightarrow CH_3CH = CHCH_2OH: H_2 / Pt$

C. $R - COOH \rightarrow R - CH_2OH: NaBH_4$

D. $CH_3CH_2COCl \rightarrow CH_3CH_2CHO: H_2Pd / BaSO_4$

Answer: B

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16. Identify (X), (Y) and (Z) in the given reaction.

$$CH_3COCH_3 \xrightarrow[\text{heat}]{I_2 + NaOH} X \xrightarrow[\text{heat}]{Ag} Y \xrightarrow[\text{heat}]{H_2SO_4 / HgSO_4} Z$$

A. $X = CHI_3, Y = CH_3CHO, Z = HCHO$

B. $X = CHI_3, Y = CH_3OH, Z = CH_3CHO$

C. $X = CHI_3, Y = CH \equiv CH, Z = CH_3CHO$

D. $X = CH_3COCI_3, Y = CH_2 = CH_2, Z = CH_3CHO$

Answer: C

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17. Identify (X), (Y) and (Z) reagents in the given sequence of reaction.

$$CH \equiv CH \xrightarrow{X} CH_3CHO \xrightarrow{Y} CH_3CH(OH)CH_3 \xrightarrow{Z} CH_3COCH_3$$

A. $X = H_2SO_4, Y = H_2\frac{\emptyset}{O}H^-, Z = PCl_5$, heat

B. $X = HNO_3, Y = Na_2CO_3, Z = H_2SO_4$, heat

C. $X = H_2SO_4 / Hg^{2+}, Y = PCl_5 / H_2O, Z = K_2Cr_2O_7 / OH^-$

D. $X = H_2SO_4 / Hg^{2+}, Y = CH_3MgBr / H_2O, Z = K_2CrO_7 / H^+$

Answer: D

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18. Which of the following does not answer iodoform test ?

A. n - Butyl alcohol

B. sec - Butyl alcohol

C. Acetophenone

D. Acetaldehyde

Answer: A

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19. A compound 'A' having the molecular formula $C_5H_{12}O$, on oxidation gives a compound 'B' with molecular formula $C_5H_{10}O$. Compound 'B' gave a 2, 4- dinitrophenylhydrazine derivative but did not answer haloform test or silver mirror test. The structure of compound 'A' is

A. $CH_3 - CH_2 - CH_2 - CH_2 - CH_2 - OH$

B. $CH_3 - CH_2 - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_3$

C. $CH_3 - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_2 - CH_3$

D. $CH_3 - CH_2 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - OH$

Answer: C

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20. To differentiate between pentan -2-one and pentan -3-one a test is carried out. Which of the following is the correct answer?

A. Pentan - 2 -one will give silver mirror test.

B. Pentan - 2 - one will give iodoform test.

C. Pentan - 3 - one will give iodoform test.

D. None of these.

Answer: B

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21. An organic compound of molecular formula C_3H_6O did not give a silver mirror with with Tollens' reagent but give an oxime with hydroxylamine. It may be

A. $CH_2 = CH - CH_2 - OH$

B. CH_3COCH_3

C. CH_3CH_2CHO

D. $CH_2 = CH - OCH_3$

Answer: B

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22. Which is the correct method of synthesising acetamide from acetone?

A.

$$CH_3COCH_3 \xrightarrow{Pd/BaSO_4} CH_3CHO \xrightarrow{NH_3} CH_3CH_2NH_2 \xrightarrow{H_2O} CH_3CON$$

B.

$$CH_3COCH_3 \xrightarrow[NaOH]{I_2} CH_3COONa \xrightarrow[NH_3]{H^+} CH_3COONH_4 \xrightarrow{\Delta} CH_3CON$$

C. $CH_3COCH_3 \xrightarrow{CrO_3} CH_3COOH \xrightarrow{NH_3} CH_3CONH_2$

D.

$$CH_3CONH_3 \xrightarrow[NaOH]{I_2} CH_3COOH \xrightarrow{HCl} CH_3COCl \xrightarrow{NH_3} CH_3CONH_2$$

Answer: B

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23. Compound (X) with molecular formula C_3H_8O is treated with acidified potassium dichromate to form a product (Y) with molecular formula C_3H_6O. (Y) does not form a shining silver mirror on warming with ammoniacal $AgNO_3$. (Y) when treated with an aqueous solution of $NH_2CONHNH_2.HCl$ and sodium acetate, gives a product (Z). The structure of (Z) is

A. $CH_3CH_2CH = NNHCONH_2$

B. $(CH_3)_2C = NNHCONH_2$

C. $(CH_3)_2C = NCONHNH_2$

D. $CH_3CH_2CH = NCONHNH_2$

Answer: B

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24. Few simple chemical tests are given below to differentiate between the pairs of compounds.Which of the following tests is not correct for differentiation ?

A. Propanal and propanone - Silver mirror test

B. Acetophenone and benzophenone - Iodoform test

C. Ethanal and propanal - Fehling's test

D. Benzoic acid and ethyl benzoate - Sodium bicarbonate test

Answer: C

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25. Which of the following will not give aldol condensation ?

A. Phenyl acetaldehyde

B. 2 - Methylpentanal

C. Benzaldehyde

D. 1 - Phenylpropanone

Answer: C

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26. The claisen schmidt condensation product of benzaldehyde and acetone is

A. $C_6H_5CH = C(CH_3)_2$

B. $C_6H_5CH_2 - \overset{O}{\overset{\|}{C}} - CH = CH_2$

C. $C_6H_5 - \overset{\overset{O}{\|}}{C} - CH = CH - CH_3$

D. $C_6H_5 - CH = CH - \overset{\overset{O}{\|}}{C} - CH_3$

Answer: D

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27. Study the following sequence of reaction and identify the product (Y).

$$CH_3CHO + HCHO \xrightarrow[\text{heat}]{\text{dil.}NaOH} X \xrightarrow[H_3O^+]{HCN} Y$$

A. $CH_2 = CH - \underset{\underset{OH}{|}}{CH} - COOH$

B. $CH_3 - \overset{\overset{CN}{|}}{\underset{\underset{OH}{|}}{C}} - COOH$

C. $CH_3CH_2 - \underset{\underset{OH}{|}}{CH} - COOH$

D. $CH_2 = CH - \underset{\underset{CN}{|}}{CH} - COOH$

Answer: A

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28. Identify (X), (Y) and (Z) in the given reaction.

$$X + Y \xrightarrow{Z} \underset{\text{3-Hydroxybutanal}}{CH_3 - \overset{OH}{\overset{|}{C}}H - CH_2 - CHO}$$

A. $\begin{matrix} X & Y & Z \\ HCHO & CH_3CHO & KOH \end{matrix}$

B. $\begin{matrix} X & Y & Z \\ CH_3CHO & CH_3CHO & NaOH \end{matrix}$

C. $\begin{matrix} X & Y & Z \\ CH_3CH_2OH & HCHO & H_2SO_4 \end{matrix}$

D. $\begin{matrix} X & Y & Z \\ CH_3CH_2CHO & HCHO & \text{Dry ether} \end{matrix}$

Answer: B

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29. Propanal on treatment with dilute sodium hydroxide gives

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_2COOH

Answer: C

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30. Aldehydes that do not undergo aldol condensation are

(1) propanal (2) trichloroethanal (3) 2- phenylethanal (4) ethanal (5) benzaldehyde

A. 3 and 4 only

B. 2 and 5 only

C. 1, 2 and 3 only

D. 2, 3 and 5 only

Answer: B

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31. The order of reactivity of $CH_3CHO, CH_3COC_2H_5$ and CH_3COCH_3 is

A. $CH_3CHO > CH_3COCH_3 > CH_3COC_2H_5$

B. $C_2H_5COCH_3 > CH_3COCH_3 > CH_3CHO$

C. $CH_3COCH_3 > CH_3CHO > C_2H_2COCH_3$

D. $CH_3COCH_3 > C_2H_5COCH_3 > CH_3CHO$

Answer: A

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32. The final product (Y) in the following sequence of chemical reaction is

$$CH_3OH \xrightarrow[300^\circ C]{Cu} X \xrightarrow{NaOH} Y + CH_3OH$$

A. an alkene

B. a carboxylic acid

C. an aldehyde

D. sodium salt of carboxylic acid.

Answer: D

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33. Which of the following is a correct statement ?

A. $CCl_3 - CHO$ gives aldol condensation.

B. When mixture of ethanal and propanal is treated with aqueous NaOH, the product contains four aldols.

C. Mixture of HCHO and CH_3CHO will not give aldol condensation.

D. HCHO is least reactive towards oxidation.

Answer: B

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34. Which of the following is the most reactive isomer ?

A. $CH_3CH_2CH_2CH_2-\overset{\overset{O}{\|}}{C}-H$

B. $CH_3CH_2CH_2-\overset{\overset{O}{\|}}{C}-CH_3$

C. $CH_3CH_2-\overset{\overset{O}{\|}}{C}-CH_2CH_3$

D. $CH_3-\overset{\overset{O}{\|}}{C}-\underset{\underset{CH_3}{|}}{CH}-CH_3$

Answer: A

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35. When propanal reacts with 2- methylpropanal in presence of NaOH, four different products are formed. The reaction is known as

A. aldol condensation

B. cross aldol condensation

C. Cannizzaro reaction

D. HVZ condensation.

Answer: B

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36. Fill in the reagents for the given conversion :

$$CH_3COCl \xrightarrow{(X)} CH_3CHO \xrightarrow{(Y)} CH_3 - \overset{\overset{OH}{|}}{CH} - CH_2CHO \xrightarrow{(Z)} CH_3CH =$$

A. $\begin{matrix} X & Y & Z \\ H_2/Pd/BaSO_4 & \text{dil. } NaOH & \text{heat} \end{matrix}$

B. $\begin{matrix} X & Y & Z \\ NaOH & \text{Hydrolysis} & \text{heat} \end{matrix}$

C. $\begin{matrix} X & Y & Z \\ I_2/NaOH & LiAlH_4 & H_3O^+ \end{matrix}$

D. $\begin{matrix} X & Y & Z \\ CrO_3 & \text{Warm} & CO_2 \end{matrix}$

Answer: A

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37. Which compound is obtained when acetaldehyde is treated with dilute solution of caustic soda ?

A. Sodium acetate

B. Resinous mass

C. Aldol

D. Ethyl acetate

Answer: C

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38. Which of the following compounds will undergo self aldol condensation in the presence of cold dilute alkali ?

A. $CH \equiv C - CHO$

B. $CH_2 = CHCHO$

C. C_6H_5CHO

D. CH_3CH_2CHO

Answer: D

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39. Which of the following compounds will undergo Cannizzaro reaction ?

A. CH_3CHO

B. CH_3COCH_3

C. C_6H_5CHO

D. $C_6H_5CH_2CHO$

Answer: C

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40. Which of the following does not undergo Cannizzaro reaction?

A. Benzaldehyde

B. 2 - Methylpropanal

C. p - Methoxybenzaldehyde

D. 2, 2 - Dimethylpropanal

Answer: B

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41. Fill in the blanks by suitable choices.

The carbon atom in carbonyl group is ____ hybridised. The carbonyl group in aldehydes and ketone undergoes___. The carbonyl group in aldehydes and ketones undergoes _____ reactions. Aldehydes which have α-H atom undergo _____ reaction while aldehydes which have no α-H atom undergo _____ reaction.

A. sp^3 nucleophilic substitutions, aldol condensation, Cannizzaro

B. sp, electrophilic substitution, Cannizzro, aldol condensation

C. sp^2, nucleophilic addition, aldol condensation, Cannizaro

D. sp^3, electrophilic addition, Cannizzaro, aldol condensation

Answer: C

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42. Match the column I with column II and mark the appropriate choice .

Column I		Column II	
(A)	Clemmensen reduction	(i)	Conc. KOH
(B)	Rosenmund reduction	(ii)	Zn/Hg + conc. HCl
(C)	Iodoform reaction	(iii)	H_2/Pd-$BaSO_4$
(D)	Cannizzaro reaction	(iv)	NaOH + I_2

A. $(A) \rightarrow (i), (B) \rightarrow (iii), (C) \rightarrow (ii), (D) \rightarrow (iv)$

B. $(A) \rightarrow (iii), (B) \rightarrow (iv), (C) \rightarrow (i), (D) \rightarrow (ii)$

C. $(A) \rightarrow (ii), (B) \rightarrow (iii), (C) \rightarrow (iv), (D) \rightarrow (i)$

D. $(A) \rightarrow (iv), (B) \rightarrow (i), (C) \rightarrow (ii), (D) \rightarrow (iii)$

Answer: C

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43. Which of the following aldehydes will show Cannizzaro reaction ?

A. HCHO

B. C_6H_5CHO

C. $(CH_3)_3CCHO$

D. All of these.

Answer: D

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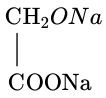
44. $\begin{matrix}\text{CHO}\\|\\\text{CHO}\end{matrix} \xrightarrow{NaOH} X$

The product (X) will be

A. 

B. 

C. 

D. 

Answer: C

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45. An organic compound (X) with molecular formula $C_9H_{10}O$ gives positive 2, 4-DNP and Tollens'tests. It undergoes Cannizzaro reaction and on vigorous oxidation it gives 1, 4-benzenedicarboxylic acid. Compound (X) is

A. Benzaldehyde

B. o-methylbenzaldehyde

C. p-ethylbenzaldehyde

D. 2, 2-dimethylhexanal.

Answer: C

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46. Match the column I with column II and mark the appropriate choice .

Column I		Column II	
(A)	$RCOCH_3 \xrightarrow[HCl]{Zn-Hg} RCH_2CH_3$	(i)	Wolff-Kishner reduction
(B)	$2C_6H_5CHO \xrightarrow{NaOH} C_6H_5COONa + C_6H_5CH_2OH$	(ii)	Clemmensen reduction
(C)	$C_6H_6 + CH_3COCl \xrightarrow[AlCl_3]{Anhy.} C_6H_5COCH_3$	(iii)	Friedel–Crafts reaction
(D)	$C_6H_{10}O \xrightarrow[KOH/ethylene\ glycol,\ \Delta]{(i)\ NH_2NH_2} C_6H_{12} + N_2$	(iv)	Cannizzaro reaction

A. $(A) \rightarrow (ii), (B) \rightarrow (iv), (C) \rightarrow (iii), (D) \rightarrow (i)$

B. $(A) \rightarrow (i), (B) \rightarrow (iii), (C) \rightarrow (ii), (D) \rightarrow (iv)$

C. $(A) \rightarrow (iii), (B) \rightarrow (ii), (C) \rightarrow (i), (D) \rightarrow (iv)$

D. $(A) \rightarrow (iv), (B) \rightarrow (i), (C) \rightarrow (ii), (D) \rightarrow (iii)$

Answer: A

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47. What are correct steps to convert acetaldehyde to acetone?

A. CH_3MgBr, H_2O,Oxidation

B. Oxidation, $Ca(OH)_2$, Heat

C. Reduction, KCN, Hydrolysis

D. Oxidation C_2H_5ONa, heat

Answer: B

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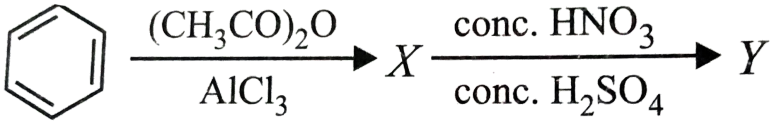
48. Identify the products (X) and (Y) in the given reaction:



A. X = Acetophenone, Y = m-Nitroacetophenone

B. X = Toluene, Y = m-Nitroacetotoluene

C. X = Acetophenone, Y = o and p - Dinitroacetophenone

D. X = Benzaldehyde, Y = m-Nitrobenzaldehyde

Answer: A

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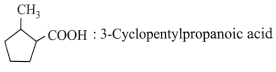
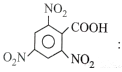
49. Which of the following IUPAC names is not correctly matched?

A. 

: 3-Cyclopentylpropanoic acid

B. $(CH_3)_2C = CHCOOH$: 3-Methylbut-2-enoic acid

C. $PhCH_2CH_2COOH$: 3-Phenylpropanoic acid

D. 

: 2, 4, 6-Trinitrobenzoic acid

Answer: A

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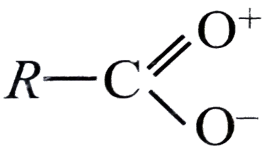
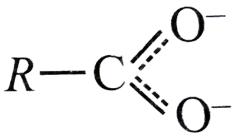
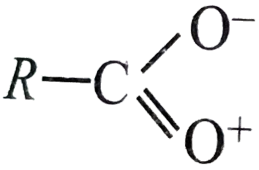
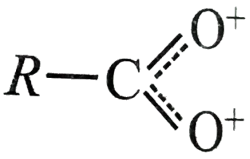
50. The correct structure representation of carboxylate ion is

A. 

B. 

C. 

D. 

Answer: B

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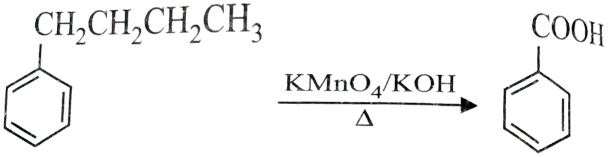
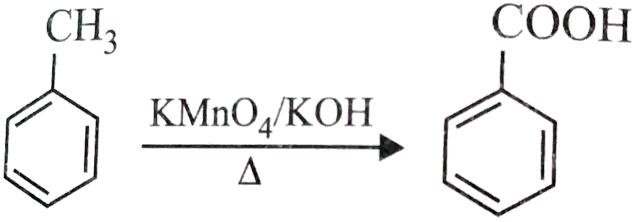
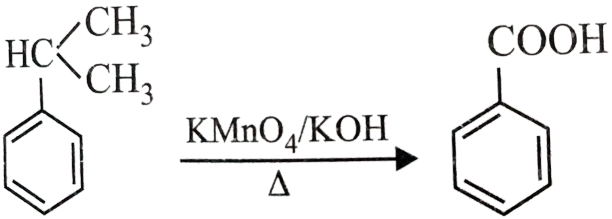
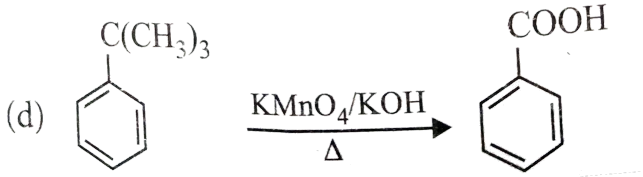
51. Which of the following reactions does not occur ?

A. 

B. 

C. 

D. 

Answer: D

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52. Which of the following will not yield acetic acid on strong oxidation ?

A. Butanone

B. Propanone

C. Ethyl ethanoate

D. Ethanol

Answer: C

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53. Various products formed on oxidation of 2, 5-dimethylhexan-3-one are

(i)$CH_3 - \underset{\underset{CH_3}{|}}{CH} - COOH$

(i) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - COOH$

(iii) CH_3COOH

(iv)HCOOH

A. (i) and (iii)

B. (i), (ii) and (iii)

C. (i) , (ii), (iii) and (iv)

D. (iii) and (iv)

Answer: C

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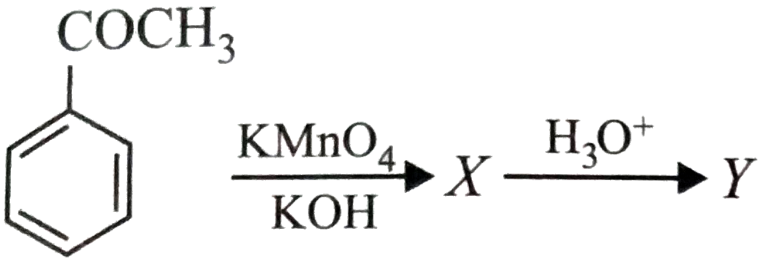
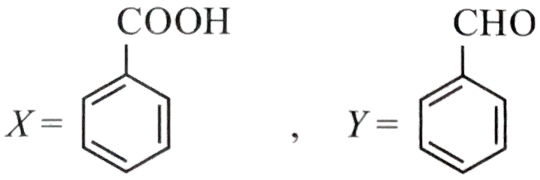
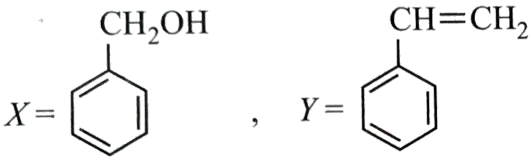
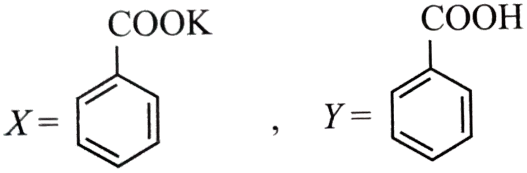
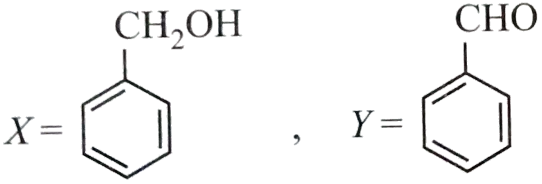
54. Identify (X) and (Y) in the given reaction sequence.



A. 

B. 

C. 

D. 

Answer: C

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55. α-hydroxypropanoic acid can be prepared from ethanal by following the steps given in the sequence.

A. Treat with HCN followed by acidic hydrolysis.

B. Treat with $NaHSO_3$ followed by reaction with Na_2CO_3.

C. Treat with H_2SO_4 followed by hydrolysis.

D. Treat with $K_2Cr_2O_7$ in presence of suphuric acid.

Answer: A

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56. The end product (Z) in the given sequence of reaction is

$$CH_3CH = CHCHO \xrightarrow{NaBH_4} X \xrightarrow[ZnCl_2]{HCl} Y \xrightarrow[(ii)\,H+]{(i)\,KCN} Z$$

A. $CH_3CH = CHCH_2COOH$

B. $CH_3CH_2CH_2COOH$

C. $CH_3CH = CHCOOH$

D. $CH_3CH(Cl)CH_2COOH$

Answer: A

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57. Complete the reactions with appropriate products.

$$CH_3CHO + NH_2OH \rightarrow X$$

(i)$CH_3CHO + NH_2OH \rightarrow X$

(ii) $CH_2 = CH_2 + PdCl_2 + H_2O \xrightarrow{CuCl_2} Y$

(iii) $CH_3CH_2CH_2CH_2OH \xrightarrow{CrO_3 - H_2SO_4} Z$

A.

$X = CH_3CH = NOH, Y = CH_3CHO, Z = CH_3CH_2CH_2COOH$

B.

$X = CH_3CH_2NH_2, Y = CH_3CH_2CHO, Z = CH_3CH_2CH_2COOH$

C. $X = CH_3CONH_2, Y = HCHO, Z = CH_3COCH_3$

D. $X = CH_3C \equiv N, Y = CH_3CHO, Z = HCOOH$

Answer: A

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58. An aromatic compound (X) (C_8H_8O) gives positive 2, 4-DNP test. It gives a yellow precipitate of compound (Y) on reaction with iodine and sodium hydroxide solution. (X) does not give Tollens' test on oxidation

under drastic conditions. It gives a carboxylic acid (Z) $(C_7H_6O_2)$.(Z) is also formed with (Y) during the reaction. (X), (Y) and (Z) respectively are

A. $C_6H_5COCH_3, CHI_3, C_6H_5COOH$

B. $CH_3COCH_3, CHI_3, CH_3COOH$

C. $C_6H_5COCH_3, CHI_3, CH_3COOH$

D. $CH_3CHO, CHI_3, C_6H_5COOH$

Answer: A

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59. Carboxylic acids dimerise due to

A. high molecular weight

B. coordinate bonding

C. intermolecular hydrogen bonding

D. covalent bonding.

Answer: C

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60. Which of the following carboxylic acids is highly insoluble in water

A. Propanoic acid

B. Butanoic acid

C. Pentanoic acid

D. Decanoic acid

Answer: D

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61. Which of the following compounds would have the smallest value for pK_a?

A. $CHF_2CH_2CH_2COOH$

B. $CH_3CH_2CF_2COOH$

C. $CH_2FCHFCH_2COOH$

D. $CH_3CF_2CH_2COOH$

Answer: B

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62. $-OH$ group present in alcohols is neutral white it is acidic in carboxylic acid because

A. in carboxylic acid -OH group is attached to electron withdrawing carbonyl group

B. in alcohols -OH group is attached to alkyl group which is elecron withdrawing

C. carboxylic group is an electron releasing group

D. alcoholic group is an electron withdrawing group.

Answer: A

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63. Which of the following is the correct order of relative strength of acids ?

A. $ClCH_2COOH > BrCH_2COOH > FCH_2COOH$

B. $BrCH_2COOH > ClCH_2COOH > FCH_2COOH$

C. $FCH_2COOH > ClCH_2COOH > BrCH_2COOH$

D. $ClCH_2COOH > FCH_2COOH > BrCH_2COOH$

Answer: C

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64. Which of the following orders is not correct for the decreasing order of acidic character ?

A.

$$CH_3CH_2CH(Cl)COOH > CH_3CH(Cl)CH_2COOH > CH_2(Cl)CH$$

B.

$$ICH_2COOH > BrCH_2COOH > ClCH_2COOHbtFCH_2COOH$$

C. $CCl_3COOH > CHCl_2COOH > CH_2ClCOOH > CH_3COOH$

D. $HCOOH > CH_3COOH > C_2H_5COOH > (CH_3)_2CHCOOH$

Answer: B

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65. In a set of the given reactions, acetic acid yielded a product iC.

$$CH_3COOH + PCl_5 \rightarrow A \xrightarrow[Anh.\,AlCl_3]{C_6H_6} B \xrightarrow[\text{ether}]{C_2H_5MgBr} C$$

Product C would be

A. $CH_3CH(OH)C_2H_5$

B. $CH_3COC_6H_5$

C. $CH_3CH(OH)C_6H_5$

D. $CH_3 - \overset{C_2H_5}{\underset{|}{C}}(OH)C_6H_5$

Answer: D

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66. Identify the compounds (X), (Y) and (Z) in the following reaction :

$$CH_3Br \xrightarrow{Mg/ether} X \xrightarrow[(ii)\,\text{water}]{(i)\,CO_2} Y \xrightarrow[\Delta]{CH_3OH,H^+} Z$$

A. $(X) = CH_3MgBr, (Y) = CH_3COOH, (Z) = CH_3COOCH_3$

B.

$(X) = CH_3CH_2Br, (Y) = CH_3CH_2OH, (Z) = CH_3CH_2CH_2CH_3$

C.

$(X) = CH_3CH_2MgBr, (Y) = CH_3CH_2COOH, (Z) = CH_3CH_2C$

D.

$$(X) = CH_3COOH, (Y) = CH_3CH_2COCH_3, (Z) = CH_3COOCH_3$$

Answer: A

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Ncert Exemplar

1. 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. $CH_3 - \overset{O}{\overset{\|}{C}} - OH + H - \overset{O}{\overset{\|}{C}} - H$

Answer: B

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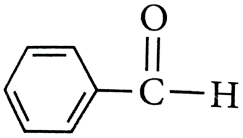
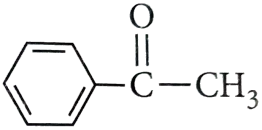
2. Which of the following compounds is most reactive towards nucleophilic addition reactions ?

A. $CH_3 - \overset{O}{\overset{\|}{C}} - CH_3$

B. $CH_3 - \overset{O}{\overset{\|}{C}} - H$

C. 

D. 

Answer: B

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3. The correct order of increasing acidic strength is _____.

A. phenol < ethanol < chloroacetic acid < acetic acid

B. ethanol < phenol < chloroacetic acid < acetic acid

C. ethanol < phenol < acetic acid < chloroacetic acid

D. chloroacetic acid < acetic acid < phenol < ethanol

Answer: C

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4. Compound $Ph-O-\overset{\overset{O}{\|}}{C}-Ph$ can be prepared by the reaction of _____ .

A. phenol and benzoic acid in the presence of NaOH

B. phenol and benzoyl chloride in the presence of pyridine

C. phenol and benzoyl chloride in the presence of $ZnCl_2$

D. phenol and benzaldehyde in the presence of palladium

Answer: B

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5. The reagent which does not react with both, acetone and benzaldehyde is _____ .

A. sodium hydrogensulphite.

B. phenyl hydrazine

C. Fehling's solution

D. Grignard reagent

Answer: C

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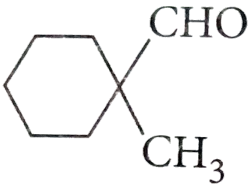
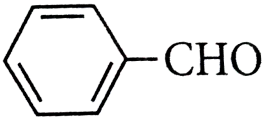
6. Cannizzaro's reaction is not given by _____ .

A. 

B. 

C. HCHO

D. CH_3CHO

Answer: D

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7. $CH_3 - C \equiv CH \xrightarrow[1\,\%\,HgSO_4]{40\,\%\,H_2SO_4} A \xrightarrow{\text{Isomerisation}} CH_3 - \underset{\underset{O}{\|}}{C} - CH_3$

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.

Answer: D

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8. Compounds (A) and (C) in the following reactions are

$$CH_3CHO \xrightarrow[(ii)\,H_2O]{(i)\,CH_3MgBr} (A) \xrightarrow{H_2SO_4,\,\Delta} (B) \xrightarrow{\text{Hydroboration oxidation}} (C)$$

A. identical

B. positional isomers

C. functional isomers

D. optical isomers.

Answer: B

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9. Which is the most suitable reagent for the following conversion ?

$$CH_3 - CH = CH - CH_2 - \overset{O}{\overset{\|}{C}} - CH_3 \rightarrow CH_3 - CH = CH - CH_2 - \overset{O}{\overset{\|}{C}}$$

A. Tollens' reagent

B. Bonzoyl peroxide

C. I_2 and NaOH solution

D. Sn and NaOH solution

Answer: C

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10. Which of the following compound will give butanone on oxidation with alkaline $KMnO_4$ solution ?

A. Butan-1-ol

B. Butan-2-ol

C. Both of these

D. None of these.

Answer: B

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11. 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

Answer: A

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Assertion And Reason

1. Assertion : In formaldehyde all the four atoms lie in one plane.

Reason : Carbonyl carbon forms a π-bond with oxygen by overlapping of p -orbitals.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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2. Assertion : Acetaldehyde can be prepared by addition of water to ethyne in the presence of H_2SO_4 and $HgSO_4$.

Reason : Higher alkynes give higher aldehydes.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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3. Assertion : Etard reaction helps to stop the oxidation of toluene at the aldehyde stage.

Reason : Chromyl chloride oxidises methyl group to a chromium complex, which on hydrolysis gives corresponding benzaldehyde.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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4. Assertion : The boiling points of given compounds follow the order :

$CH_3CH_2CH_2CHO \approx CH_3CH_2CH_2CH_2CH_3 < CH_3CH_2CH_2CH_2OH \approx$

Reason : Boiling point depends upon molecualr mass only.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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5. Assertion : Acetaldehyde is more reactive than acetone in nucleophilic addition reactions.

Reason Two alkyl groups in acetone reduce the electrophilicity of the carbon.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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6. Assertion : β- hydrogen atom of carbonyl compounds is acidic in nature.

Reason : β- hydrogen is directly attached to carbon next to carbonyl carbon.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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7. Assertion : Cross aldol condensation of ethanal and propanal gives a mixture of four products.

Reason : Ethanal and propanal, both contain α- hydrogen atom.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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8. Assertion : Aromatic aldehydes and formaldehyde undergo Cannizzaro reaction.

Reason : Those aldehydes which have α-H atom undergo Cannizzaro reaction.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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9. Assertion : Aromatic aldehydes and ketones undergo electrophilic substitution reaction at metaposition.

Reason : Carbonyl group activates the ring towards electrophilic substitution reactions.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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10. Assertion : In the presence of alkaline $KMnO_4$ 4-methylacetophenone is oxidised to benzoic acid.

Reason : Keto group is oxidised to $-COOH$ group.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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11. Assertion : Most carboxylic acids exist as dimers in the vapour phase or in aprotic solvents.

Reason : Higher carboxylic acids are practically insoluble in water due to the increased hydrophobic interaction of hydrocarbon part.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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12. Assertion : Phenol and benzoic acid can be distinguished by Na_2CO_3.

Reason : Benzoic acid is stronger acid than phenol, hence reacts with Na_2CO_3.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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13. Assertion : Direct attachment of groups such as phenyl or vinyl to the carboxylic acid, increases the acidity of the carboxylic acid.

Reason : Resonance effect always increases the acidity of carboxylic acids.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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14. Assertion : $(CH_3)_3CCOOH$ does not give HVZ reaction.

Reason : $(CH_3)_3CCOOH$ does not have α-hydrogen atom.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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15. Assertion : Carboxylic acids do not undergo Friedel - Crafts reaction.

Reason : Carboxyl group is meta-directing group.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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