CHEMISTRY

BOOKS - MODERN PUBLISHERS CHEMISTRY (HINGLISH)

ALDEHYDES ,KETONES AND CARBOXYLIC ACIDS

Example

1. Write the IUPAC names of the following compounds :

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2. Write the structure formulae of all the carbonyl compounds with the molecular formula $C_5H_{10}O$ and name them according to IUPAC system

(b) write the structrual formula of the following :

(I) 3-phenylprop-2-enal , (ii) 4- methylpent-3-one

(iii) 3-methybutanol (iv) 4- chloropentan -2- one

(c) write the IUPAC names of the following compounds :

$(i) CH_3 - \underset{\underset{CH_3}{|}}{C}\ H - CO - \underset{\underset{CH_3}{|}}{C}\ H - CH_3$

$(ii) CH_3 - CH_2 - CH = CH - \overset{\overset{O}{||}}{C} - H$

(iii) $C_6H_5 - CH_2 - CO - CH_2 - CO - CH_2 - CH_3$

(iv)

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3. How can you perform the following conversions?

(i) But-2-ene to Ethanol.

(ii) Cyclohexanol to Cyclohexanone

(iii) Butyne to Butan-2-one

(iv) p-Nitrotoluene to p-Nitrobenzaldehyde

(iv) Pent-3-en-2-ol to Pent-3-en-2-one

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4. Give names of the reagents to bring about the following transformations:

(i) Hexan-1-ol to hexanal

(ii) Cyclohexanol to cyclohexanone

(iii) p-Fluorotoluene to p-Fluorobenzaldehyde

(iv) Ethanenitrile to ethanal

(v) Allyl alcohol to propenal

(vi) But-2-ene to ethanal

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5. Arrange the following compounds in the increasing order of their boiling points :

$CH_3CH_2CH_2CHO, CH_3CH_2CH_2CH_2OH, C_2H_5 - O - C_2H_5, CH_3CH_2$

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6. Arrange the following carbonyl compounds in the increasing order of their reactivity in nucleophilic addition reactions :

(i) Ethanal, propanal, propanone, butane

(ii) Benzaldehyde, p-tolualdehyde, p-nitrobenzaldehyde , acetophenone

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7. Would you expect benzaldehyde to be more reactive or less reactive in nucleophilic addition reactions than propanal? Explain your answer.

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8. How will you bring about the following conversions in not more than two steps

(a) Propanone to propene

(b) propanal to butanone

(c) benzaldehyde to benzophenone

(d) Benzaldehyde to -3- phenylpropan -1- ol

(e) Benzaldehyde to α- hydroxyphenyl acetic acid

(f) ethanl to 3- hydroxybutanal

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9. Convert the following :

(a) ethanal to propanone

(b) ethanal to lactic acid

(c) Ethanal to 2-hydroxybut -3-enoic acid

(d) Acetaldehyde to formaldehyde.

(e) formaldehyde to acetaldehyde

(f) Acetaldehyde to crotonic acid .

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10. An organic compound (A) with molecular formula C_8H_8O forms an orange red precipitate with 2,4 -DNP reagent and gives yellow precipitate on heating with iodine in the presence of sodium hydroxide . It neither reduces Tollen's reagent or Fehling's solution , nor does it decolourise

bromine water or Baeyer's reagent. On drastic oxidation with chromic acid, it gives a carboxylic acid (B) having molecular formulae $C_7H_6O_2$. Identify the compound (A) and (B) and explain the reactions involved .

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11. An unknown aldehyde A on reaction with alkali gives a β- hydroxy aldehyde, which loses water to form an unsaturated aldehyde, But-2-enal. Another aldehyde 'B' undergoes disproportionation reaction in the presence of conc. alkali to form products C and D. C is an aryl alcohol with the formula (C_7H_8O)

(i) Identify A and B.

(ii) Write the sequence of reactions involved.

(iii) Name the product, when B reacts with Zn amalgam and hydrochloric acid.

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12. A compound 'X' (C_2H_4O) on oxidation gives 'Y' $(C_2H_4O_2)$ 'X' undergoes haloform reaction . On treatment with HCN 'X' forms a product 'Z' which on hydrolysis gives 2- hydroxypropanoic acid

(i) write down structures of 'X' and 'Y'

(ii) Name product when 'X' reacts with dil NaOH

(iii) write down the equation for the reactions involved

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13. Complete the following reactions

$(i) C_6H_5CHO + CH_3COCH_3 \xrightarrow[\Delta]{OH^-}$

$(ii) C_6H_5COCH_3 \xrightarrow{Zn/Hg}$

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14. (a) predict the main product of the following reactions :

(b) Write the main products formed when propanal reacts with the following reagents :

(i) 2 moles of CH_3OH in the pressure of dry HCI

(ii) dilute NAOH

(iii) H_2N-NH_2 followed by heating with KOH in ethylene glycol

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15. (a) An organic compound (A) has characteristic odour . On treatment with NaOH it forms two compounds (B) and (C) compound (B) has molecular formula C_7H_8O which on oxidation gives back (A) . The compound (C) is a sodium salt of an acid. When (C) is treated with soda lime it yields an aromatic hydrocarbon (D).Deduce the structures of (A) , (B) , (C) and (D) write the sequence of reactions involved .

(b) complete each synthesis by filling the missing starting materials reagents or products (x,y and z)

(i) $C_6H_5CHO+CH_3CH_2CHO \xrightarrow{NaOH} X$

(ii) $CH_3(CH_2)_9COOC_2H_5 \xrightarrow{Z} CH_3(CH_2)_9CHO$

(c) How will you bring about the following conversions in not more than

two steps

(i) Toluene to benzaldehyde

(ii) Ethylcyanide to 1- Phenylpropanone .

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16. (a) How do you convert the following

(i) Ethanal to propanone

(ii) Toluene to benzoic acid

(b) (A),(B) and (C) are three non cyclic functional isomers of a carbonyl compound with molecular formula C_4H_8O. isomers (A) and (C) give positive Tollen's test whereas isomers (B) does not give Tollen's test but gives positive iodoform test , isomers (A) and (B) on reduction with $Zn(Hg)$/conc. HCl gives the same product (D)

(i) Write the structures of (A), (B), (C) and (D)

(ii) out of A,B and (C) isomers which one is least reactive towards additions of HCN

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17. Write chemical reactions to affect the following transformations:

(i) Butan-1-ol to butanoic acid

(ii) Benzyl alcohol to phenylethanoic acid

(iii) 3 Nitrobromobenzene to 3-nitrobenzoic acid

(iv) 4-Methylacetophenone to benzene-1,4-dicarboxylic acid

(v) Cyclohexene to hexane-1,6-dioic acid

(vi) Butanal to butanoic acid.

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18. Predict the organic prodcuts of the following reactions :

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19. Predict the organic prodcuts of the following reactions :

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20. Describe how the following conversions are carried out :

(i) Toluene to benzoic acid

(ii) Bromobenzene to benzoic acid

(iii) Ethylcyanide to ethanoic acid

(iv) butan -1- ol to butanoic acid

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21. How will you convert acetic acid to

(i) malonic acid (ii) tert-butyl -alcohol (iii) glycine (iv) acetylene (v) ethylamine

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22. How will you make the following conversions ?

(i) propionic acid to acetic acid

(ii) Propioinc Acid to isopropyl alcohol

(iii) Acetic acid to ethanal

(iv) Ethene to succinic acid

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23. Write the strcture fo A,B,Cand D in the following reaction

$$CH_2 = CN \xrightarrow[(ii)H_2O]{(I)SnCI_2/HCI} \underset{D}{\overset{dil,NaOH}{\underset{\downarrow HCN}{\longrightarrow}}} B \xrightarrow{\text{Heat}} C$$

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24. write the structures of compounds A and B in each of the following reaction :

(b) Write structures of main compounds A and B in each of the following reactions

(c) Write chemical equation for the following reaction :

(i) Propanone is treated with dilute $Ba(OH)_2$

(ii) Acetophenone is treated with Zn (hg) / conc. HCI

(iii) Benzoyl chloride is hydrogenated in the presence of $Pd/BaSO_4$

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Practice Problems

1. Give IUPAC names of the following :

$(a)CH_3CH_2CH_2\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_2CHO(b)CH_3COCHCH_2CH_2Cl \quad (c)(CH_3)_2C$

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2. Write IUPAC and common names for the following :

$(a)(CH_3)_3CCHO$

$(b)HOCH_2CH_2CHO$

$(c)H_2C=CHCOCH_3$

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3. Give the structures and IUPAC names of isomers aldehydes having molecular formula $C_5H_{10}O$.

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4. Give the structures and IUPAC names of all the carbonyl compounds having the molecular C_4H_6O.

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5. Give formula of

(I) functional isomer of $CH_3CH_2CH_2CHO$

(ii) Position isomer of $CH_3CH_2COCH_2CH_2CH_3$

(iii) metamer of $CH_3CH_2COCH_2CH_3$

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6. Draw the strutures of the following compounds :

(a) 3- methylbutanal (b) 4- chloropentan -2- one (c) 4- methylpent -3-en -2 one

(d) p-Methyl benzaldehyde

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7. Name the following compounds according to IUPAC system of nomenclature :

$(a)CH_3CH=CHCHO$

$(b)CH_3CH(CH_3)CH_2CH_2CHO$

$(c) OHCC_6H_4CHO - p$

(d) $CH_3COCH_2COCH_3$

$(e) CH_3CH_2COCH(C_2H_5)CH_2CH_2Cl$

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8. Which alkene upon reductive ozonolysis will give acetone as the product?

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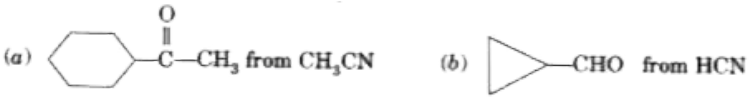
9. How will you obtain the following ?



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10. Arrange the following in order of increasing boiling points :

(i) propanone (ii) propanal (iii) propan -1 ol (iv) Propane (v) Dimethyl

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11. which of the following compounds would undergo aldol condensation , which the cannizzario's reaction and which neither ? Write the structure of the expected products of aldol condensation and connizzaro's reaction :

(a) Benzaldehyde (b) Benzophenone (c) cyclohexanone (d) methanal

(e) 2- methylpentanal (f) butan -1-ol (g) phenylacetadehyde (h) 1-phenylproanone

(i) Methanal (j) 2,2 Dimethylbutanal

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12. Write the names and structures of the products formed by the following reactions :

(i) addition of HCl to acetone .

(ii) Reaction of semicarbazide with formaldehyde .

(iii) Addition of Grignard reagent to butanone

(iv) Reaction of acetophenone with hydrazine in strong base .

(v) Reaction of PCl_5 and propanone

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13. What is the order of reactivity of the following towards HCN ?

$(I)C_6H_5CHO$

$(ii)C_8H_5COC_6H_5$

$(iii)C_3CHO$

$(iv)HCHO$

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14. Predict the product of reaction of

(I) Acetone with aniline (ii) RCHO with hydrazine in the pressence of KOH

(iii) formaldehyde with ammonia (iv) Butanone with $LiALH_4$

(v) aldehyde with tollen's reagent (vi) acetone with $KMnO_4$

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15. What Grignard reagent would use to make following conversions?

(i) Acetophenone to 2-phenylbutan -2-ol

(ii) Cyclohexanone to 1- propylcyclohexanol

(iii) Formaldehyde to benzyl alcohol .

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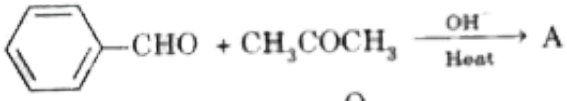
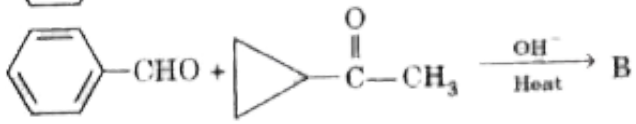
16. What are A and B in the following reactions ?

(i) 

(ii) 

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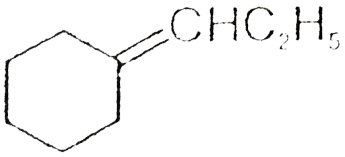
17. Identify unknown compounds A to E in the following sense of chemical reactions.

(i) 

(ii) $A + B \xrightarrow{\text{dil NaOH}} C + H_2O$

(iii) $C \xrightarrow[(ii)\, Zn/H_2O]{(i)\, O_3} A + D$

(iv) $D \xrightarrow[\Delta]{H_2/Ni} E$

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18. Write the IUPAC names of the following :

$(i)CH_3CH = CHCOOH \quad (ii)CH_3CH_2CH_2COOH \quad (iii)C_6H_5CH_2C$

$(v)CH_3CH_2COCH_2COOH (vi)(CH_3)_3CCH_2COOH \quad (vii)CH_3 - \underset{OH}{\overset{|}{C}}H$

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19. Give the structures of the following :

(i) Phenyl acetic acid (ii) Trimethyl acetic acid (iii) Iso - valeric acid (iv)

Malonic acid

(v) Adiopic acid

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20. Write the IUPAC names of the following acids whose common names are given :

(I) Isobutyric acid (ii) n- Valeric acid (iii) Succinic acid (iv) Phenyl acetic acid

(v) Malonic acid

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21. Write the functional isomers of propanoic acid .

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22. Draw the structures of the following :

(I) 3-Bromo -4- phenylpentanoic acid (ii) Hex -2- en 4- ynoic acid

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23. Write equations for the preparation of benzoic acid from the following compounds ::

(I) benzyl alcohol (ii) toluene

(iii) benzonitrile (iv) ethyl benzene

(v) benzo trichloride

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24. How will you prepare

(i) Acetic acid from acetylene (ii) butanoic acid from propan -1- ol

(iii) benzoic acid from aniline (iv) ethanoic acid from carbon dioxide

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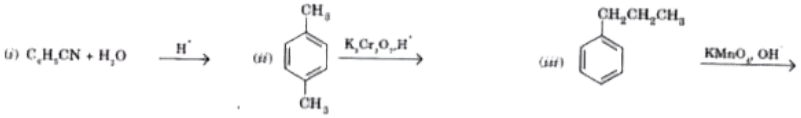
25. Complete the following reactions indiicating the major product formed



(iv) $CH_3CH_2MgI + CO_2 \xrightarrow{\text{Dry ether}} \xrightarrow{H^+, H_2O} (v) CH_3CCl_3 + KOH \rightarrow$

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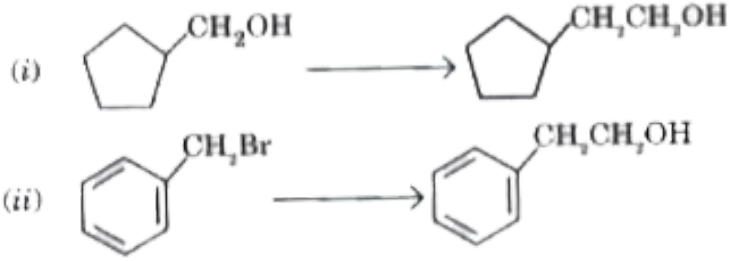
26. How would you carry out the following transformation ?



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27. How will you prepare

(I) ethyl bromide from propionic acid (ii) ethyl propanoate from

propanoic acid

(iii) Acetone from acetic acid (iv) m- nitrobenzoic acid from benzoic

(v) Chloracetic acid from methyl chloride

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28. Which bond $C-OH$ or $CO-H$ of carboxylic acids is broken when

(a) acid chloride is formed (b) Acid reacts with zinc

(c) Acid reacts with NH_2 to from amide .

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29. Which of the following is a stronger acid in each of the following pairs

?

(a)

$CH_2(Cl)COOH, CH_2(F)COOH \quad (b)CH_2(Cl)CH_2CH_2COOH, CH_3C$

(c)

$CH_3COOH, C_6H_5CH_2COOH \quad (d)m-NO_2C_6H_4COOH, p-NO_2C_6$

$(e)p-NO_2C_6H_4COOH, C_6H_5COOH \quad (f)m-OHC_6H_4COOH, p-$

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30. Arrange the following in the increasing order of acidic strength :

(i) $ClCH_2COOH$

(ii) CH_2ClCH_2COOH

(iii) FCH_2COOH

(iv) CH_3COOH

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Conceptula Questions 1

1. Why do aldehydes and ketones have high dipole moments ?

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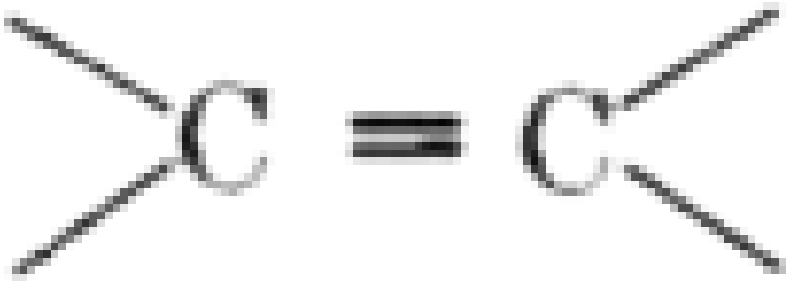
2. How does `



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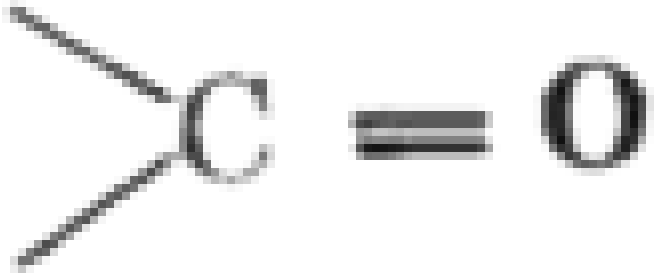

differ from `

group in chemical reaction ?

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3. Sodium bisulfite is used to purify aldehydes and ketones. Explain.

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4. In the preparation of aldehydes from primary alcohols, aldehydes formed must be distilled as soon as they are formed. Why ?

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5. Oxidation of toluene with CrO_3 to benzaldehyde is carried out in the pressure to acetic anhydride

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6. Aliphatic aldehydes do not position isomers why ?

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7. Aldehydes and ketons have lower boiling points than corresponding alcohols and acids . Explain .

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8. How will you distinguish between the following ?

$C_6H_5 - CH = CH - COCH_3$ and

$C_6H_5 - CH = CH - COCH_2CH_3$

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9. Formalin is:

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10. Give the different products obtained when but -1-yne undergoes

(I) Hydroboration oxiation reaction

(ii) Hydrogen in the presence of Hg^{2+} and H^+

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11. An organic compound with molecular formula $C_9H_{10}O$ forms 2,4,-DNP` derivative reduces Tollen's reagent and undergoes Cannizzaro reaction .On vigorous oxidation it gives 1,4-benzene dicarboxylic acid Identify the compound .

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12. Arrange the following in the increasing order of their reactivity towards addition of HCN :

Acetone , acetaldehyde , benzaldehyde , acetophenone

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13. Explain with the help of chemical reaction :

Two molecules of benzaldehyde are treated with conc . NaOH

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14. Write the product in the following reaction

$$CH_2CH = CH - CN \xrightarrow[(ii)\, H_2O]{(I)\, DIBAL - H}$$

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Conceptula Questions 2

1. Aromatic carboxylic acids do not undergo Friedel crafts reaction. Explain.

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2. pK_a value of 4- nitrobenzoic acid to lower than that of benzoic acid . Explain

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3. Write the IUPAC name of

$(I) HOOC - COOH \quad (ii) COOH - CH_2 - COOH$

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4. Why are the boiling points of carboxylic acids higher than the corresponding alcohols ?

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5. Carboxylic acids do not give the characteristic reactions of carbonyl group. Explain.

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6. Formic acid reduces Tollen's reagent because

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7. $(CH_3)_3CCH_2COOH$ is more acidic than $(CH_3)_3SiCH_2COOH$ because

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8. Give reasons for the following in one or two sentences.

'Acetic acid can be halogenated in the presence of P and Cl_2, but formic acid cannot be halogenated in the same way'.

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9. Arrange the following in the decresing order of acidic strength :

(a) $H_2O, CH_3OH, C_6H_5, OH, CH_2COOH$

$(b) CH_3CH_2COOH, HOCH, C_6H_5COOH, ClCH_2COOH$

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10. Why is the bond length of C=O in carboxylic acids slightly larger than that in aldehydes and ketons ?

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11. What is glacial acetic acid ? Why is it so named ?

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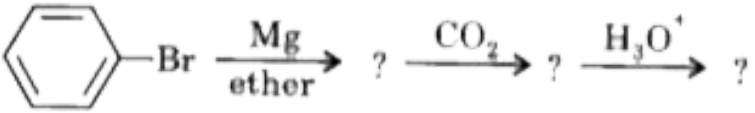
12. Complete the following :



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13. Arrange the following compounds in the increasing of their acid strength :

$(I)(a)CH_3CH_2CH(Br)COOH(b)CH_3CH(Br)CH_2COOH(c)(CH_3)_2CH$

`(ii) (a) Benzonic acid (b) p-nitrobenzonic acid (c) 3,4- dinitrobenzoic acid (d) 4- methoxybenzoic acid

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14. Highly branched carboxylic acids are less acidie than unbranched acids . Why ?

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15. Arrange the following compounds in increasing order of their acid strength :

Benzonic acid 4- nitrobenzoic acid , 3,4-dinitrobenzoic acid , 4-Methoxybenzoic acid .

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Ncert File Ncert In Text Questions

1. Write the structures of the following compounds.

(i) α-Methoxypropionaldehyde

(ii) 3-Hydroxybutanal

(iii) 2-Hydroxycyclopentane carbaldehyde

(iv) 4-Oxopentanal

(v) Di-sec. butyl ketone

(vi) 4-Fluoroacetophenone

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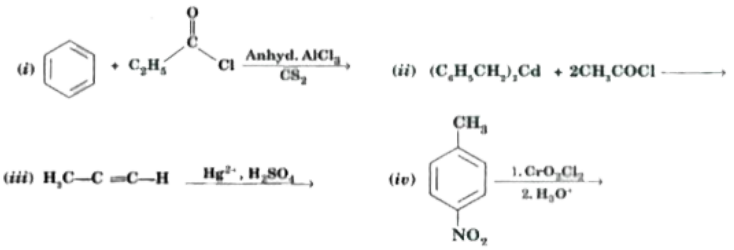
2. Write the structures of products of the following reactions :



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3. Arrange the following compounds in the increasing order of their boiling points :

$CH_3CHO, CH_2OH, CH_3OCH_3, CH_3CH_2CH_3$

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

(i) Ethanal, Propanal, Propanone, Butanone.

(ii) Benzaldehyde, p-Tolualdehyde, p-Nitrobenzaldehyde, Acetophenone.

Hint: Consider steric effect and electronic effect.

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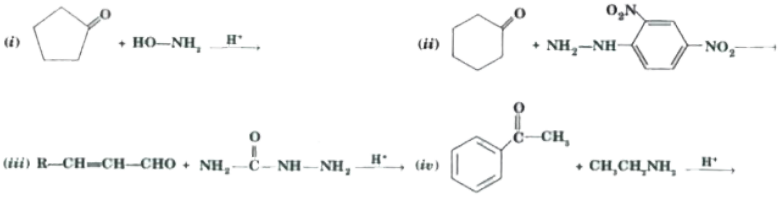
5. Predict the products of the following reactions :



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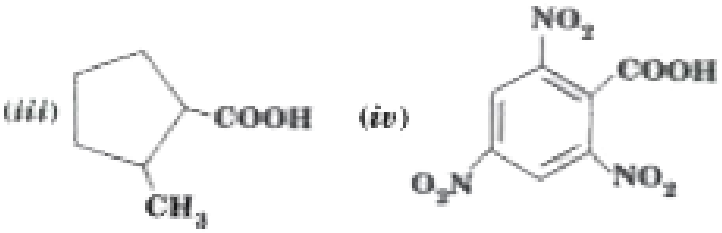
6. Give the IUPAC names of the following compounnds :

$(i) ph CH_2 CH_2 COOH (ii) (CH_3)_2 C = CHCOOH$(iii)



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7. Show how each of the following compounds can be converted to benzoic acid.

(i) Ethylbenzene

(ii) Acetophenone

(iii) Bromobenzene

(iv) Phenylethene (Styrene)

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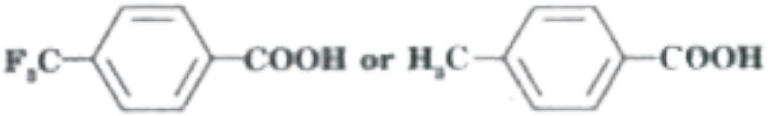
8. Which acid of each pair shown would you expect to be stronger ?

$(I) CH_4CO_2H$ or CH_2FCO_2H

$(ii) CH_2FCO_2H$ or CH_2CICO_2H

$(iii) CH_2FCH_2CH_2CO_2H$ or $CH_2CHFCH_2CO_2H$



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Ncert File Ncert Textbook Exercises

1. What is meant by the following terms ? Give an example of the reaction in each case.

(i) Cyanohydrin

(ii) Acetal

(iii) Semicarbazone

(iv) Aldol

(v) Hemiacetal

(vi) Oxime

(vii) Ketal

(vii) Imine

(ix) 2,4-DNP-derivative

(x) Schiff's base

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2. Name the following compounds according to IUPAC system of nomoenclature :

$(I) CH_3CH(CH_5)CH_2CH_2CHO$

(ii)$CH_3CH_2COCH(C_2H_5))CH_2CH_2Cl$

$(iii)CH_3CH = CHCO$

$(iv)CH_3COCH_2COCH_3$

$(v)CH_2CH(CH_3)CH_2C(CH_3)_2COCH_3$

$(vi)(CH_3)_2CCH_2COOH$

$(vii)OHCC_6H_4CHO - p$

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3. Draw the structures of following compound:

i. 3-Methylbutanal

ii. p-Nitropropiopehnone

iii. P-Methylbenzaldehyde

iv. 4-Methylpent-3-en-2-one

v. 4-Chloropentan-2-one

vi. 3-Bromo-4-phenylpentanoic acid

vii. p-p'-Dihydroxybenzophenone

viii. Hex-2-en-4-ynoic acid

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4. Write the IUPAC names of the ketons and aldehydes wherever possible .

Give also common names

(I) $CH_3CO(CH_2)_4CH_3$

$(ii)CH_2CH_2CHBrCH_2CH(CH_3)CHO$

$(iii)CH_3(CH_2)_5CHO$

$(iv)ph-CH=CH-CHO$

$(vi)phCOPh$

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5. Draw the structure of following derivatives:

i. 2,4-Dinitrophylhydrazone of benzaldehyde.

ii. Cyclopropanone oxime

iii. Actaldehyde dimethyl acetal

iv. Semicarbazone of cyclobutanone

v. Ethylene ketal of hexan-3-one

vi. Methyl hemiacetal of formaldehyde

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6. Predict the product formed when cyclohexanecarbaldehyde reacts with following reagents :

(I) PhMgBr and then H_2O^+ (ii) Tollen's ethanool and acid

(v) Zinc amalgam and dilute hydrochoric acid

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7. Which of the following compounds would undergo aldol condensation or the Cannizzaro reaction, or neither? Writer the structures of expected products of aldol condensation and Cannizzaro reaction.

i. Methanal ii. 2-Methylpentanal

iii. Benzaldehyde iv. Benzophenone

v. Cyclohexanone vi. 1-Phenylpropanone

vii. Phenylacetaldehye viii. Butan-1-ol

ix. 2,2-Dimethylbutanal

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8. How will you convert ethnal into the following compounds ?

i. Butane-1,3-idol , ii. But-2-enal

iii. But-2-enoic acid

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9. Write structure formulae and names of four possible aldol condensation products form propanal and butanal. In each case. Indicate which aldehyde acts as nucleophile and which as electrophile.

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10. An organic compound with the molecular folmula $C_9H_{10}O$ form 2,4-DNP derivative, reduces Tollens reagent, and undergoes Cannizaro reaction. On vigorous oxidation, it gives 1,2-benzenedicarboxylic acid. Identify the compound.

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11. An organic compound (A) (molecular formula $C_8H_{16}O_2$) was hydrolysed with dilute sulphuric acid to give a carboxylic acid (B) and an alcohol (C). Oxidation of (C) with chromic acid produced (B). (C) on dehydration gives but-1-ene. Write equations for the reactions involved.

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12. Arrange the following compounds in the increasing order of their property as indicated:

i. Acetaldehyde, acetone, di-tert-butyl ketone, methyl tert-butyl ketone (reactivity towards HCN).

ii.

$CH_3CH_2CH(Br)COOH, CH_3CH(Br)CH_2COOH, (CH_3)_2CHCOOH,$

(acidic strength).

iii. Benzoic acid, 4-nitrobenzoic acid, 3,4-dinitro-benzoic acid, 4-methoxybenzoic acid (acidic strength).

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13. Give simple chemical test to distinguish between the following pairs of compounds.

i. Propanal and Propanone

ii. Acetophenone and Benzophenone

iii. Phenol and Benzioc acid

iv. Benzoic acid and Ethyl benzoate

v. Pentan-2-one and Pentan-3-one

vi. Benzaldehyde and Acetophenone

vii. Ethanal and Propanal

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14. How will you prapare the following compounds from benzene ? You may use any inorganic reagent and any organic one having not more than one carbon atom.

i. Methyl benzonate ii. m-Nitrobenzonic acid

iii. p-Nitrobenzoic acid iv. Phenylacetic acid

v. p-Nitrobenzaldehyde

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15. How will you bring about the following conversions in not more than two steps ?

i. Propanone to propene

ii. Benzoic acid to Benzaldehyde

iii. Ethanol to 3-Hydroxybutanal

iv. Benzene to m-Nitroacetopenone

v. Benzaldehyde to Benzophenone

vi. Bromobenzene to 1-Phenylethonal

vii. benzaldehyde to 3-Phenylpropan-1-ol

viii. Benzaldehyde to α-Hydrophylacetic acid

ix. Benzoic acid to m-Nitrobenzyl alcohol

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16. Describe the following

i. Acetylation

ii. Cannizzaro reaction

iii. Cross aldol condensation

iv. Decarboxylation

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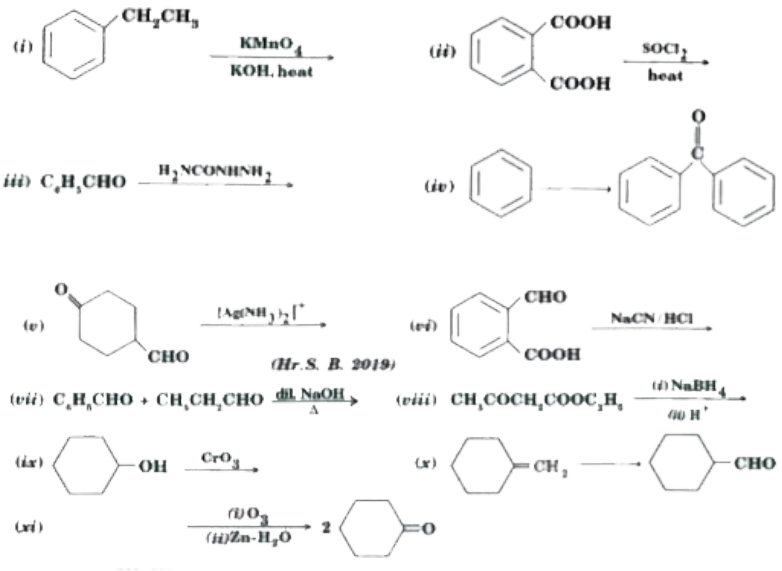
17. complete each synthesis by giving missing starting material , reagent or products



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18. Giving plausible explanation for each of the following:

i. Cyclohexanone forms cyanohydrin good yield but 2,2,6-trimethylcyclohexanone does not.

ii. There are two $(-NH_2)$ groups in semicarbazide. However, only one is involved in the formation of semicarbazones.

iii. During the preparation of esters from a carboxylic acid and an alcohol in the easter should be removed as soon as it is formed.

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19. An organic compound contains 69.77% carbon, 11.63% hydrogen, and rest oxygen. The molecular mass of the compound is 86. It does not reduce Tollens reagent but forms an aditional compound with sodium hydrogensulphite and gives positive iodoform test. On vigorous oxidation, it gives ethanoic and propanoic acid. Write the possible structure of the compound.

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20. Although phenoxide ion has more number of resonating structures than carboxylate ion, carboxylic acid is a stronger than phenol. Why ?

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Ncert File Ncert Exemplar Problems Multiple Choice Questions Type I

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. $CH_3 - CH_2 - CH_2 - \overset{\overset{O}{||}}{C} - H$

B. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - CH_3$

C. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - OH + CO_2$

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

Answer: B

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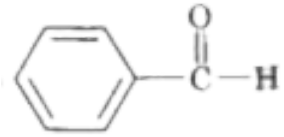
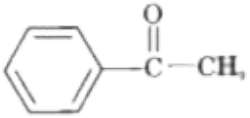
2. Which of the following compounds is most reactive towards nucleophilic addition reactions ?

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

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

C. 

D. 

Answer: A

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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 $Ph - O - \overset{O}{\overset{||}{C}} - Ph$ 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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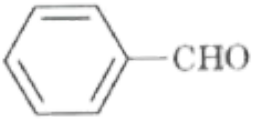
6. Cannizaro's reaction is not given by _____

A. 

B. 

C. $HCHO$

D. CH_3CHO

Answer: D

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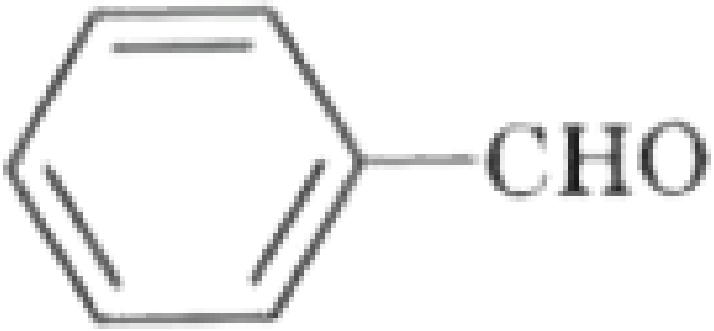
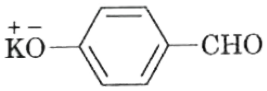
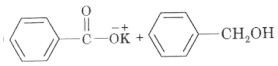
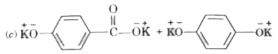
7. Which product is formed when the compound

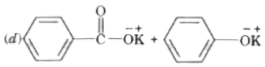


concentrated aqueous KOH solution ?

A. 

B. 

C. 

D. 

Answer: B

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

Stucture 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 , trautomerism

C. prop -2- en -2- ol , geometrical isomerism

D. Prop-1-en- 2-ol tautomerism

Answer: D

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9. 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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10. 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. Tollen's reagent

B. Benzoyl peroxide

C. I_2 and NaOH solution

D. Sn and NaOH solution

Answer: C

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11. 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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12. 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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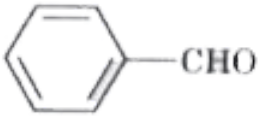
Ncert File Ncert Exemplar Problems Multiple Choice Questions Type Ii

1. Which of the following compounds do not undergo aldol condensation?

A. $CH_3 - CHO$

B. 

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

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

Answer: B:D

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2. Treatement of compound $Ph - O - \overset{\overset{O}{||}}{C} - Ph$

with NaOH solution yields

A. phenol

B. sodium phenoxide

C. Sodium benzoate

D. Benzophenone

Answer: B

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3. Which of the following conversion can be carried out by Clemmensen reduction ?

A. Benzaldehyde into benzyl alcoohol

B. Cyclohexanone into cyclohexane

C. Benzoyl chloride into benzaldehyde

D. Benzophenone into diphenyl methane

Answer: B::D

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4. Through which of the following reactions number of carbon atoms can be increased in the chain ?

A. Grignard reaction

B. Cannizaro's reaction

C. Aldol condensation

D. HVZ reaction

Answer: A::C

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5. Benzophenone can be obtained by .....

A. Benzoyl chloride +Benzene +$AlCl_3$

B. Benzonyl choride +Diphenyl cadmium

C. Benzoyl chlride +Phenyl magnesium chlride

D. Benzene +Carbon monoxide $+ ZnCl_2$

Answer: A

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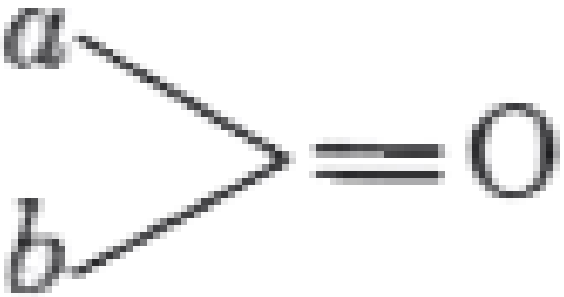
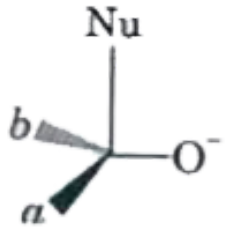
6. Which of the following is the correct represntation for intermediate of nuclephilic addition reaction to the given carbonyl compound (A) :



(A)

A.

B.



C.

D.

Answer: A::B

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Ncert File Ncert Exemplar Problems Short Answer Type Questions

1. Why is there a large difference in the boiling points of butanal and butan-1-ol ?

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2. Write a test to differentiate between pentan-2-one and pentan-3-one.

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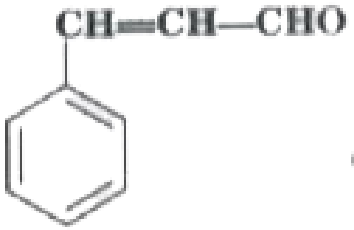
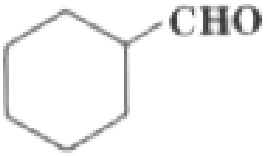
3. Give the IUPAC names of the following compounds

(i) 

(ii) 

(iii) $CH_3 - CH_2 - \underset{\underset{O}{||}}{C} - CH_2 - CHO$

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

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4. Give the structure of the following compounds :

(i) 4-Nitropropiophenone

(ii) 2-Hydroxycyclopentanecarbaldehyde

(iii) Phenyl acetaldehyde.

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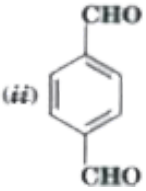
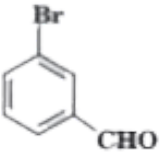
5. Write IUPAC names of the following structures .

(I) $\begin{matrix} CHO \\ | \\ CHO \end{matrix}$

(i) $\begin{matrix} CHO \\ | \\ CHO \end{matrix}$

(ii) 

(iii) 

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6. Benzaldehyde can be obtained from benzalchloride. Write reactions for obtaining benzalchloride and then benzaldehyde from it.

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7. Name the electrophile produced in the reaction of benzene with benzoyl chloride in the presence of anhydrous $AlCl_3$. Name the reaction also.

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8. Oxidation of ketones involves carbon-carbon bond cleavage. Name the products formed on oxidation of 2, 5-dimethylhexan-3-one.

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9. Arrange the following in decreasing order of their acidic strength and give reason for your answer.

$CH_3CH_2OH, CH_3COOH, ClCH_2COOH, FCH_2COOH, C_6H_5CH_2COO$

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10. What product will be formed on reaction of propanal with 2-methylpropanal in the presence of NaOH? Write the name of the reaction also.

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11. Compound 'A' is prepared by oxidation of compound 'B' with alkaline $KMnO_4$. Compound 'A' on reduction with lithium aluminium hydride gets converted back to compound 'B'. When compound 'A' is heated with compound 'B' in the presence of H_2SO_4, it produces fruity smell of compound 'C'. To which family, the compounds 'A', 'B' and 'C' belong to ?

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12. Arrange the following in decreasing order of their acidic strength. Give explanation for the arrangement.

$C_6H_5COOH, FCH_2COOH, NO_2CH_2COOH$

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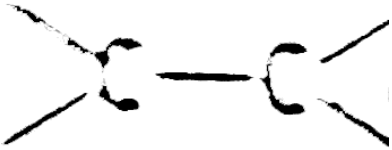
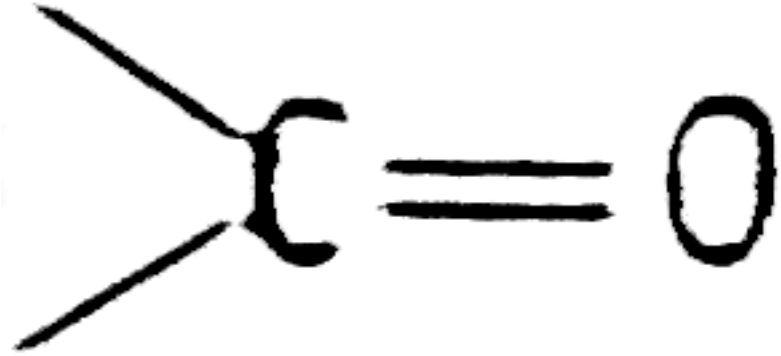
13. Alkenes  and carbonyl compounds  both contain a π bond but alkenes show electrophilic addition reactions whereas carbonyl compounds show nucleophilic addition reactions. Explain.

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14. Carboxylic acids contain carbonyl group but do not show the nucleophilic addition reactions like aldehydes or ketones. Why?

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15. Identify the compounds A, B and C in the following reaction :

$$CH_3 - Br \xrightarrow{Mg\,/\,ether} (A) \xrightarrow[(i)\,\text{Water}]{(i)\,CO_2} (B) \xrightarrow[\Delta]{CH_3OH\,/\,H} (C)$$

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16. Why are carboxylic acids more acidic than alcohols or phenols although all of them have hydrogen atom attached to a oxygen atom (-O-H)?

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17. Complete the following reaction sequence

$$CH_3 - \overset{\overset{O}{||}}{C} - CH_3 \xrightarrow[(ii)\,H_2O]{(i)\,CH_3MgBr} (A) \xrightarrow[\text{Ether}]{\text{Na metal}} (B) \xrightarrow{CH_3 - Br} (C)$$

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18. Ethylbenzene is generally prepared by acetylation of benzene followed by reduction and not by the direct alkylation of benzene. Think of a possible reason.

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19. Can Gattermann-Koch reaction be considered similar to Friedel Craft's acylation ? Discuss.

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Ncert File Ncert Exemplar Problems Matching Type Questions

1. Match the column names gives in Column I with the IUPAC names given is coloumn II.

Column I (Common names)	Column II (IUPAC names)
(a) Cinnamaldehyde	(i) Pentanal
(b) Acetophenone	(ii) Prop-2-enal
(c) Valeraldehyde	(iii) 4-Methylpent-3-en-2-one
(d) Acrolein	(iv) 3-Phenylprop-2-enal
(e) Mesityl oxide	(v) 1-Phenylethanone

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2. Match the common names gives in Column I with the IUPAC names given is coloumn II.

Column I (Acids)	Column II (IUPAC names)
(a) Phthalic acid	(i) Hexane-1,6-dioic acid
(b) Oxalic acid	(ii) Benzene-1,2-dicarboxylic acid
(c) Succinic acid	(iii) Pentane-1,5-dioic acid
(d) Adipic acid	(iv) Butane-1,4-dioic acid
(e) Glutaric acid	(v) Ethane-1,2-dioic acid

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3. Match the column names gives in Column I with the IUPAC names given is coloumn II.

Column I (Reactions)	Column II (Reagents)
(a) Benzophenone → Diphenylmethane	(i) $LiAlH_4$
(b) Benzaldehyde → 1-Phenylethanol	(ii) DIBAL—H
(c) Cyclohexanone → Cyclohexanol	(iii) Zn(Hg)/Conc. HCl
(d) Phenyl benzoate → Benzaldehyde	(iv) CH_3MgBr

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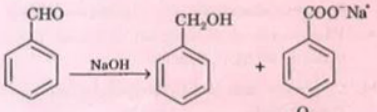
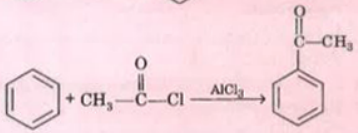
4. Match the common names gives in Column I with the IUPAC names given is coloumn II.

Column I (Example)	Column II (Reaction)
(a) $CH_3-\overset{O}{\overset{\|}{C}}-Cl + H_2 \xrightarrow{Pd-C/BaSO_4} CH_3-\overset{O}{\overset{\|}{C}}-H$	(i) Friedel Crafts acylation
(b) 	(ii) HVZ reaction
(c) 	(iii) Aldol condensation
(d) $R-CH_2-COOH \xrightarrow{Br_2/Red\ P} R-\underset{Br}{\underset{\|}{C}}-COOH$	(iv) Cannizaro's reaction
(e) $CH_3-CN \xrightarrow[(ii)\ H_2O/H^+]{(i)\ SnCl_2/HCl} CH_3CHO$	(v) Rosenmund's reduction
(f) $2CH_3CHO \xrightarrow{NaOH} CH_3-CH=CHCHO$	(vi) Stephen's reaction

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5. Assertion (A): Formaldehyde is a planar molecule.

Reason (R) :It contains sp^2 hybridised carbon atom.

A. Assertion and reason both are correct statements and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: A

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6. Assertion (A) compound containing -CHO group are easily oxidised to corresponding carboxylic acids

Reason (R) : Carboxylic acids can be reduced to alcohols by treatment with $LiAlH_4$

A. Assertion and reason both are correct statements and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion and reason both are correct statements but reason is not correct explanation of assertion .

Answer: D

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7. Assertion (A) The α-hydrogen atom in carbonyl compounds is less acidic.

Reason (R) The anion formed after the loss of α-hydrogen atom is resonance stabilised.

A. Assertion and reason both are correct statements and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: D

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8. Assertion : Aromatic aldehydes and formaldehyde undergo Cannizzaro reaction

Reason : Aromatic aldehydes are almost as reactive as formaldehyde.

A. Assertion and reason both are correct statements and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: C

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9. Assertion (A) Aldehydes and ketones, both react with Tollen's reagent to form silver mirror.

Reason (R) Both, aldehydes and ketones contain a carbonyl group.

A. Assertion and reason both are correct statements and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: D

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Quick Memory Test A Say True Or False

1. Aldehydes and ketones react with electrophiles but not with nucleophiles.

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2. Wolff Kishner reduction of acetophenone gives toluene.

Watch Video Solution

3. Acetaldehyde can be prepared by the distillation of calcium acetate.

Watch Video Solution

4. Acetaldehyde can be reduced to ethane in the presence of $LiAlH_4$.

Watch Video Solution

5. Benzaldehyde cannot undergo Cannizzaro reaction.

Watch Video Solution

6. Aldehydes are less easily oxidised than ketones.

Watch Video Solution

7. Acetaldehyde cyanohydrin on hydrolysis gives lactic acid.

Watch Video Solution

8. Benzaldehyde reduces Fehling solution.

Watch Video Solution

9. Benzaldehyde forms addition product with sodium bisulphite but acetophenone does not.

Watch Video Solution

10. Ketones give nucleophilic addition reactions more readily than aldehydes.

Watch Video Solution

11. Calcium formate on heating gives acetaldehyde.

Watch Video Solution

12. The pK_a value of formic acid is smaller than that of acetic acid.(True/ false) explain it.

Watch Video Solution

13. The carbon-oxygen bond lengths in formic acid are equal.

Watch Video Solution

14. Nitration of benzoic acid gives m-nitrobenzoic acid.

Watch Video Solution

15. During the reaction of carboxylic acid with $NaHCO_2$ the carbon of the CO_2 produced comes from $NaHCO_3$

View Text Solution

16. When benzoic acid is heated with soda lime, benzene is formed.

View Text Solution

17. Acetate ion is a stronger acid than methoxide ion.

Watch Video Solution

18. Ethanoic acid liberates hydrogen with sodium metal.

Watch Video Solution

19. $Me_3CCH_2COOH$is more acidic than Me_3SiCH_2COOH.

Watch Video Solution

20. Formic acid gives silver mirror test with Tollen's reagent.

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Quick Memory Test B Complete The Missing Links

1. Aldehydes form red precipitate with Fehling solution of.....

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2. In carbonyl compounds the carbon atom involves ..... hybridisation.

Watch Video Solution

3. IUPAC name of crotonaldehyde is

Watch Video Solution

4. The oxidation of toluene with ..... gives benzaldehyde.

Watch Video Solution

5. Ketones on reduction with ..... amalgam and water form pinacols.

View Text Solution

6. Three moles of acetone on refluxing with conc. H_2SO_4 give .....

Watch Video Solution

7. Acetone reacts with hydroxylamine to form .....

Watch Video Solution

8. Pentan-2-one can be distinguished from pentan-3-one by .....

Watch Video Solution

9. Ammonia reacts with ..... to give urotropine.

Watch Video Solution

10. When but-2-yne is hydrated with conc. H_2SO_4 in the presence of $HgSo_4$ it gives .....

Watch Video Solution

11. Carboxylic acids may be prepared by the reaction of Grigrand reagents with .....

Watch Video Solution

12. Kolbe's electrolysis of potassium succinate gives CO_2 and .....

Watch Video Solution

13. ..... is produced on heating ammonium acetate.

Watch Video Solution

14. Acidic Hydrolysis of HCN gives .....

Watch Video Solution

15. The lowest molecular mass monocarboxylic acid containing a secondary carbon atom is .....

Watch Video Solution

16. Trimethylacetic acid has ..... pk_a value than trichloroacetic acid.

Watch Video Solution

17. Ethyl acetate is reduced with $LiAlH_4$ to give .....

Watch Video Solution

18. Benzoic acid reacts with conc. H_2SO_4 in the presence of SO_3 to give ..... and water.

Watch Video Solution

Quick Memory Test C Choose The Correct Alternative

1. When calcium acetate and calcium formate together is subjected to dry distillation , the product is

Watch Video Solution

2. Benzoyl chloride on reduction with hydrogen in the presence of Pd and $Baso_4$ gives acetophenone/ benzaldehyde.

Watch Video Solution

3. Aldehydes and ketones undergo nucleophilic/electrophilic addition reactions.

Watch Video Solution

4. Acetaldehyde reacts with DNP to give orange/black precipitate.

Watch Video Solution

5. Aldehydes and ketones react with ammonia derivatives in weakly acidic/strongly acidic medium.

Watch Video Solution

6. The reddish brown precipitate formed in the Fehlings test for aldehydes (RCHO) is due to the formation of

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7. Iodoform test is given by ethanal OR propanal.

Watch Video Solution

8. Aldehydes or ketones are reduced to alkanes/alcohols with $NaBH_4$

Watch Video Solution

9. On cooling acetaldehyde with a few drops of conc. H_2SO_4 at $0^\circ C,$ the product formed is paraldehyde/metaldehyde.

Watch Video Solution

10. The reaction $:CH_2 = CH + 2 + CO + H_2O$ (steam) $\xrightarrow{H_3PO_4,\ \Delta} CH_3CH_2COOH$ is known as Koch reaction/ Mendius reaction.

View Text Solution

11. During the reaction of carboxylic acid with $Na_3CO_3$the carbon dioxide evolved comes from Na_2CO_3 / carboxylic acid.

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12. pK_a value of m-hydroxybenzoic acid is less / more than that of benzoic acid.

Watch Video Solution

13. Carboxylic acids are reduced to alkanes/alcohols with HI, red P.

Watch Video Solution

14. When calcium acetate is distilled, it gives acetonel acetaldehyde.

Watch Video Solution

15. Formic acid gives/does not give silver mirror with Tollen's reagent.

Watch Video Solution

16. Carboxyl group in benzoic acid is o-and plm director.

Watch Video Solution

17. o-hydroxybenzoic acid is less/more acidic than p-hydroxy benzoic acid.

Watch Video Solution

18. Boiling points of carboxylic acids are less / more than the corresponding alcohols.

Watch Video Solution

19. Chloroacetic acid reacts with KCN followed by acidic hydrolysis to give malonic acid/lactic acid.

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Revision Exercises Objective Questions Multiple Choice Questions

1. Aldehydes and ketones undergo

A. electrophilic addition

B. electrophilic substitution

C. nucleophilic addition

D. nucleophilic substitution.

Answer: C

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

A. CH_3COCH_3

B. CH_3CHO

C. $CH_3COC_2H_5$

D. $HCHO$

Answer: D

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3. In the carbonyl group, the carbon atom undergoes

A. sp hybridisation

B. sp^2 hybridisation

C. sp^3 hybridisation

D. sp^3d hybridisation.

Answer: B

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4. $CH_3COCl \xrightarrow[BaSO_4]{Pd, H_2} X$, X is

A. acetaldehyde

B. propionaldehyde

C. acetone

D. acetic acid

Answer: A

View Text Solution

5. Which of the following gives iodoform test?

A. CH_3OH

B. $CH_3COCH_2CH_3$

C. $HCHO$

D. CH_3COOH

Answer: B

Watch Video Solution

6. The reaction of formaldehyde with methyl magnesium bromide followed by hydrolysis gives

A. secondary alcohol

B. primary alcohol

C. ketone

D. tertiary alcohol

Answer: B

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7. Which of the following will not undergo aldol condensation?

A. Acetaldehyde

B. Propanaldehyde

C. Benzaldehyde

D. Propanone

Answer: C

Watch Video Solution

8. Which of the following is the strongest acid ?

A. CH_3COOH

B. $CH_3CHClCOOH$

C. CH_3CH_2COOH

D. CH_2ClCH_2COOH

Answer: B

Watch Video Solution

9. Vinegar is dilute aqueous solution of

A. Ethanoic acid

B. Benzoic acid

C. Citric acid

D. Oxalic acid.

Answer: A

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10. Salicylic acid on heating with soda lime gives

A. benzene

B. benzoic acid

C. phenol

D. toluene.

Answer: C

Watch Video Solution

11. The strongest acid among the following is

A. $p - Cl - C_6H_4COOH$

B. $p - OHC_6H_4COOH$

C. C_6H_5COOH

D. $p - NO_2C_6H_4COOH$

Answer: D

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12. Carboxylic acids are reduced by red P and HI to

A. alkanes

B. alcohols

C. alkenes

D. aldehydes.

Answer: A

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13. Formic acid and acetic acid are distinguished by

A. litmus solution

B. caustic soda

C. $NaHCO_3$

D. ammoniacal $AgNO_3$

Answer: D

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14. Which of the following compounds does not have a carboxyl group ?

A. Benzoic acid

B. Palmitic acid

C. Picric acid

D. Oleic acid

Answer: C

Watch Video Solution

15. The conversion of a carboxylic acid to alpha-bromocarboxylic acid using red phosphorus and bromine is a

A. Cannizzaro's reaction

B. Aldol condensation

C. Hell Volhard Zelinsky reaction

D. Kolbe's reaction.

Answer: C

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16. $RCOOAg + Br_2 \xrightarrow[\Delta]{CC1_4} R - Br + AgBr + CO_2$ this reaction is called:

A. Hunsdiecker reaction

B. Kolbe's reaction

C. Friedel Craft's reaction

D. Wurtz reaction.

Answer: A

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17. Benzene reacts with CH_3COCl in the presence of anhy $AlCl_3$ to give

A. $C_6H_5CH_3$

B. C_6H_5Cl

C. $C_6H_5COCH_3$

D. C_6H_5COCI

Answer: C

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18. Decarboxylation of sodium benzoate on heating with soda lime gives

A. benzene

B. toluene

C. benzaldehyde

D. benzoic acid.

Answer: A

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19. Benzoic acid reacts with $LiAlH_4$ to give

A. Ethylbenzene

B. Methanzene

C. Phenol

D. Benzyl alcohol

Answer: D

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20. The IUPAC name of the compound

$CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - CH_2 - COOH$ is

A. 2-Oxo-but-3-enal

B. 3-Oxo-1-formylpent-4-oic acid

C. 1-Formylpent-4-en-3-one

D. 3-Oxopentanoic acid

Answer: D

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21. Which is most acidic ?

A. CF_3COOH

B. CCI_3COOH

C. CBr_3COOH

D. CH_3COOH

Answer: A

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22. Among the following which has lowest pK_a value?

A. $HCOOH$

B. CH_3COOH

C. $(CH_3)_2 - CH - COOH$

D. $CH_3 - CH_2 - COOH$

Answer: A

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23. The IUPAC name of $CH_3CH_2 - \overset{O}{\overset{||}{C}} - CH_2 - \overset{O}{\overset{||}{C}} - H$ is

A. 1-oxopentanal-3-one

B. 1-oxopentanal

C. 3-oxopentanal

D. 3-oxopentanal-3-one

Answer: C

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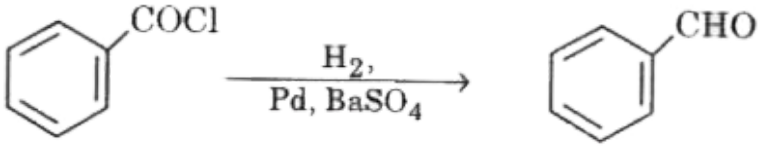
24. What is the name of the following reaction:



A. Stephen reaction

B. Rosenmund reduction

C. etard reaction

D. Aldol condensation

Answer: B

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

A. nucleophilic substitution reaction

B. nucleophilic addition reaction

C. electrophilic addition reaction

D. electrophilic substitution reaction

Answer: B

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26. Which on heating with aqueous KOH, produces acetaldehyde?

A. $CH_3 - CH - Cl_2$

B. $CH_3 - CO - Cl$

C. $CH_3 - CH_2 - Cl$

D. $CH_2 - Cl - CH_2 - Cl$

Answer: A

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27. Iodoform test is not given by

A. Pentan-2-one

B. Pentan-3-one

C. Ethanol

D. Ethanal

Answer: B

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28. In the following, strongest acid is :

A. CH_3CH_2COOH

B. CH_3COOH

C. C_6H_5COOH

D. $C_6H_5CH_2COOH$

Answer: C

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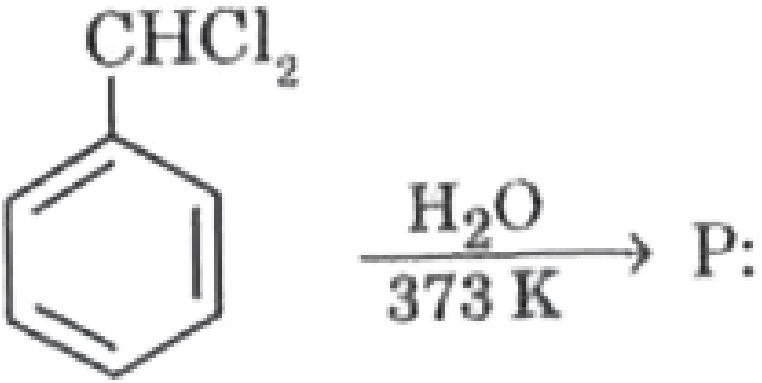
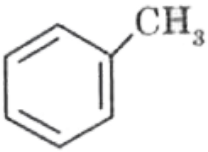
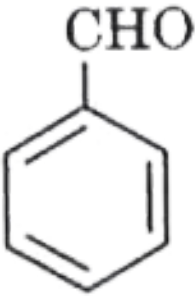
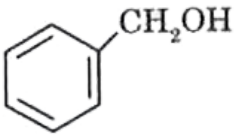
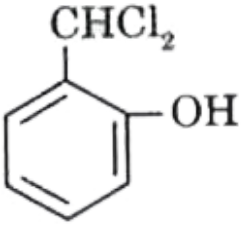
29. in the following reaction , product P is



A. 

B. 

C. 

D. 

Answer: B

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30. Acetaldehyde and acetone can be distinguished by

A. $FeCl_3$ test

B. $NaHCO_3$ test

C. Tollen's test

D. Molisch test

Answer: C

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31. A carbonyl group can be converte into $-CH_2$ group by:

A. NH_2NH_2 / HCI

B. $Zn - Hg /$ conc. HCI

C. H_2 / Ni

D. $LIAIH_4$

Answer: B

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32. Among the following compounds, which will not repond to cannizzaro's reaction, upon treatement with alkali?

A. Cl_2CCHO

B. Me_3CCHO

C. C_6H_5CHO

D. $HCHO$

Answer: A

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33. The IUPAC name of $PhCH_2CH_2COOH$is named as

A. 3-phenylpropanoic acid

B. benzylacetic acid

C. carboxyethyl benzene

D. 2-phenylpropanoic acid.

Answer: A

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34. Which of the following compound undergoes haloform reaction?

A. CH_3COCH_3

B. $HCHO$

C. CH_3CH_2Br

D. $CH_3 - O - CH_3$

Answer: A

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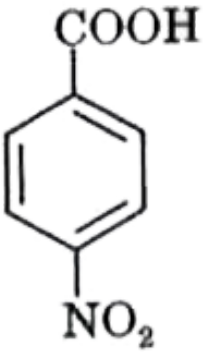
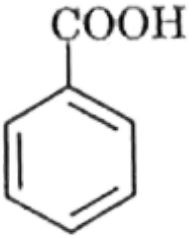
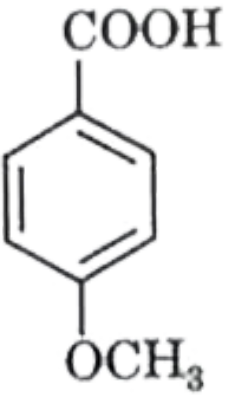
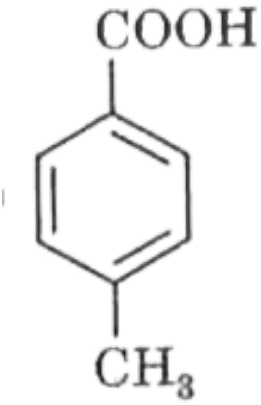
35. Which of the following is most acidic ?

A. 

B. 

C. 



D.

Answer: A

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36. Which of the following is the strongest acid:

A. $HCOOH$

B. CH_3COOH

C. CH_3CH_2COOH

D. $(CH_3)_2CHCOOH$

Answer: A

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37. What type of organic compounds are prepared by Gattermann-Koch reaction ?

A. Aliphatic aldehyde

B. Aromatic ketone

C. Aliphatic ketone

D. Aromatic aldehyde

Answer: D

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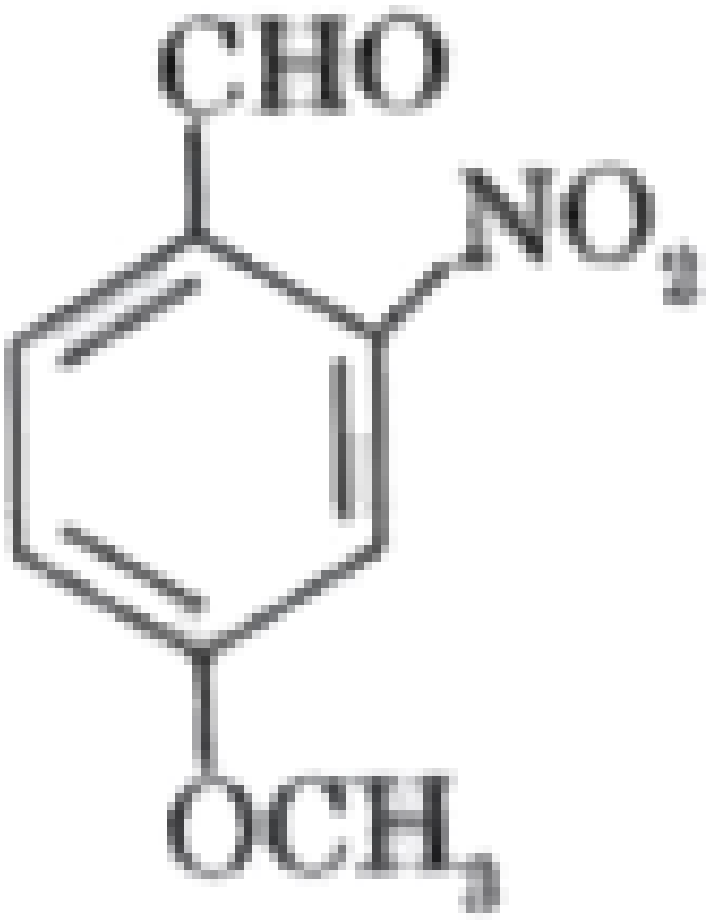
38. the IUPAC name of the compound



is

A. 2-formyl -5- methoxynitrobenzene

B. 4-methoxy -6- nitrobenzaldehyde

C. 4- methoxy -2- nitrobenzaldehyde

D. 4- formyl -3- nitroanisole

Answer: C

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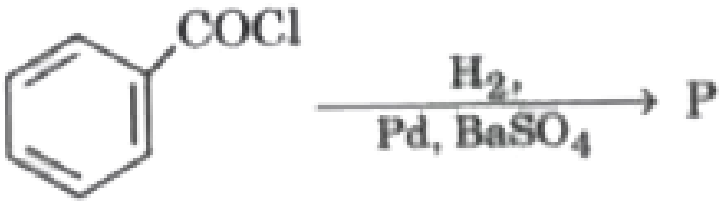
39. In the reaction



the product P is

A. C_6H_5CHO

B. C_6H_5OH

C. $C_6H_5CH_2CHO$

D. $C_6H_5COCH_3$

Answer: A

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40. Match the name reaction (column I) with the reagent (column II) used .

Column I	Column II
(i) HVZ reaction	(A) CO, HCl, Cu_2Cl_2
(ii) Gattermann Koch reaction	(B) I_2, NaOH
	(C) X_2, red P
	(D) HI, red P

A. (i) -C ,(ii)-A

B. (i) -D ,(ii)-B

C. (i) -C , (ii) -B

D. (i) -D,(ii)-A

Answer: A

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41. Match the name reaction (column I) with the reagent (column II) used .

Column I	Column II
(i) $CH_3COOH \xrightarrow{LiAlH_4, ether}$	(A) $C_6H_5CH_2CH_3$
(ii) $C_6H_5COCH_3 \xrightarrow[HCl]{Zn/Hg}$	(B) $C_6H_5CH_2OH$
	(C) CH_3CH_2OH
	(D) CH_3CH_3

A. (i) -D(ii)-A

B. (i) -D ,(ii)-B

C. (i) -C , (ii) -A

D. (i) -C ,(ii)-B

Answer: C

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42. Match the name reaction (column I) with the reagent (column II) used .

Column I	Column II
(i) $CH_3CHO \xrightarrow[(ii)H^+, heat]{(i)\ dil\ OH^-}$	(A) 3-Hydroxy-4-methyl pent-3-en-2-one
(ii) $CH_3COCH_3 \xrightarrow[(ii)H^+, heat]{(i)\ dil\ OH^-}$	(B) But-2-enal
	(C) But-1-enal
	(D) 4-Methylpent-3-en-2-one

A. (i) -B ,(ii)-D

B. (i) -B ,(ii)-A

C. (i) -C , (ii) -D

D. (i) -C,(ii)-A

Answer: A

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43. Match the name reaction (column I) with the reagent (column II) used .

Column I	Column II
(i) $CH_3COCl + H_2 \xrightarrow{Pd/BaSO_4} CH_3CHO$	(A) Gattermann reaction
(ii) $C_6H_5CH_3 \xrightarrow[H_3O^+]{CrO_2Cl_2, CS_2} C_6H_5CHO$	(B) Etard's reaction
	(C) Rosenmund reaction
	(D) Friedel Crafts reaction

A. (i) -C ,(ii)-A

B. (i) -C ,(ii)-B

C. (i) -A , (ii) -C

D. (i) -B,(ii)-C

Answer: B

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44. Match the name reaction (column I) with the reagent (column II) used .

Column I	Column II
(i) $RCOONa \rightarrow R\text{-}H$	(A) Zn/Hg, HCl
(ii) $RCHO \rightarrow R\text{-}CH_3$	(B) NaOH, CaO
	(C) $NaBH_4$

A. (i) -C ,(ii)-A

B. (i) -B ,(ii)-C

C. (i) -B, (ii) -A

D. (i) -A,(ii)-C

Answer: C

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45. Match the name reaction (column I) with the reagent (column II) used .

Column I	Column II
(i) $>C=O \rightarrow >CHOH$	(A) Zn-Hg/conc. HCl
(ii) $>C=O \rightarrow >CH_2$	(B) CH_3MgBr, H_3O^+
	(C) Dibal-H
	(C) I_2, NaOH

A. (i) -B ,(ii)-A

B. (i) -B ,(ii)-C

C. (i) -A , (ii) -B

D. (i) -A,(ii)-D

Answer: A

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Revision Exercises Objective Questions Passage Based Questions

1. Aldehydes and ketones undergo nucleophilic addition reactions. With weak nucleophiles such as ammonia and its derivatives, (H_2N-Z), aldehydes and ketones react in weakly acidic medium to form compounds

containing carbonnitrogen double bond with the elimination of water to form  .

Aldehydes can be easily oxidised to carboxylic acid on treatment with common oxidising agents like $KMnO_4 K_2Cr_2O_7, HNO_3$, etc. The carboxylic acid formed contain the same number of carbon atoms as the aldehydes. However ketones under drastic conditions with powerful oxidising agents undergo cleavage of C-C bond giving mixture of carboxylic acids having lesser number of C atoms than the original ketone.

Arrange the following in the decreasing order of their reactivity towards HCN:

$HCHo, CH_3COCH_3, CH_3CHO, C_6H_5CHO$

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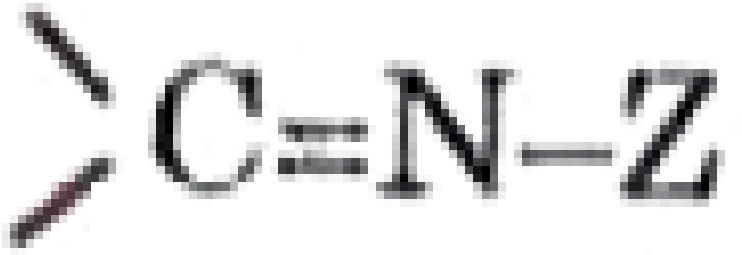
2. Aldehydes and ketones undergo nucleophilic addition reactions. With weak nucleophiles such as ammonia and its derivatives, (H_2N-Z), aldehydes and ketones react in weakly acidic medium to form compounds containing carbonnitrogen double bond with the elimination of water to form  .

Aldehydes can be easily oxidised to carboxylic acid on treatment with common oxidising agents like $KMnO_4 K_2Cr_2O_7, HNO_3$, etc. The carboxylic acid formed contain the same number of carbon atoms as the aldehydes. However ketones under drastic conditions with powerful oxidising agents undergo cleavage of C-C bond giving mixture of carboxylic acids having lesser number of C atoms than the original ketone.

Write the reaction of acetone with semicarbazide.

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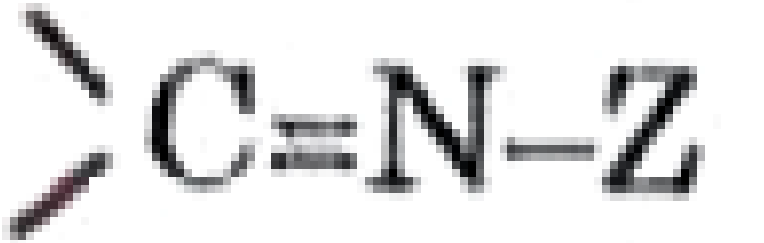
3. Aldehydes and ketones undergo nucleophilic addition reactions. With weak nucleophiles such as ammonia and its derivatives, (H_2N-Z), aldehydes and ketones react in weakly acidic medium to form compounds containing carbonnitrogen double bond with the elimination of water to form  .

Aldehydes can be easily oxidised to carboxylic acid on treatment with common oxidising agents like $KMnO_4 K_2Cr_2O_7, HNO_3$, etc. The carboxylic acid formed contain the same number of carbon atoms as the aldehydes. However ketones under drastic conditions with powerful oxidising agents undergo cleavage of C-C bond giving mixture of carboxylic acids having lesser number of C atoms than the original ketone.

Name the product formed when formaldehyde reacts with ammonia.

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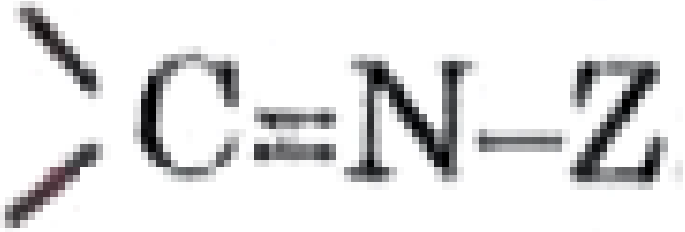
4. Aldehydes and ketones undergo nucleophilic addition reactions. With weak nucleophiles such as ammonia and its derivatives, (H_2N-Z), aldehydes and ketones react in weakly acidic medium to form compounds containing carbonnitrogen double bond with the elimination of water to form  .

Aldehydes can be easily oxidised to carboxylic acid on treatment with common oxidising agents like $KMnO_4 K_2Cr_2O_7, HNO_3$, etc. The carboxylic acid formed contain the same number of carbon atoms as the aldehydes. However ketones under drastic conditions with powerful oxidising agents undergo cleavage of C-C bond giving mixture of carboxylic acids having lesser number of C atoms than the original ketone.

Name the product obtained when pentan-2-one is oxidised with conc. HNO_3

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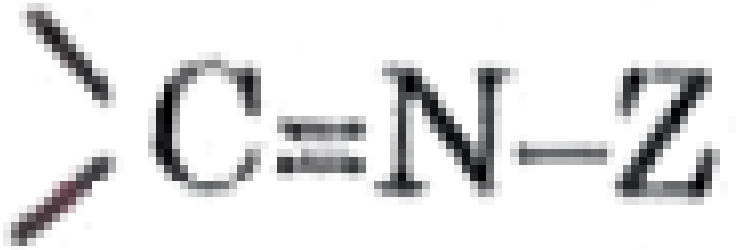
5. Aldehydes and ketones undergo nucleophilic addition reactions. With weak nucleophiles such as ammonia and its derivatives, (H_2N-Z), aldehydes and ketones react in weakly acidic medium to form compounds containing carbonnitrogen double bond with the elimination of water to form  .

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Complete the reaction:

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6. Carboxylic acids are distinctly acidic and ionise in water to give H_3O^+ ions. In general, electron withdrawing groups increase the acidity of carboxylic acids while electron donating groups decrease the acidity of the carboxylic acid. The electron releasing groups such as $-CH_3 - OH$, $-NH_2$ and $-OCH_3$ make benzoic acid weaker while electron withdrawing groups such as $-CI$, $-NO_2$, etc., make benzoic acid stronger. The ortho isomer of every substituted benzoic acid is the strongest among the three isomers due to effect known as ortho effect. Carboxylic acids neutralise alkalies, decompose carbonates and bicarbonates evolving CO_2 with brisk effervescence.

Arrange the following in increasing order of acidic strength :

$FCH_2COOH, CH_3COOH, CICH_2COOH, CH_3CH_2OH, C_6H_5COOH$

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The pK_a value of formic acid is less than that of acetic acid.True or False.

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Carboxylic acids neutralise alkalies, decompose carbonates and bicarbonates evolving CO_2 with brisk effervescence.

Give one test to distinguish between phenol and benzoic acid.

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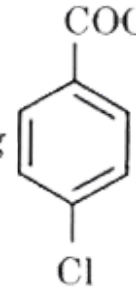
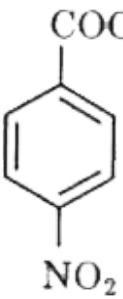
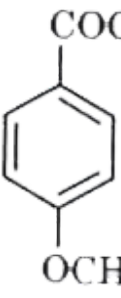
Among  ,  and  ,

among

which is the strongest acid .

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10. Carboxylic acids are distinctly acidic and ionise in water to give H_3O^+ ions. In general, electron withdrawing groups increase the acidity of carboxylic acids while electron donating groups decrease the acidity of the carboxylic acid. The electron releasing groups such as $-CH_3 - OH$, $-NH_2$ and $-OCH_3$ make benzoic acid weaker while electron withdrawing groups such as $-CI$, $-NO_2$, etc., make benzoic acid stronger. The ortho isomer of every substituted benzoic acid is the strongest among the three isomers due to effect known as ortho effect. Carboxylic acids neutralise alkalies, decompose carbonates and bicarbonates evolving CO_2 with brisk effervescence.

Give a reaction for the preparation of benzoic acid using a Grignard reagent.

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Revision Exercises Objective Questions Assertion Reason Questions

1. (A) Pentan-2-one can be distinguished from pentan-3-one by iodoform test.

(R) Former is a methyl ketone whereas the latter is not a methyl ketone.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: A

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2. Assertion : In methanal, all the four atoms are in the same plane.

Reason : The carbon atom in methanal is sp^2 hybridized.

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3. Assertion : Benzaldehyde is less reactive than propanal towards nucleophilic addition reactions.

Reason : Benzaldehyde is less sterically hindred.

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4. Assertion : Acetaldehyde undergoes aldol condensation with dil. NaOH.

Reason Aldehydes which donot contain a-hydrogen undergo aldol condensation.

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5. Assertion : Cross Cannizzaro's reaction between methanal and benzaldehyde gives benzyl alcohol and formate ion.

Reason : Benzaldehyde does not contain a-hydrogen atom.

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6. Assertion: The pK_a of acetic acid is lower than that of phenol.

Reason : Phenoxide ion is more resonance sabilised.

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7. Assertion : Phenol and benzoic acid can be distinguished by $NaHCO_3$.

Reason : Benzoic acid is a stronger acid than phenol.

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8. Assertion : Fluoroacetic acid is stronger acid than chloroacetic acid.

Reason : due to greater electron donating effect of F than Cl.

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9. Acetic acid does not undergo haloform reaction.

Acetic acid has no alpha-hydrogen.

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10. Assertion : Acetic acid is weaker acid than CH_3CH_2COOH.

Reason : due to +I effect of methyl group.

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Revision Exercises Objective Questions Very Short Answer Questions

1. What is the hybridised state of carbonyl carbon atom?

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2. Give the structure and IUPAC name of an aliphatic aldehyde having five carbon atoms which undergoes Cannizzaro's reaction

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3. Write down the position isomer of

$$CH_3 - \overset{O}{\overset{||}{C}} - CH_2CH_2 - CH_3$$

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4. Draw the structural formula of 1-phenyl Propan-1-one molecule.

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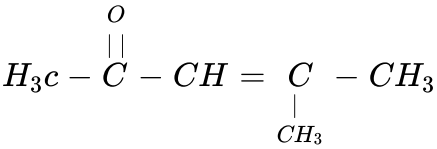
5. Write the IUPAC name of



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6. Write the IUPAC name of $(CH_3)_2CHCHO$.

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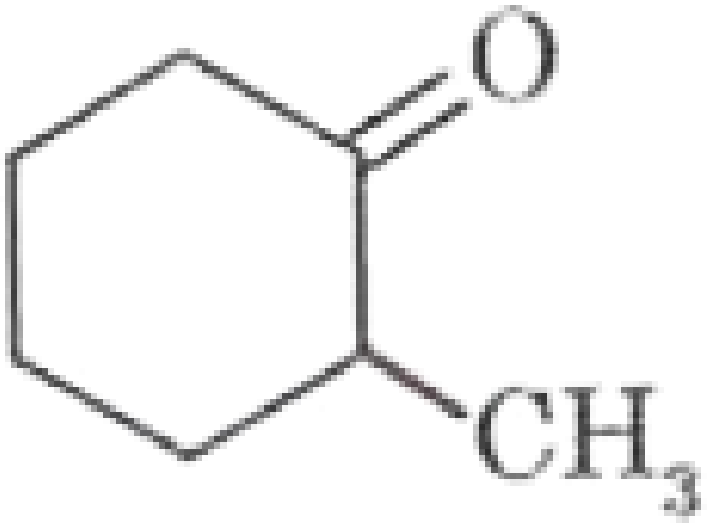
7. Write IUPAC name of



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8. What is Tollen's reagent?

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9. Write the IUPAC name of the compound

$$CH_3 - \underset{OH}{\overset{|}{C}}H - CH_2 - \underset{O}{\overset{||}{C}} - CH_3$$

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10. Write the IUPAC name of the compound

$$CH_3 - \underset{\underset{OH}{|}}{C}H - CH_2 - \underset{\underset{O}{||}}{C} - CH_3$$

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11. Among C_6H_5COOH and CH_3CH_2COOH which is stronger acid and why?

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12. Give the IUPAC name of HOOCCH = CHCOOH.

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13. Write the IUPAC name of

$$HOOC - CH_2 - \overset{\overset{COOH}{|}}{C}H - CH_2 - COOH$$

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14. Write the IUPAC name of the compound

$$CH_3 - \underset{\underset{OH}{|}}{C}H - CH_2 - COOH$$

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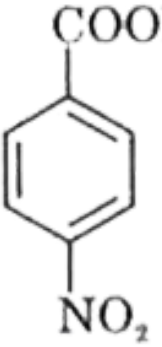
Among  and 

15. Among

which is stronger acid and why ?

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16. Arrange the following in the order of their incresing reactivity towards HCN:

$CH_3CHO, CH_3COCH_3, HCHO, C_2H_5COCH_3$

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17. Write a test to differentiate between pentan-2-one and pentan-3-one.

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18. What happens when benzophenone is reduced with Zn(Hg) in the presence of HCI ?

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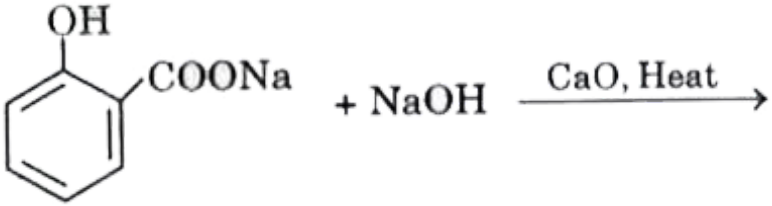
19. Complete the following reaction :



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20. Arrange the following compound in an increasing order of their reactivity in nucleophilic addition reactions : ethanal propanal, butanone, propanone.

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21. Arrange the following in the increasing order of their reactivity in nucleophilic addition reactions : $C_6H_5CHO, C_6H_5COCH_3, C_6H_5COC_6H_5$

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22. Arrange the following in the increasing order of boiling point:

$C_2H_5OC_2H_5, C_4H_9COOH, C_4H_9OH$

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23. Describe a test to distinguish between phenol and benzoic acid.

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24. Arrange the following in the order of increasing acidic strength :

$(I)CH_3CHFCOOH$

$(ii)CH_3CH_2COOH$

$(iii)CH_3CF_2COOH$

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25. Arrange the following in the decreasing order of dipole moment:

$CH_3CHO, (CH_3)_2CO, CH_3COOH$

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26. In the series of reactions $CH_3COOH \xrightarrow[P_2O_5]{NH_3} A$

$A \xrightarrow{\text{Heat}} B \xrightarrow{P_2O_5} C$ the end product C is

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27. Write the IUPAC name of $CH_3\underset{\underset{Cl}{|}}{C}HCH_2CHO$.

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28. What is the reagent 'A' used in the following equation?

$R - COOH \xrightarrow{A} RCH_2OH$

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29. Complete the following reaction :

$$C_6H_5COCH_3 \xrightarrow[(ii)\,KOH \;\; \text{ethylene glycol heat}]{(I)\,NH_2NH_2}$$

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30. $CH_3COCl + H_2 \xrightarrow[\text{Quinoline}]{Pd\,/\,BaSO_4}$

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31. Arrange the following in the increasing order of pK_a values:

$CH_3COOH, ClCH_2COOH, Cl_2CHCOOH, Cl_3CCOOH$

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32. Write the IUPAC name of $CH_3COCH_2COCH_3$

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33. Give the structure of 3-Oxopentanal.

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34. Write the structural formula of 1-phenylpentan-2-one.

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35. Write the IUPAC name of $CH_3\underset{\underset{CH_2}{|}}{C}H-CO-\underset{\underset{CH_3}{|}}{C}H-CH_3$

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36. Write the IUPAC name of the following

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

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37. Write the structure of p-Methylbenzaldehyde molecule.

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38. Write the structure of 4 chloropentan 2 one

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39. Write the structure of 2 hydroxybenzoic acid.

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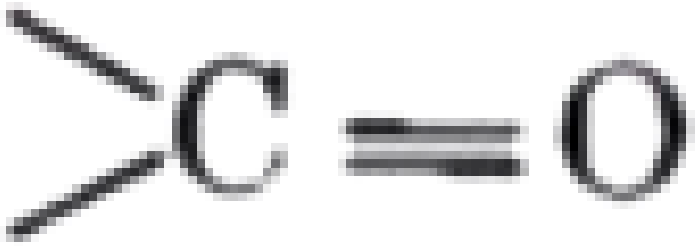
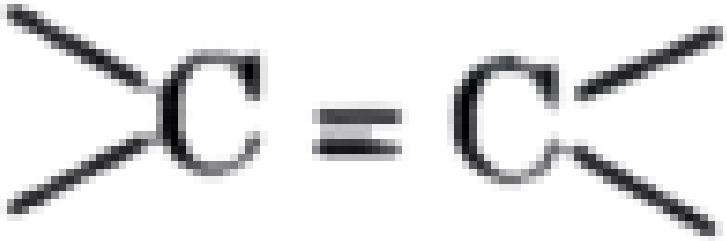
Revision Exercises Objective Questions Short Answer Questions



1. How does `



differ from

group in chemical reactions ?

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2. Explain the following

(a) it is necessary to control the pH during the reaction of aldehydes or ketons with ammonia derivations .

(b) Benzophene does not react with sodium bisulphite

(c) Acetaldehyde gives aldol condensation while formaldehyde does not .

(d) HCHO reacts with nHCN faster than CH_3CHO

(e) Aldehydes and ketons undergoes nucleophilic addition reactions .

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3. Distinguish between the following pairs:

(i) Propanal and propanone

(ii) Phenol and benzoic acid

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4. An organic compound $P(C_2H_4O)$reduces Tollen's reagent. On oxidation of P with acidified $K_2Cr_2O_7$, the compound A is formed which on treatment with calcium hydroxide forms a compound B. Dry distillation of B produces C which on warming with dilute NaOH gives D. Heating D with an acid produces E. What are A, B, C, D and E and give the reaction sequences.

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5. (a) What are Claisen-Schmidt condensation and Kolbe's reaction? Give one example of each.

(b) NH, and its derivatives do not show nucleophilic addition reactions with aldehydes and ketones in high acidic medium. Justify.

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6. Give the chemical equation for each of the following reactions:

(i) Wolff-Kishner reduction

(ii) Rosenmund's reaction

(iii) Aldol condensation

(b) What is formalin ?

(c) Give simple chemical test to distinguish between methanal and ethanal.

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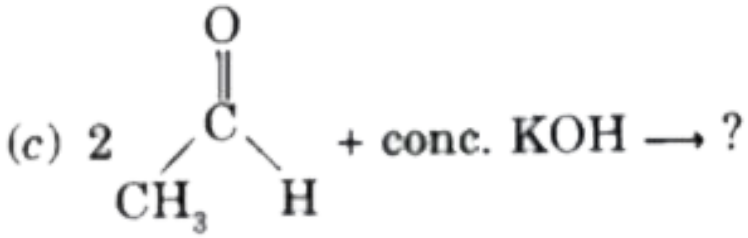
7. Identify the product of the following reactions : (Any two)

$(a) CH_3 - \underset{\underset{CH_3}{|}}{C} = O \xrightarrow[(ii)\, KOH / \text{glycol}\, \Delta]{(I)\, H_2N - NH_2} ?$

(b) $C_2H_5 - CO - CH_3 \xrightarrow{NaOH / I_2} ?$

(c) 

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8. (a)what are Etard reaction and Gattermann Koch reaction ? Give one example of each .

(b) Aldehydes are more reactive towards nucleophilic addition reactions than ketons . Justify .

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9. Predict the products of the following reactions

$$(i) CH_3 - \underset{\underset{CH_3}{|}}{C} = O \xrightarrow[(ii)\, KOH \,/\, \text{glycol} \quad \Delta]{(i)\, H_2N - NH_2}$$

$$(ii) C_6H_5 - CO - CH_3 \xrightarrow{NaOH \,/\, I_2} ? + ?$$

$$(iii) CH_3COONa \xrightarrow[\Delta]{NaOH \,/\, CaO} ?$$

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10. (a) How will you distinguish between

$$CH_3CHO \text{ and } CH_3\overset{\overset{O}{||}}{C}CH_3$$

(b) complete the following reactions :

$$2HCHO + NaOH(50\,\%) \rightarrow ? + ?$$

(c) Arrange the following in decreasing order of acidic strength

$$H_2O, CH_3OH, C_6H_5OH, CH_3COOH$$

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11. (a) Why are the boiling points of carboxlic acids higher than those of the corresponding alcohols ?

(b) Define the following terms and write reaction involved in it :

(i) Reimer - Tiemann reaction

(ii) Rosenmund's reduction reaction

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12. Describe the following:

(a) Wolff Kishner reduction

(b) Clemmensen reduction

(c) Cross aldol condensation

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13. Convert benzene into

(a) Benzaldehyde

(b) Benzoic acid

(c) Acetophenone

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14. (a) What is aldol-condensation reaction ? Write the reaction involved in it.

(b) What happens when

(i) Aldehyde reacts with hydroxylamine.

(ii) Ketone reacts with hydrazine.

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15. (a) (i) Give the reaction involved in

(a) Wolff-Kishner reduction

(b) Clemmensen reduction

(ii) Explain HVZ reaction with an example,

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16. (b) (i) Why do aldehydes and ketones undergo a large number of nucleophilic addition reactions.

(ii) What is Gattermann-Koch reaction? Write chemical reaction involved in it.

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17. Write short notes on the following:

(a) Reimer-Tiemann reaction.

(b) Etard reaction

(c) Cannizzaro reaction

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18. Write the following reactions :

(a) Haloform reaction

(b) Gattermann reaction

(c) Hunsdiecker's reaction

(d) Reimer-Tiemann reaction.

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19. (i) Write Cannizzaro reaction.

(ii) Write aldol condensation.

(iii) Why are aliphaticcarboxylic acids stronger than phenols?

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20. (i) Write Hell-Volhard-Zelinsky reaction.

(ii) Write cross aldol condensation.

(iii) Ethanoic acid is weaker acid than benzoic acid. Why?

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21. (a) Aldehydes and ketones undergo a number of nucleophilic addition reactions. Why?

(b) Acetic acid is liquid while aromatic acids are solids, Give reasons.

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22. (a) How does benzene react with acetyl chloride in the presence of anhydrous $AlCl_3$? Give equation

(b) (i) Write general equation of esterification reaction.

(ii) Name the product obtained when benzoic acid is heated with ammonia.

(c) Name the reagent used in the Clemmensen reduction.

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23. (i) What is Fehling's solution test?

(ii) Give the reaction of Grignard reagent with aldehyde and ketone.

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24. Write a short note on Rosenmund's reaction giving suitable chemical reaction.

(a) Explain that the bond length of C=O in carboxylic acid is slightly larger than that in aldehydes and ketones.

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25. (b) Explain why chloroacetic acid is a stronger acid than acetic acid.

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26. Write structures of compounds A,B and C in each of the following reactions:

(i) $C_6H_5Br \xrightarrow{\text{Mg/dry ether}} A \xrightarrow[(b)\,H_3O^+]{(a)\,CO_2\,(g)} B \xrightarrow{PCl_5} C$

(ii) $CH_3CN \xrightarrow[(b)\,H_3O^+]{(a)\,SnCl_2/HCl} A \xrightarrow{\text{dil.}NaOH} B \xrightarrow{\Delta} C$

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27. Do the following conversions in not more than two steps:

(i) Benzoic acid to be to benzaldehyde

(ii) Ethyl benzene to Benzoic acid

(iii) Prapanone to Propene

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28. Write the reactions involved in the following:

(i) Hell-Volhard Zelinsky reaction

(ii) Decarboxylation reaction

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29. (a) How will you distinguish between pentan-2-one and pentan-3-one with the help of iodoform test?

(b) How will you bring about following conversions ?

(i) Benzoic acid to m-Nitrobenzyl alcohol.

(ii) Benzaldehyde to benzophenone

(iii) Benzoic acid to benzamide.

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30. Describe the following:

(a) Aldol condensation

(b) Decarboxylation

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31. (a) Give mechanism for the nucleophilic addition reaction of HCN with propanone.

(b) Write a note on aldol condensation.

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32. How will you bring about the following conversions?

(i) Ethanol to 3-hydroxybutanal

(ii) Benzaldehyde to benzophenone

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33. Predict the products of the following reactions :

$(i) CH_3 - \underset{\underset{CH_3}{|}}{C} = O \xrightarrow{HCN} ?$

$(ii) C_6H_5 - CH_2CH_3 \xrightarrow[(b)\, H^+]{(a)\, KmnO_4 / Koh} ?$

$(iii) CH_3COOH \xrightarrow{NH_3 / \Delta} ?$

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34. How do you convert the following ?

(a) Ethanal to Propanone (b) Toluene to Benzoic acid

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35. Account for the following :

(a) Aromatic carboxylic acids do not undergo Friedel-Crafts reaction.

(b) pK_a value of 4-nitrobenzoic acid is lower than that of benzoic acid .

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36. (A), (B) and (C) are three non-cylic funtional isomers of a carbonyl compound with molecular formula C_4H_8O. Isomers (A) and (C) give positive Tollen's test whereas isomer (B) does not give Tollens' test but gives positive iodoform test. Isomers (A) and (B) on reduction with $Zn(Mg)$ | conc. HCl give the same product (D).

(a) Write the structures of (A), (B) ,(C) and (D).

(b) Out of (A), (B) and (C) isomers, which one is least reactive towards addition of HCN ?

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1. Account for the following :

(i) CH_3CHO is more reactive than CH_3COCH_3 towards reaction with HCN.

(ii) Carboxylic acid is a stronger acid then phenol .

(b) Write the chemical equations to illuustrate the following reaction :

(i) Wolff-Kishner reduction

(ii) Aldol condensation

(iii) Cannizzaro reaction

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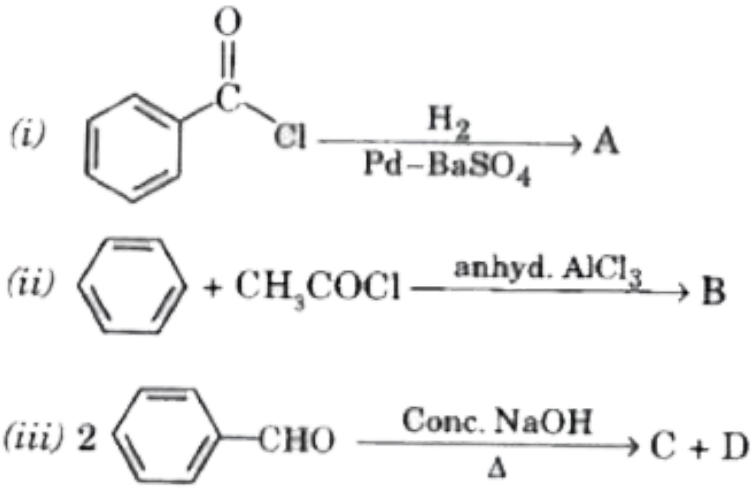
2. (a) How will you bring about the following conversions :

(i) Toluene to benzaldehyde

(ii) Ethanenitrile to ethanoic acid

(B) Identify A, B, C and D in the following reactions :'



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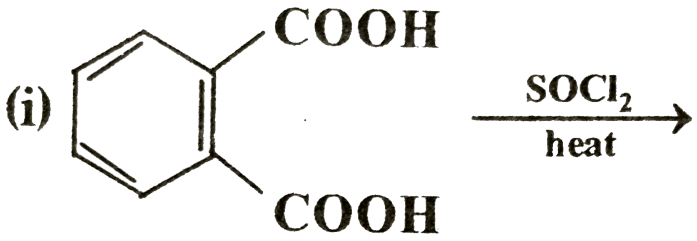
3. (a) Given chemical tests to distinguish between the following :

(i) Benzoic and ethyl benzoate.

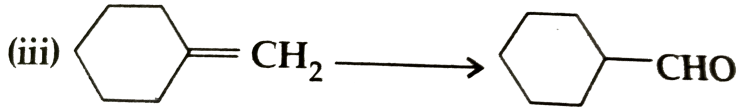
(ii) Benzaldehy and acetophanone.

(b) Complete each synthesis by giving missing regents or products in following.

(i) 

(i)

(ii) $C_6H_3CHO \xrightarrow{H_2NCONHNH_2}$

(iii) 

(iii)

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4. (a) Illustrate the following name reactions:

(i) Cannizzaro's reaction.

(ii) Clemmensen reduction

(b) How would you obtain the following:

(i) But-2-enal from ethanal.

(ii) Butanoic acid from butanol.

(iii) Benzoic acid from ethylbenzene.

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5. Give chemical tests to distinguish between

(i) Propanal and propanone

(ii) Benzaldehyde and acetophenone

(b) Arrange the following compounds in an increasing order of their property as indicated :

(i) Acetaldehyde, Acetone , Methyl tert-butyl ketone (reactivity towards HCN)

(ii) Benzoic acid ,3,4-Dinitrobenzoic acid , 4-Metthoxybenzoic acid (acid strength)

(iii)

$CH_3CH_2CH(Br)(COOH), CH_3CH(Br)CH_2COOH, (CH_3)_2CHCOOH$

(acid strength)

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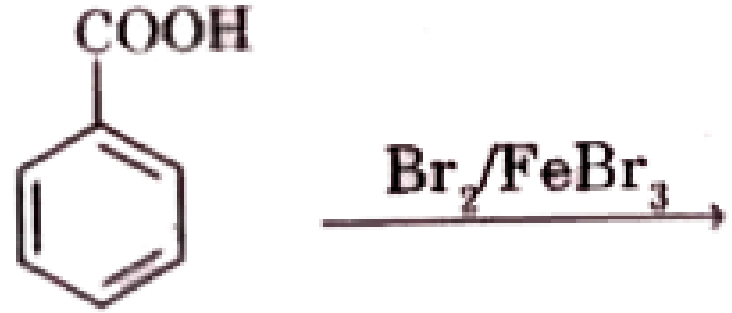
6. How will you convert the following:

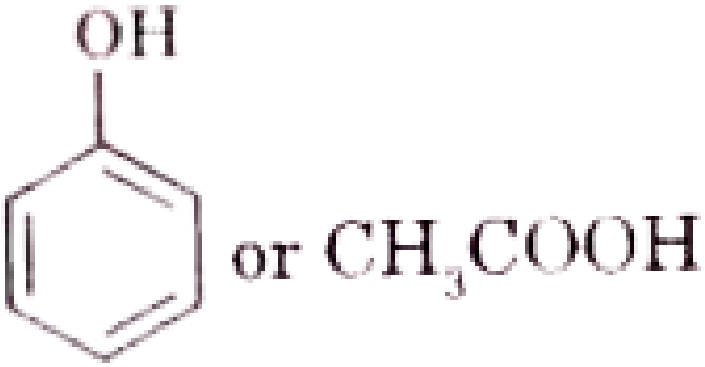
(a) Toluene to benzoic acid

(b) Write products of the following reactions :



(c) Which acid of each pair shown here would you expect to be stronger?

$(i) F - CH_2 - COOH$ or $CI - CH_2 - COOH$



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7. (a) Write the reactions involved in the following:

(i) Etard reaction

(ii) stephen reduction

(b) How will you convert the following in not more than two steps:

(i) Benzoic acid to Benzaldehyde

(ii) Acetophenone to Benzoic acid

(iii) Ethanoic acid to 2-Hydroxyethanoic acid.

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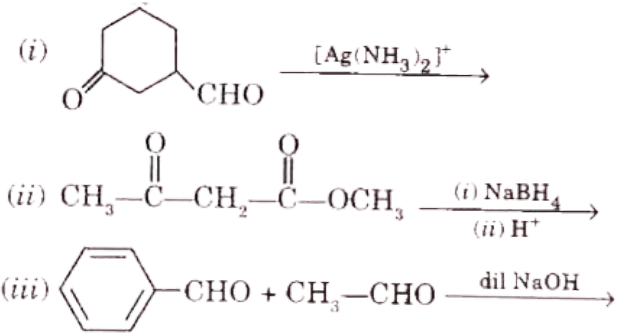
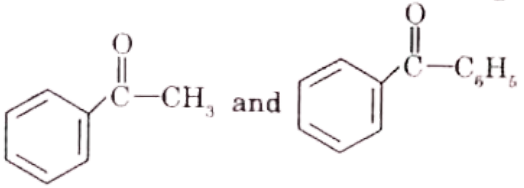
8. (a) Predict the main product of the following reactions:



(b) Give a simple chemical test to distinguish between



(c) Why is alpha (α) hydrogen of carbonyl compounds acidic in nature ?

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Hots Higher Order Thinking Skills

1. Hydrogen of acetadehyde are not highly acidic medium explain .

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2. Oximes are more acidic than hydroxylamine. Explain.

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3. Di-tert-butyl ketone does not give precipitate with $NaHSO_4$ whereas acetone does. Explain.

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4. Dialkyl cadmium is used to prepare ketones from acid chlorides and not from Grignard reagents. Assign reason.

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5. What is the function of Rochelle salt in Fehling's solution ?

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6. Aldehydes usually donot form stable hydrates but chloral normally exists as chloral hydrate. Explain.

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7. Treatment of C_6H_5CHO with HCN gives a mixture of two isomers which cannot be separated even by very careful fractional distillation. Explain

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8. A ketone A, which undergoes haloform reaction, gives compound B on reduction B on heating with sulphuric acid gives compounds C, which forms mono-ozonide D. D on hydrolysis in the presence of zinc dust gives only acetaldehyde. Identify A, B and C. Write down the reaction involved.

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9. An organic compound $A(C_3H_6O)$is resistant to oxidation but forms compound $B(C_3H_8O)$ on reduction which reacts with HBr to form the bromide (C). C forms a Grignard reagent which reacts with A to give $D(C_6H_{14}O)$. Give the structures of A, B, C and D and explain the reactions involved.

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10. An organic compound (A) $(C_6H_{10}O)$ on reaction with CH_3MgBr followed by acid treatment gives compound (B). The compound (B) on ozonolysis gives compound (C), which in the presence of a base gives 1-

acetyl cyclopentene (D). The compound (B) on reaction with HBr gives compound (E). Write the structures of (A), (B), (C), (D), and (E). Show how (D) is formed from (C).

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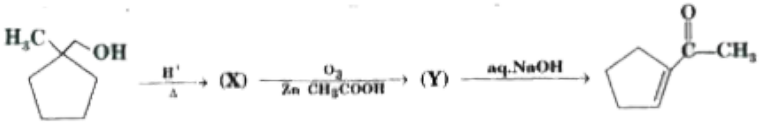
11. Identify (x) and (Y) in the following reaction sequence :



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12. Explain the fact that the C-O bond length in RCOOH is shorter than in ROH

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13. Although p-hydroxy benzoic acid is less acidic than benzoic acid, ortho hydroxy benzoic acid (salicylic acid) is about 15 times more acidic than benzoic acid. Explain.

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14. Fluorine is more electronegative than chlorine but p-fluorobenzoic acid is a weaker acid than p-chlorobenzoic acid. Explain.

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15. Addition of Grignard reagents to dry ice followed by hydrolysis gives carboxylic acids whereas that of organolithium compounds under similar conditions give ketones. Explain.

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Competition File Objective Type Questions Multiple Choice Questions Mcq A Multiple Choice Questions

1. Ketones are less reactive than aldehydes because

A. C = O group is less polar in ketones

B. of electromeric effect

C. steric hindrance to the attacking reagent

D. none of these

Answer: C

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2. The molecule that can give Cannizzaro's reaction is

A. acetaldehyde

B. formaldehyde

C. butyraldehyde

D. propionaldehyde

Answer: B

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3. Aldehydes and ketones form hydrocarbons by

A. Clemmensen reduction

B. Cannizzaro reaction

C. Rosenmund's reduction

D. Aldol condensation

Answer: A

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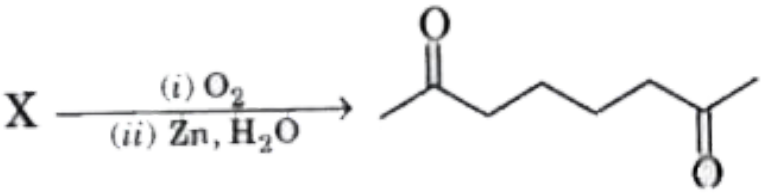
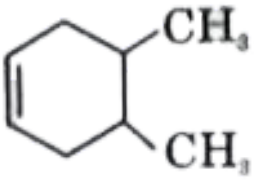
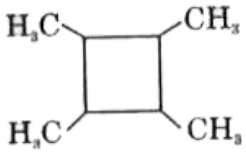
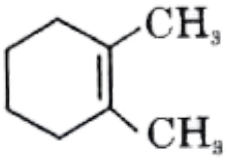
4. In the following reaction, X is



A. 

B. 

C. $CH_3CH = CH - CH_2CH_2CH = CHCH_3$

D. 

Answer: D

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5. Cyanohydrin of which compound on hydrolysis will give lactic acid?

A. Acetaldehyde

B. Formaldehyde

C. Acetone

D. Propanal

Answer: A

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6. In the reaction

$$HC \equiv CH \xrightarrow[\text{dil}H_2SO_4]{HgSO_4} X \xrightarrow{LIAIH_4} Y \xrightarrow{P, Br_2} Z,$$ Z is

A. Ethylidene bromide

B. Ehtyl bromide

C. Bromobenzene

D. Ehtylene bromide

Answer: B

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7. in the reaction

$$2CH_3\underset{\underset{O}{||}}{C}CH_3 \xrightarrow[\text{Catalyst}]{\text{Base}} A \xrightarrow[\text{Catalyst}]{\text{Acid}} B$$

the product B is

A. $CH_3COH(CH_3)CH_2COCH_3$

B. $CH_3COH(CH_3)CH_2COOH$

C. $CH_3C(CH_3) = CHCOCH_3$

D. $CH_3CH = CHCH_2COCH_3$

Answer: C

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8. A ketone reacted with ethyl magnesium bromide followed by hydrolysis gave a product which on dehydration gave an alkene. The alkene on ozonolysis gave diethyl ketone and acetaldehyde. The ketone is-

A. dimethyl ketone

B. diethyl ketone

C. ethyl methyl ketone

D. ethyl propyl ketone

Answer: B

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9. Which of the following reagents cannot be used to distinguish between pentanal and pentan-2-one ?

A. Tollen's reagent

B. Fehling solution

C. I_2 in $NaOH$

D. Br_2 in CCl_4

Answer: D

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10. Butanal undergoes aldol condensation to give

A. $CH_3CH_2CH_2\underset{\underset{OH}{|}}{C}HCH_2CH_2CH_2CHO$

B. $CH_3CH_2CH_2\underset{\underset{OH}{|}}{C}H\underset{\underset{OH}{|}}{C}HCH_2CHO$

C. $CH_3CH_2CH_2\underset{\underset{OH}{|}}{C}H\quad\underset{\underset{CH_2-CH_3}{|}}{C}\quad HCHO$

D. $CH_3CH_2CH_2\underset{\underset{OH}{|}}{C}H\underset{\underset{OH}{|}}{C}HCH_2CH_2CH_3$

Answer: C

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11. m-Chlorobenzaldehyde on reaction with conc. KOH at room temperature gives:

A. Potassium m - chlorobenzoate and m-hydroxy benzaldehyde

B. m-Hydroxy benzaldehyde and m - chloro benzyl alcohol

C. m- chlorobenzyl alcohol and m- hydroxybenzyl alcohol

D. Potassium m - chlorobenzoate and m -chlorobenzyl alcohol

Answer: D

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12. Treatment of propionaldehyde with dilute $NaOH$ solution gives

A. $CH_3CH_2COOCH_2CH_2CH_3$

B. $CH_3CH_2CH(OH)CH(CH_3)CHO$

C. $CH_3CH_2COCH_2CH_2CHO$

D. $CH_3CH_2COCH_2CH_2CHO$

Answer: B

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13. Benzyl alcohol can be prepared from benzaldehyde by

A. Wurtz reaction

B. Cannizzaro reaction

C. Claisen reaction

D. Perkin reaction

Answer: B

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14. The aldol condensationof acetaldehyde results in the formation of :

A. $CH_3\underset{\underset{O}{||}}{C} - \underset{\underset{OH}{|}}{C}HCH_3$

B. $CH_3\underset{\underset{OH}{|}}{C}HCH_2\underset{\underset{O}{||}}{C}H$

C. $CH_3CH_2\underset{\underset{OHO}{|}}{C}HC\underset{\underset{O}{||}}{C}-H$

D. $CH_3CH_2OH + CH_3 + CH_3COOH$

Answer: B

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15. An organic compound of molecular formula C_3H_5O did not give a silver mirror with Tollen's reagent, but gave an oxime with hydroxylamine, it may be

A. $CH_2 = CH - CH_2OH$

B. CH_3CH_2CHO

C. CH_3COCH_3

D. $CH_2 = CH - OCH_3$

Answer: C

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16. In the Cannizzaro reaction , which is the slowest step ?

$$2PhCHO \xrightarrow{OH^-} PhCH_2OH + PhCOO^-$$

A. THE attack of OH^- at the carbonyl group

B. the transfer of hydride to the carbonyl group

C. The abstraction of proton from carboxylic acid

D. The deprotonation of $PhCH_2OH$

Answer: B

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17. Identify the final product (Z) in the following sequence of reactions :

$$Me_2CO + HCN \rightarrow X \xrightarrow{H_3O^+} Y \xrightarrow[\text{Heat}]{H_2SO_4} Z$$

A. $(CH_3)_2C(OH)COOH$

B. $CH_2 = C(CH_3)COOH$

C. $HO\mathbb{C}H_2CH(CH_3)COOH$

D. $CH_3CH = CHCOOH$

Answer: B

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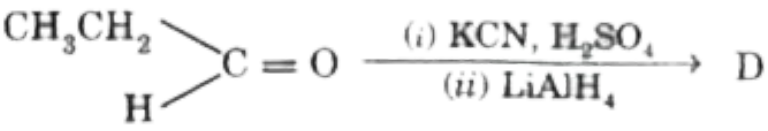
18. in the reaction



D is

A. $CH_3CH_2CH_2\underset{OH}{\underset{|}{C}}HNH_4$

B. $CH_3CH_2\underset{OH}{\underset{|}{C}}HCH_2NH_4$

C. $CH_3\underset{OH}{\underset{|}{C}}HCH_2CH_2NH_2$

D. $CH_3 - CH_2 - \underset{OH}{\overset{OH}{\underset{|}{\overset{|}{C}}}} - NH_2$

Answer: B

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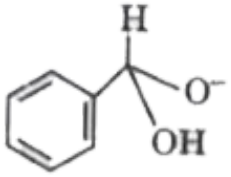
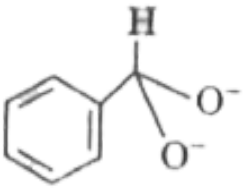
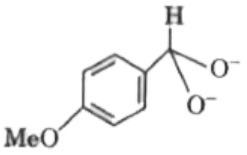
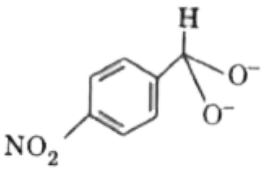
19. In the cannizzaro's reaction the intermediate that will be the best hydride donor?

A. 

B. 

C. 

D. 

Answer: D

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20. An acid chloride on reaction with $H_2 / Pd - BaSO_4$ gives $(CH_3)_2CHCHO$ this acid chloride on reaction with dimethyl cadmium in the presence of dry ether , gives :

A. $(CH_3)_3COH$

B. $(CH_3)_2CHOH$

C. $(CH_3)_2CHCOCH_3$

D. $(CH_3)_2CHCHO$

Answer: C

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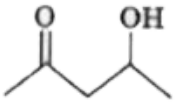
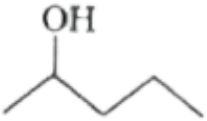
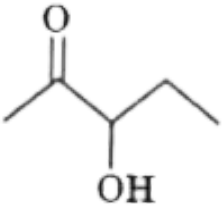
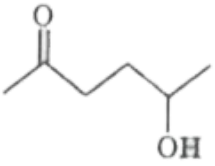
21. Which of the following will be most readily dehydrated in acidic conditions ?

A. 

B. 

C. 

D. 

Answer: A

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22. Acetic acid is reduced with $LiAlH_4$ to give

A. CH_3CH_2OH

B. CH_3CHO

C. CH_3CH_3

D. CH_3OH

Answer: A

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23. Benzoic acid in treament with HNO_3 in the presence of H_2SO_4 gives

A. m-nitrobenzoic acid

B. nitrobenzene

C. o- nitrobenzoic acid

D. Benzene sulphonic acid

Answer: A

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24. In the reaction :

$CH_3COOH \xrightarrow{Ca(OH)_2} A \xrightarrow{\text{Heat}} B \xrightarrow{NH_2OH} C,$ C is

A. CH_3COONH_4

B. $CH_3CH_2CH = NOH$

C. $(CH_3)_2 = NOH$

D. CH_3CONH_2

Answer: C

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25. The reaction

$RCH_2CH_2COOH \xrightarrow[Br_2]{\text{RedP}}$

$R - CH_2 - \underset{\underset{Br}{|}}{CH} - COOH$ is called as

A. Reimer Tieamann reaction

B. Hell volhard zelinsky reaction

C. connizzaro's reaction

D. Sandmeyer's reaction

Answer: B

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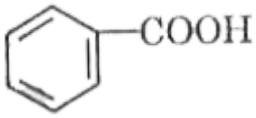
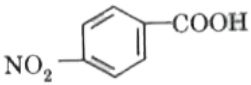
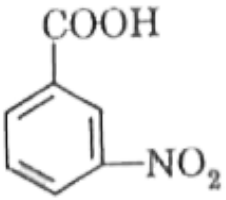
26. Which of the following is Weakest acid ?

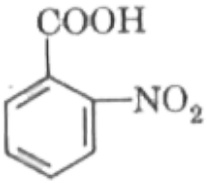
A. 

B. 

C.



D.



Answer: A

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27. in the reaction

$CH_3CH_2COOH \xrightarrow{P, CI_2} X \xrightarrow{KCN} Y$ Y is

A. $CH_3CH_2CONH_2$

B. $CH_3CH(CN)COOH$

C. $CH_2(CN)CH_2COOH$

D. $CH_2(CN)COOH$.

Answer: B

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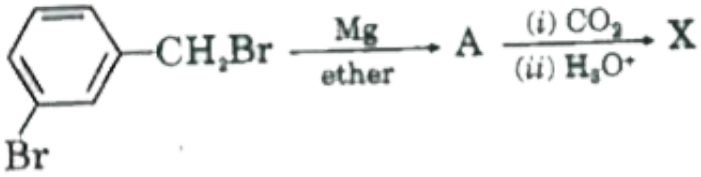
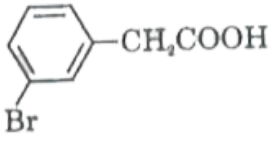
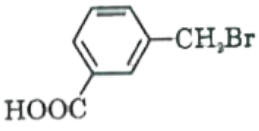
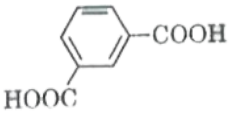
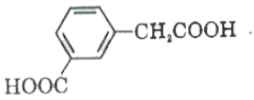
28. The end product (X) of the reaction is



A. 

B. 

C. 



D.

Answer: D

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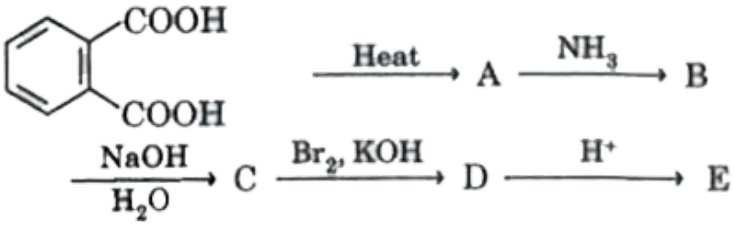
29. in the reaction



The product E is

A. `Salicylic acid

B. n-nitrobenzoic acid

C. anthranilic acid

D. Crotonic acid

Answer: C

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30. which of the following has highest boiling point ?

A. CH_3COCI

B. $(CH_3CO)_2O$

C. CH_3COOH

D. CH_3CHO

Answer: C

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31. which of the following ester does not undergo chlaisen self condensation ?

A. $CH_3CH_2CH_2CH_2COOC_2H_5$

B. $C_6H_5CH_2COOCH_5$

C. $C_6H_{11}CH_2COOC_2H_5$

D. $C_6H_5CH_2COOC_2H_6$

Answer: B

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32. $CH_3CH_2COOH \xrightarrow{Cl_2/Fe} (X) \xrightarrow[KOH]{Alc.} (Y)$

Compound (Y) is :

A. $CH_3CH_2CH_2OH$

B. $CH_2 = CHCOOH$

C. CH_3CH_2CN

D. $\underset{\underset{CI}{|}}{CH} = CHCOOH$

Answer: B

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33. The reaction of CH_3MgBr on dry ice followed by acid hydrolysis gives

A. CH_3COOH

B. $HCOOH$

C. Oxalic acid

D. Benzoic acid

Answer: A

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34. Which of the following will not undergo hell volhard Zelinsky reaction

A. Propnaoic acid

B. 2,2-dimehtylpropanoic acid

C. 2-Methylpropanoic acid

D. Butanoic acid

Answer: B

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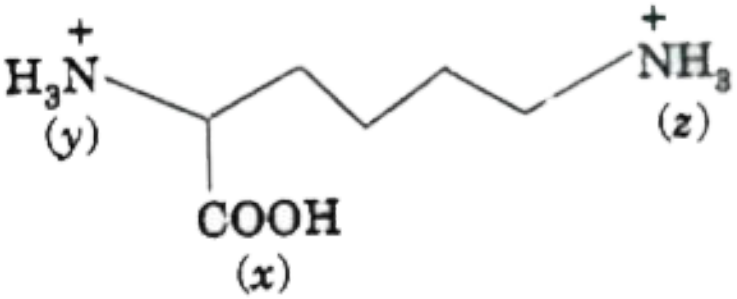
35. In the compound given below :



the correct order of acidity of the position x,y, and z is

A. $z > z > y$

B. $x > y > z$

C. $x > z > y$

D. $y > z > z$

Answer: B

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Competition File Objective Type Questions Multiple Choice Questions Mcq B Multiple Choice Questions

1. Propionic acid with Br_2/P yields a dibromoproduct. Its structure would be:

A. $H-\overset{\overset{Br}{|}}{\underset{\underset{Br}{|}}{C}}-CH_2COOH$

B. CH_2Br-CH_2COBr

C. $CH_3-\overset{\overset{Br}{|}}{\underset{\underset{Br}{|}}{C}}-COOH$

D. $CH_3(Br)-CH(Br)-COOH$

Answer: C

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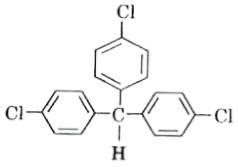
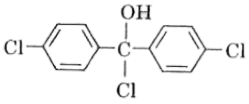
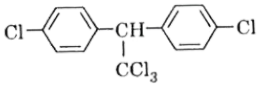
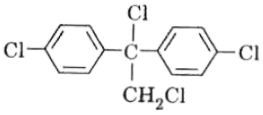
2. Trichloroacetaldehyde, CCl_3CHO reacts with chlorobenzene in presence of sulphuric acid and produces.

A. 

B. 

C. 

D. 

Answer: C

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3. Which of the following reactions will not result in the formation of carbon- carbon bond?

A. Wurtz reaction

B. Friedel Crafts acylation

C. Reimer Tiemann reaction

D. Cannizzaro reaction

Answer: D

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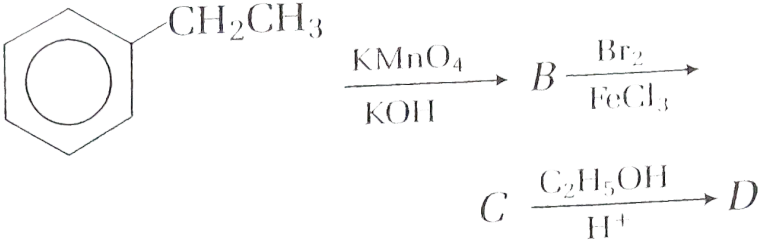
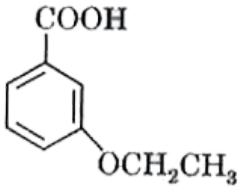
4. In a set of reactions, ethyl benzene yielded a product D.

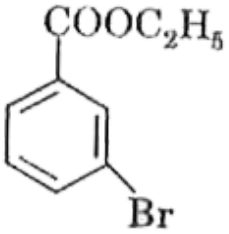


D would be

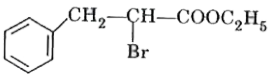
A.



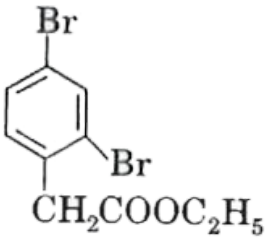
B.



C.



D.



Answer: B

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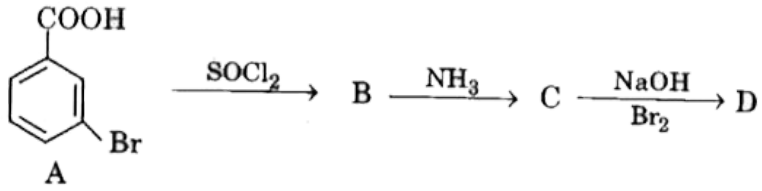
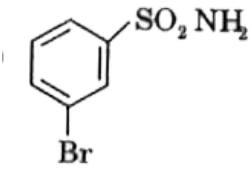
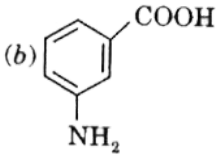
5. IN a set of reaction m- bromobenzoic acid gave a product D. Identify the product D.

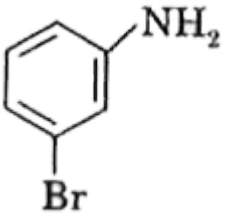




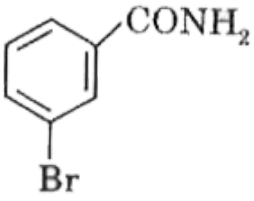
A.



B.



C.



D.

Answer: C

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6. Clemmensen reduction of a ketone is carried out in the presence of which of the following ?

A. glycol with KOH

B. $Zn - Hg$ with HCl

C. $LiAlH_4$

D. H_2 and Pt as catalyst

Answer: B

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7. CH_3CHO and $C_6H_5CH_2CHO$ can be distinguished chemically by

A. Benedicts test

B. Iodoform test

C. Tollen's reagent test

D. Fehling's solution test

Answer: B

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8. Predict the products in the given reaction

A. 

B. 

C. 

D. 

Answer: C

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9. The correct order of decreasing acid strength of trichloroacetic acid (A),

trifluoroacetic acid

(B) acetic acid

(C) and formic acid

(D) is:

A. $B > A > D > C$

B. $B > D > C > A$

C. $A > B > C > D$

D. $A > C > B > D$

Answer: A

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10. Reaction by which benzaldehyde cannot be prepared is :

A. 

B. 

C. 

D. 

Answer: B

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11. 5-oxohexanal is obtained by ozonolysis of:

A. 

B. 

C. 

D. 

Answer: B

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12. Which of the following carboxylic acids undergoes decarboxylation easily ?

A. $C_6H_5COCH_2COOH$

B. $C_6H_5\underset{\underset{OH}{|}}{C}HCOOH$

C. $C_6H_5\underset{\underset{NH_2}{|}}{C}HCOOH$

D. $C_6H_5COCOOH$

Answer: A

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13. Which one is most reactive towards nucleophilic addition reaction?

A. 

B. 

C. 

D. 

Answer: D

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14. When a mixture of benzaldehyde and acetophenone is treated with dilute $NaOH$ at $293K$, it form

A. 2,3 diphenylpropanal

B. $1, 1$ - diphenylpropana-2-one -1 ol

C. $1, 3$- Diphenylprop -2 -en-1- one

D. $1, 2$ diphenylprop -2- en -1one

Answer: C

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15. Reaction of carbonyl compound with one of the following reagents involves nucleophilic addition followed by elimination of water. The reagent is:

A. hydrocyanic acid

B. sodium hydrogen sulphite

C. a Grignard reagent

D. Hydrazine in presence of feebly acidic solution

Answer: D

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16. An organic compound 'X' having molecular formula $C_5H_{10}O$ yield phenylhydrazone and gives negative response to the iodoform test and Tollens test . It produces n-pentane on reduction. 'X' could be

A. Pentan -3-one

B. n-amyl alcohol

C. pentanal

D. pentan-2- one

Answer: A

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17. Given

which of the given compounds can exhibit tautomerism ?

A. II AND III

B. I,II and III

C. I and II

D. I and III

Answer: B

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18. A single compound of the structure

is obtainable from ozonolysis of which of the following cylic compound ?

A. 

B. 

C. 

D. 

Answer: C

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19. Treatment of cyclopentance  with methyl lithium gives which of the following species ?

A. cyclopentanonyl radical

B. cyclopentanonyl biradical

C. cyclopentanonyl anion

D. cyclopentanonyl cation

Answer: C

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20. Which among the given molecules can exhibit tauomerism

A. III only

B. Both I and II

C. Both I and II

D. both II and III

Answer: A

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21. The correct statement regrarding a carbonyl compound with a hydrogen atom on the its alpha-carbon is:

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

B. A carbonyl compound with a hydrogen atom on its alpha - carbon rapidly equilibrates with its corresponsing enol and this process is known as keto - enol tautomerism

C. A carbonyl compound with a hydrogen atom on its alpha - carbon bever equilibrium with its corresponding enol

D. A carbonly compound with a hydrogen atom on its alpha - carbon rapidly equilibrium with its corresponding enol and this process is known as aldehyde - ketone equilibrium

Answer: B

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22. The product formed by the reaction of an aldehyde with a primary amine is:

A. Carboxylic acid

B. aromatic acid

C. Schiff's base

D. ketone

Answer: C

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23. The correct structure of the product 'A' formed in the reaction :

A. 

B. 

C. 

D. 

Answer: B

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24. The IUPAC name of the cmpound

A. 2-formylhex -2- en -3-one

B. 5-methyl-4-oxohex-2-en-5-al

C. 3-keto-2-methylhex-5-enol

D. 3-keto-2-methylhex-4-enal

Answer: D

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25. Predict the correct intermediate and product in the following reaction

:

$H_3C - C \equiv CH \xrightarrow[HgSO_4]{H_2O, H_2SO_4}$ underset((B)) underset("Product ") underset(darr) underset((A)) ontermediate

A. $A: H_3C - \underset{\underset{OH}{|}}{C} = CH_2$ $B: H_3C - \underset{\underset{SO_4}{|}}{C} = CH_2$

B. $A: H_3C - \underset{\underset{O}{||}}{C} - CH_3$ $B: H_3C - C \equiv CH$

C. $A: H_3C - \underset{\underset{OH}{|}}{C} = CH_2$ $B: H_3C - \underset{\underset{O}{||}}{C} - - CH_3$

D. $A: H_3C - \underset{\underset{SO_4}{|}}{C} = CH_2$ $B: H_3C - \underset{\underset{O}{||}}{C} - CH_3$

Answer: C

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26. Of the following which is the product formed when cyclohexanone undergoes aldol condensation followed by heating?

A. 

B. 

C. 

D. 

Answer: A

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27. Consider the reactions ,

Identify A,X,Y and Z .

A. A-Methoxymethane ,x-Ethanol ,Y-Ethanoic acid Z-Semicarbazide .

B. A-Ethanal ,X-ethanol ,y-but-2-enal Z-Semicarbazone.

C. A-Ethanol ,X-Acetaldehyde ,Y-Butanone z-Hydrozone

D. A-Methoxymethane ,X-Ethanoic acid ,Y-Acetate ion,Z-hydrazine

Answer: B

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28. Compound A, $C_8H_{10}O$, is found to react with $NaOI$ (produced by reacting Y with $NaOH$) and yields a yellow precipitate with characteristic smell.

A and Y are respectively

A. 

B. 

C. 

D. 

Answer: C

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29. Carboxylic acid have higher boiling points than aldehydes, ketones and even alcohol of comparable molecular mass. It is due to their

A. Formation of intramolecular H-bonding

B. Formation of carboxylate ion

C. More extensive association of carboxylic acid via van der Waals forces of attraction

D. Formation of intermolecular H- bonding .

Answer: D

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30. The major product of the following reaction is :

A. 

B. 

C. 

D. 

Answer: B

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31. One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44u. The alkene is:

A. But-2-ene

B. Ethane

C. Propene

D. But -1-ene

Answer: A

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32. The correct order of increasing basicity of the given conjugate bases $(R = CH_3)$ is

A. $RCOO^- < NH_2^- < HC \equiv C^- < R^-$

B. $RCOO^- < HC \equiv C^- NH_2^- < NH_2^{2<R^-}$

C. $RCOO^- < HC \equiv C^- < R^- < NH_2^-$

D. $R^- < HC \equiv C^- < RCOO^- < NH_2^-$

Answer: B

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33. Which of the following reagents may be used to distinguish between phenol and beznoic acid ?

A. Aqueous NaOH

B. Tollen's reagent

C. Molisch reagent

D. Neutral $FeCI_3$

Answer: D

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34. Trichloroacetaldehyde was subjected to cannizzaro's reaction by using NaOH. The mixture of the products contains sodium trichloroacetate ion and another compound. The other compound is

A. 2,2,2-trichloroethanol

B. trichloromethanol

C. 2,2,2-trichloropropanol

D. chloroform

Answer: A

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35. Which of the following pairs can be distinguished by sodium hypoiodite?

A. CH_3CHO and CH_3COCH_3

B. CH_3CH_2CHO and CH_3COCH_3

C. CH_3CH_2OH and $CH_3CH_2CHOHCH_3$

D. CH_3OH and CH_3CH_2CHO

Answer: B

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

A. $CH_3CH_2CH_2CH_2CHO$

B. $CH_3CH_2COCH_2CH_3$

C. $CH_3CH_2CH_2CH_2CH_2OH$

D. $CH_3CH_2CH_2CH(OH)CH_3$

Answer: D

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37. In the given transformation, which of the following is the most appropriate reagent?

A. $Zn - Hg/HCI$

B. $Na.\ lIq.\ NH_3$

C. $NaBH_4$

D. $NH_2 - NH_2/OH^-$

Answer: D

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38. In the following species, the one which is likely to be intermediate during benzoin condensation of benzaldehyde, is

A. $Ph - C \equiv \overset{\oplus}{O}$

B. 

C. 

D. $Ph - \overset{\ominus}{C} = O$

Answer: C

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39. The correct increasing order of the acid strength of benzoic acid (I),4-nitrobenzoic acid (II),3,4-dinitrobenzoic acid (III) and 4-methoxybenzoic

acid (IV) is

A. $I < II < III < IV$

B. $II < I < IV < III$

C. $IV < I < II < III$

D. $IV < II < I < III$

Answer: C

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40. $C_6H_5COOH \xrightarrow[(ii)\,\Delta]{(i)\,NH_3} 'p' \xrightarrow{NaOBr} 'Q' \xrightarrow[(ii)\,\text{heat to 460 K}]{(i)\,conc.\,H_2SO_4} 'R'$

The product 'R' is :

A. o-bromosulphanilic acid

B. sulphanilamide

C. sulphanilic acid

D. p-bromosulphanilamide

Answer: C

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41. Among the following compounds, the one (s) that gives (gives) effervescence with aqueous $NaHCO_3$ solution is (are) :

(I) $(CH_3CO)_2O$, (II) CH_3COOH

(III) $PhOH$, (IV) CH_3COCHO

A. (i) and (ii)

B. (I) and (iii)

C. Only (II)

D. (i) and (iv)

Answer: A

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42. Identify the combination of compounds that undergo aldol condensation followed by dehydration to produce but-2-enal.

A. Methanal and ethanal

B. Two moles of ethanal

C. Methanal and propanone

D. Ethanal and propanone

Answer: B

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43. 

The product of the above reaction is

A. 

B. 

C. 

D. 

Answer: C

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44. Which compund will yield 5-keto -2 methyl hexanal upon treatment with O_3?

A. 

B. 

C. 

D. 

Answer: D

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45. In the following sequence of reactions :

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

the product C is :

A. $C_6H_5CH_2OH$

B. C_6H_5CHO

C. C_6H_5COOH

D. $C_6H_5CH_3$

Answer: B

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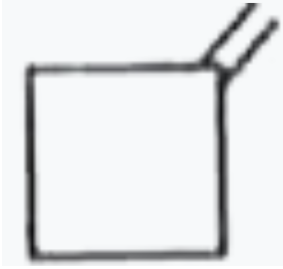
46. Ozonolysis of an alkene produces only one dicarbonyl compound. The structure of the alkene is

A. $CH_3 - CH = CH - CH_3$

B. 

C. 

D. $CH_3 - CH = CH - CH = CH_3$

Answer: B

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47. Predict the product C in the following series of reactions ,

$$CH_3 - COOH \xrightarrow{PCl_5} A \xrightarrow[Anhyd.\,AlCl_3]{C_6H_6} B \xrightarrow{CH_3MgBr} C$$

A. 

B. $CH_3CH(OH)C_6H_5$

C. $CH_3CH(OH)C_2H_5$

D. $(CH_3)_2C(OH)C_6H_6$

Answer: D

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48. For the reaction below ,

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The structure of the porduct Q is

A. 

B. 

C. 

D. 

Answer: B

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49. The condensation reacton between one equivalent of acetone and two equivalents of benzaldehyde in presence of dilute alkali leads to the formation of

A. benzalacetophenone

B. benzylideneacetone

C. benzoic acid and acetic acid

D. only benzoic acid.

Answer: C

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50. X and Y in the below reaction are _ and_____ respectively :

$$C_6H_5 - CO_2H + X \xrightarrow{\text{Heat}} C_6H_5 - COCI \xrightarrow{H_2 . Pd / BaSO_4} Y$$

A. $SOCI_2$ and C_6H_5CHO

B. $(COCI)_2$ and $C_6H_5CH_3$

C. $SOCI_2$ and $C_6H_5CH_3$

D. $SOCI_2$ and $C_6H_5CH_2CI.$

Answer: A

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51. The correct increasing order of the acid strength fo acids, butyric acid (I), 2-chlorobutyric acid (II), 3-chlorobutyaric acid (III), 2,2-dichlorobutyric acid (IV) is :

A. $I < II < III < IV$

B. $III < II < IV < I$

C. $I < III < II < IV$

D. $III < I < II < IV$

Answer: C

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52. The correct sequence of reagents for the following conversion will be :

A. $\left[Ag(NH_3)_2\right]^+OH^-, H^+/CH_3OH, CH_3MgBr$

B. $CH_3MgBr, H^+/CH_3/CH_3OH, \left[Ag(NH_3)_2\right]^+OH^-$

C. $CH_3MgBr, \left[Ag(NH_3)_2\right]^+OH^-, H^+/CH_3OH$

D. $\left[Ag(NH_3)_2\right]^+OH^-, CH_3MgBr, H^+/CH_3OH$

Answer: A

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53. The major product obtained in the following reaction is :

A. 

B. 

C. 

D. 

Answer: B

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54. The appropriate reagent for the following transformation is

A. $Zn - Hg / HCI$

B. $H_2N - NH_2$, KOH /ethylene glycol

C. NI / H_2

D. $NaBr_4$

Answer: B

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55. The compound that does not undergo haloform reaction is

A. acetaldehyde

B. ethanol

C. acetone

D. propiophenone

Answer: D

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56. The ease of hydrolysis in the compounds $\underset{(I)}{CH_3COCl}, \underset{(II)}{CH_3CO-C_6H_4-COCH_3}, \underset{(III)}{CH_3COOC_2H_5}$ and $\underset{(IV)}{CH_3CONH_2}$ is of the order

A. I gt II gt III gt IV

B. IV gt III gt II gt I

C. I gt II gt IV gt III

D. II gt I gt IV gt III

Answer: A

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

$$CH_3 - CH = CH - CH_2 - \overset{O}{\overset{||}{C}} - CH_3 \rightarrow CH_3 - CH = CH - CH_4 - \overset{O}{\overset{|}{C}}$$

A. Tollen's reagent

B. I_2 and NaOH solution

C. Benzoyl peroxide

D. Sn and NaOH solution

Answer: B

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58.

The reagents A,B and C respectively are

A. $H_2 / Pd, PCC, NaBH_4$

B. $NaBH_4, AlkKMnO_4, H_2 / PD$

C. $NaBH_4, PCC, H_2 / Pd$

D. $H_2 / PdAlk. KMnO_4, NaBH_4$

Answer: B

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59. $P \xrightarrow{H_2 / Pd - BaSO_4} Q \xrightarrow[(ii)\, dIlHCI]{(i)\, \text{conc}\ \ NaHO} R + S$

Rand S form benzyl benzoate when treated with each other. Hence, $P$is

A. C_6H_5CHO

B. $C_6H_5CH_2OH$

C. C_6H_5COCI

D. C_6H_5COOH

Answer: C

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60. Propanoic acid undergoes HVZ reaction to give chloropropanoic acid. The product obtained is

A. stronger acid than propanoic acid

B. as stronger as propanoic acid

C. weaker acid than propanoic acid

D. stronger than dichloropropanoic acid.

Answer: A

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61. When $C_6H_5COCOC_6H_5$ is reduced with $LiAlH_4$, the product formed has _____stereoisomers.

A. 2

B. 3

C. 4

D. 6

Answer: B

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62. Benzonitrile can be prepared from benzaldehyde on treatment with

A. NH_3

B. NH_3 followed by hydrogenation with NI

C. NH_2OH

D. hydrogen cyanide.

Answer: D

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63. Which of the following does not give yellow solid on treatment with sodium hypoiodite?

A. Pentan-3-one

B. Pentan-2-one

C. Acetophenone

D. Ethanal

Answer: A

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64. In the following reactions, products A and B are:

A. 

B. 

C. 

D. 

Answer: B

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65. The correct decreasing order for acid strength is :

A.

$$NO_2CH_2COOH > N\mathbb{C}H_2COOH > FCH_2COOH > ClCH_2COO$$

B.

$$FCH_2COOH > N\mathbb{C}H_2COOH > NO_2CH_2COOH > ClCH_2COO$$

C.

$$NO_2CH_2COOH > FCH_2COOH > CNCH_2COOH > ClCH_2CO$$

D.

$$CNCH_2COOH > O_2NCH_2COOH > FCH_2COOH > ClCH_2CO$$

Answer: A

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66. The major product of following reaction is :

A. 

B. 

C. 

D. 

Answer: A

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67. The major product X formed in the following reaction is

A. 

B. 

C. 

D. 

Answer: D

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68. The major product of following reaction is

A. 

B. 

C. 

D. 

Answer: D

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69. The major product of the following reaction is

A. 

B. 

C. 

D. 

Answer: B

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70. Major products of the following reaction are :

A. CH_3OH and HCO_2H

B. 

C. 

D. 

Answer: D

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71. The major product of following reaction is

A. 

B. 

C. 

D. 

Answer: B

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72. The major product of the following reaction is

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A. 

B. 

C. 

D. 

Answer: D

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73. The major product obtained in the following reaction is :

A. 

B. 

C. 

D. 

Answer: B

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74. In the following reaction sequence, the correct structures of E, F and G are

A. 

B. 

C. 

D. 

Answer: C

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75. The major product of the following reaction is

A. a hemiacetal

B. an acetal

C. an ether

D. an ester

Answer: B

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76. Among the following compound , the most acidic is

A. p-nitrophenol

B. p-hydroxybenzoic acid

C. o-hydroxybenzoic acid

D. p-toluic acid

Answer: C

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77. The compound that undergoes decarboxylation most readily under mild condition is

A. 

B. 

C. 

D. 

Answer: B

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78. The number of aldol reaction(s) that occurs in the given transformation is

A. 1

B. 2

C. 3

D. 4

Answer: C

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79. The major product H of the given reaction sequence is

$$CH_3 - CH_2CO - CH_3 \xrightarrow{\Theta_{CN}} G - \xrightarrow[Heat]{95\%\, H_2SO_4} H$$

A. $CH_3 - CH = \underset{\underset{CH_3}{|}}{C} - COOH$

B. $CH_3 - CH = \underset{\underset{CH_3}{|}}{C} - CN$

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

D. $CH_3 - CH = \underset{\underset{CH_3}{|}}{C} - CO - NH_2$

Answer: B

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80. After completion of the reactions (I and II), the organic compound(s) in the reaction mixtures is (are)

A. Reaction I: P and Reaction II:P

B. Reaction I: U, acetone and Reaction II: Q, acetone

C. Reaction I:T, U, acetone and Reaction II:P

D. Reaction I: R, acetone and Reaction II : S, acetone

Answer: C

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81. The compuond that does no liberate CO_2 on treatment with aqueous sodium bicarbonate solution is :

A. benzoic acid

B. benzenesulphonic acid

C. salicylic acid

D. carbolic acid (phenol)

Answer: D

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82. The major product in the following reaction is

A. 

B. 

C. 

D. 

Answer: D

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83. The major product of the following reaction is

A. 

B. 

C. 

D. 

Answer: A

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84. the correct order of acidity for the following compounds is

A. I gt II gt III gt IV

B. III gt I gt II gt IV

C. III gt IV gt II gtI

D. I gt III gt IV gt II

Answer: A

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85. Reagent(s) which can be used to bring about the following transformation is(are)

A. $LiAlH_4 \text{ in} (C_2H_5)_2O$

B. $BH_3 in THF$

C. $NaBH_4 in C_2H_5OH$

D. Raney Ni / H_2 in THF

Answer: C

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86. The major product of the following reaction sequence is

A. 

B. 

C. 

D. 

Answer: A

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Competition File Objective Type Questions Multiple Choice Questions Mcq C Multiple Choice Questions

1. The Cannizzaro reaction is given by

A. benzaldehyde

B. acetaldehyde

C. acetone

D. trimethyl acetaldehyde

Answer: A::D

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2. Aldol condensation is not given by

A. benzophenone

B. acetophenone

C. benzaldehyde

D. propanal

Answer: A::C

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3. Identify the binary mixture(s) that can be separated into individual compounds, by differential extraction, as shown in the given scheme.

A. C_6H_5OH and C_6H_5COOH

B. C_6H_5COOH and $C_6H_5CH_2OH$

C. $C_6H_5CH_2OH$ and C_6H_5OH

D. $C_6H_5CH_2$ and C_6H_5COOH

Answer: B::D

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4. With reference to the scheme given, which of the given statement (s) about T, U, V and Wis (are) correct?

A. T is soluble in hot aqueous NaOH.

B. U is optically active.

C. Molecular formula of W is $C_{10}H_{18}O_4$

D. V gives effervescence on treatment with aqueous $NaHCO_3$

Answer: A::C::D

View Text Solution

5. Acetophenone is prepared by

A. heating benzoyl chloride with dimethyl cadmium

B. treating benzoyl chloride with excess of CH_3MgI followed by hydrolysis

C. treating benzene with excess acetyl chloride in presence of anhydrous $AICI_3$

D. reducing benzoyl chloride with H_2 in the presence of Lindlar catalyst

Answer: A::C

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6. Choose the correct statement(s) among the following.

A. 

B. CH_3CHO on reaction with HCN gives racemic mixture

C. $CH_3-\overset{\overset{C_2H_5}{|}}{\underset{\underset{OH}{|}}{C}}-H$ and $H-\overset{\overset{C_2H_5}{|}}{\underset{\underset{CH_3}{|}}{C}}-OH$ are position mixture

D. $CH_3-CH=NOH$ shows geometrical isomerism .

Answer: B::D

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7. Positive Tollen's test is observed for

A. 

B. 

C. 

D. 

Answer: A::B::C

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8. Compound p and R upon ozonolysis produce Q and S, respectively . The molecular fromular of Q and S id C_8H_8O. Q undergoes Cannizzaro reaction but not halofrom reaction , whereas S undergoes halofrom reaction but not Cannizzaro reaction .

$(i) P \xrightarrow[(ii)\ Zn/H_2O]{(i)\ O_3/CH_2Cl_2} \underset{(C_8H_8O)}{Q}$

(ii) $R \xrightarrow[(ii)\ Zn/H_2O]{(i)\ O_3/CH_2Cl_2} \underset{(C_8H_8O)}{S}$

The option (s) with suitable combination of P and R, respectively , is(are)

A. 

B. 

C. 

D. 

Answer: B::C

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9. The reaction(s) leading to the formation of 1, 3, 5 -trimethylbenzene is (are)

A. 

B. 

C. 

D. 

Answer: A::B::D

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10. Choose the correct option (s) for the followin reaction sequence .

consider Q,R and S as major products .

A. 

B. 

C. 

D. 

Answer: A::D

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Competition File Objective Type Questions Multiple Choice Questions Mcq D Multiple Choice Questions

1. A carbonyl compound (P) which gives positive iodoform test, undergoes reaction with MeMgBr followed by dehydration to give an olefin (Q). Ozonolysis of (Q) leads to a dicarbonyl compound (R) which undergoes intramolecular aldol reaction to give predominantly (S).

$$P \xrightarrow[3.\,H_2SO_4,\Delta]{1.\,MeMgBr \\ 2.\,H^+,H_2O} Q \xrightarrow[2.\,Zn,H_2O]{1.\,O_3} R \xrightarrow[2.\,\Delta]{1.\,OH^-} S$$

The structure of the carbonyl compound (P) is:

A. 

B. 

C. 

D. 

Answer: B

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2. A carbonyl compound (P) which gives positive iodoform test, undergoes reaction with MeMgBr followed by dehydration to give an olefin (Q). Ozonolysis of (Q) leads to a dicarbonyl compound (R) which undergors intramolecular aldol reaction to give predominantly (S).

$$P \xrightarrow[3.\,H_2SO_4,\Delta]{1.\,MeMgBr \\ 2.\,H^+,H_2O} Q \xrightarrow[2.\,Zn,H_2O]{1.\,O_3} R \xrightarrow[2.\,\Delta]{1.\,OH^-} S$$

The structure of products (Q) and (R), respectively, are:

A. 

B. 

C. 

D. 

Answer: A

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3. A carbonyl compound (P) which gives positive iodoform test, undergoes reaction with MeMgBr followed by dehydration to give an olefin (Q). Ozonolysis of (Q) leads to a dicarbonyl compound (R) which undergoes intramolecular aldol reaction to give predominantly (S).

$$P \xrightarrow[\substack{2.H^+, H_2O \\ 3.H_2SO_4, \Delta}]{1.MeMgBr} Q \xrightarrow[2.Zn, H_2O]{1.O_3} R \xrightarrow[2.\Delta]{1.OH^-} S$$

The structure of the carbonyl compound (P) is:

A. 

B. 

C. 

D. 

Answer: B

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4. In the following reaction sequence, the compound J is an

interemediate

$$I \xrightarrow[CH_3COONa]{(CH_3CO)_2O} J \xrightarrow[\substack{(ii)\ SOCl_2 \\ (iii)\ \text{anhyd. } AlCl_3}]{(i)\ H_2, Pd/C} K$$

$J(C_9H_8O_2)$ gives effervsecence on the treament with $NaHCHO_3$

and positive Baeyr's test.

The compound I , is

A. 

B. 

C. 

D. 

Answer: A

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5. In the following reaction sequence, the compound J is an

interemediate

$$I \xrightarrow[CH_3COONa]{(CH_3CO)_2O} J \xrightarrow[\substack{(ii)\,SOCl_2 \\ (iii)\,\text{anhyd.}\,AlCl_3}]{(i)\,H_2, Pd/C} K$$

$J(C_9H_8O_2)$ gives effervsecence on the treament with $NaHCHO_3$

and positive Baeyr's test.

The compound I , is

A. 

B. 

C. 

D. 

Answer: C

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6. P and Q are isomers of dicarboxylic acid $C_4H_4O_4$. Both decolurize Br_2/H_2O. On heating, P forms the cyclic anhydride. Upon treatment with dilute alkaline $KMnO_4$ P as well as Q could produce one or more than one from S, T and U.

Compounds formed from P and Q are, respectively

A. optically active S and optically active pair (T, U)

B. optically inactive S and optically inactive pair (T, U)

C. optically active pair (T, U) and optically active S

D. optically inactive pair (T, U) and optically inactive S.

Answer: B

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7. P and Q are isomers of dicarboxylic acid $C_4H_4O_4$. Both decolurize Br_2/H_2O. On heating, P forms the cyclic anhydride. Upon treatment with dilute alkaline $KMnO_4$ P as well as Q could produce one or more than one from S, T and U.

in the following reaction sequences V and W are respectively

$Q \xrightarrow[\Delta]{H_2, Ni} V$

A. 

B. 

C. 

D. 

Answer: A

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8. Schemes 1 and 2 describe sequential transformation of alkynes M and N .consider only the major prodcuts formed in each step for both the schemes .

the product X is

A. 

B. 

C. 

D. 

Answer: A

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9. Schemes 1 and 2 describe sequential transformation of alkynes M and N .consider only the major prodcuts formed in each step for both the schemes .

The correct statement with respect to product Y is

A. it gives a positive Tollens test and is a functional isomer of X.

B. it gives a positive Tollens test and is a geometrical isomer of X

C. It gives a positive iodoform test is a functional isomer of X .

D. It gives a positive iodoform test and is a geometrical isomer of X .

Answer: C

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10. In the following reactions

compound X is

A. 

B. 

C. 

D. 

Answer: C

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11. In the following reactions

the major compound Y is

A. 

B. 

C. 

D. 

Answer: D

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12. columns 1,2, and 3 contain starting materials , reaction conditions and type of reactions , respectively

The only correct combination in which the reaction proceeds through radical mechanism is

A. (II) (iii) (R)

B. (III) (ii)(P)

C. (IV) (I) (Q)

D. (I) (ii)(R)

Answer: D

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13. columns 1,2, and 3 contain starting materials , reaction conditions and type of reactions , respectively

for the synthesis of benoic acid the only correct combination is

A. (III) (iv) (R)

B. (IV) (ii) (P)

C. (II) (I) (S)

D. (I) (iv) (Q)

Answer: C

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14. columns 1,2, and 3 contain starting materials , reaction conditions and type of reactions , respectively

The only correct combination that gives two different carboxylic acids is

A. (IV) (iii)(Q)

B. (I) (i)(S)

C. (III)(iii)(P)

D. (II) (iv)(R)

Answer: C

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15. The reaction of compound P with CH_3MgBr (excess) in $(C_2H_5)_2O$ followed by addition of H_2Ogives Q. The compound Q on treatment with H_2SO_4 at$0^\circ C$ gives R. The reaction of R with CH_3COCl in the presence of anhydrous $AICI_3$ in CH_2CI_2 followed by treatment with H_2O produces compound S. [Et in compound Pis ethyl group]

the product S is

A. 

B. 

C. 

D. 

Answer: C

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16. Treatment of benzene with CO/HCl in the presence of anhydrous $\mathrm{AlCl_3}/\mathrm{CuCl}$ followed by reaction with $Ac_2\mathrm{O}/\mathrm{NaOAc}$ gives compound X as the major product. Compound X upon reaction with Br_2/Na_2CO_3, followed by heating at 473 K with moist KOH furnishes Y as the major product. Reaction of X with $H_2/Pd-C$, followed by H_3PO_4 treatment gives Z as the major product.

The compound Y is

A. 

B. 

C. 

D. 

Answer: C

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17. Treatment of benzene with CO/HCl in the presence of anhydrous $AlCl_3 / CuCl$ followed by reaction with $Ac_2O / NaOAc$ gives compound X as the major product. Compound X upon reaction with Br_2 / Na_2CO_3, followed by heating at 473 K with moist KOH furnishes Y as the major product. Reaction of X with $H_2 / Pd - C$, followed by H_3PO_4 treatment gives Z as the major product.

The compound Z is

A. 

B. 

C. 

D. 

Answer: B

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Competition File Objective Type Questions Multiple Choice Questions Mcq Integer Type Questions

1. Isomeric aldehydes and ketones having the formula $C_5H_{10}O$ are :

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2. The number of compounds which undergo aldol condensation in the following list of compounds are:

methanal, 2-methylpentanal, cyclohexan-1-one, benzaldehyde, l-phenylpropanone, phenylacetaldehyde,2,2-dimethylbutanal, benzophenone, propanone,

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3. How many of the osomeric ketones having the molecular formula $C_6H_{12}O$ undergo iodoform test?

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4. The number of compounds amongst : methanal, benzaldehyde, propanal, propanone, 2,2-Dimethylpropanal, 3-methylpentanal, which give Cannizzaro's reaction are

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5. The number of reagents which convert aldehyde or ketones to alkanes in the following list are :

$NaBH_4$, NH_2NH_2KOH, HI, $redP$, H_2Ni, Zn/Hg, HCl, $LiAlH_4$, Pt, acidified $KMnO_4$, alkaline $KMnO_4$

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6. The number of compounds which are more acidic than benzoic acid amongst :o-nitrobenzoic acid, p-chlorobenzoic acid, p-methoxybenzoic acid, p-toluic acid, o-toluic acid, acetic acid, o-hydroxybenzoic acid are:

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7. The number of carboxylic acids which are more acidic than acetic acid amongst the following are:

$(i) HCOOH$

$(ii) CICH_2COOH$

$(iii) Cl_3CCOOH$

$(iv) FCH_2COOH$

$(v) CI_3CCOOH$

$(vi) CH_3CH_2CHCICOOH$

$(vii) CH_3CHCICH_2COOH$

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8. The number of carbon atoms in adipic acid is

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9. Consider all possible isomeric ketones, including stereoisomers, of MW = 100. All these isomers are independently reacted with $NaBH_4$ (NOTE:

stereoisomers are also reacted separately). The total number of ketones that give a racemic product(s) is/are

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Unit Practice Test

1. Which of the following acids has the smallest dissociation constant?

A. $CH_3CH(F)COOH$

B. FCH_2CH_2COOH

C. $BrCH_2CH_2COOH$

D. $CH_2CH(Br)COOH$

Answer:

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2. Nucleophilic addition reaction will be most favoured in

A. $(CH_3)_2C = O$

B. CH_2CH_2CHO

C. CH_3CHO

D. $CH_3CH_2CH_2\overset{\overset{O}{||}}{C}CH_3$

Answer:

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3. Aldol condensation between following compounds, followed by dehydration gives emthyl vinkyl ketone:

A. $HCHO$ and CH_3COCH_3

B. $HCHO$ and CH_3CHO

C. Two molecules of CH_3CHO

D. Two molecules of CH_3COCH_3

Answer:

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4. Assertion: 2-methylpropanal undergoes aldol condensation reaction.

Reason: It has no α-hydrogen

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement

Answer:

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5. Assertion : Phenol and benzoic acid can be distinguished by $NaHCO_3$.

Reason : Benzoic acid is a stronger acid than phenol.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement

Answer:

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6. Arrange the following compounds in the increasing order of boiling points :

$C_2H_5OC_2H_5, C_4H_9COOH, C_4H_9OH$

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7. What is the name of the following reaction?

$$RCOCI + H_2 \xrightarrow{Pd, BaSO_4} RCHO + HCI$$

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8. How will you convert the following to benzoic acid? (i) Ethylbenzene (ii) Bromobenzene.

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9. Explain the following:

(i) Benzoic acid is weeker acid than acetic acid.

(ii) Chloroacetic acid is stronger acid than acetic acid.

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10. Explain the following reactions by giving one example:

(i) Rosenmund reduction

(ii) Cannizzaro's reaction

(iii) Wolff Kishner reduction.

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11. complete the following reactions

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12. Give one chemical test to distinguish between the following:

(i) Pentan-2-one and pentan-3-one

(ii) Phenol and benzoic acid

(iii) Acetophenone and benzophenone

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13. (a) An organic compound with the molecular formula $C_9H_{10}O$ forms 2, 4-DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro reaction. On vigorous oxidation, it gives 1,2-benzenedicarboxylic acid. Identify the compound.

(B) Arrange the following compounds in the increasing order of their reactivity in nucleophilic addition reaction : Ethanal, propanal, propanone, butanone.

(c) Although p-hydroxybenzoic acid is less acidic than benzoic acid, ortho hydroxybenzoic acid is about 15 times more acidic than benzoic acid. Explain.

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