



India's Number 1 Education App



CHEMISTRY

BOOKS - CBSE COMPLEMENTARY MATERIAL CHEMISTRY

(HINGLISH)

ALDEHYDES, KETONES AND CARBOXYLIC ACIDS

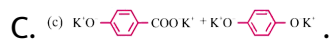
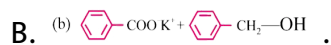
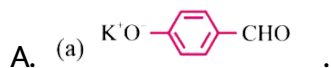
Multiple Choice Questions

1. Which product is formed when



is treated

with concentrated KOH solution ?

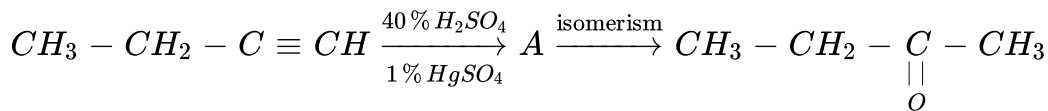


Answer: B



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2.



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

A. But-1-en-2-ol,metamerism

B. But-1-en-2-ol,tautomerism

C. But-2-en-2-ol,geometrical

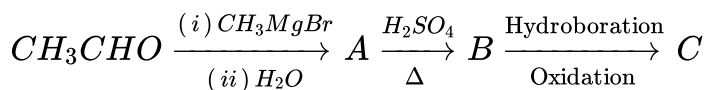
D. But-1-en-2-ol,tautomerism.

Answer: D



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3. Compound A and C in the following reaction are



- A. identical
- B. position isomer
- C. functional isomer
- D. optical isomer

Answer: B

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



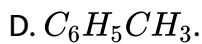
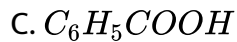
- A. Tollen's reagent
- B. Benzoyl peroxide
- C. I_2 and $NaOH$ solution

D. Sn and NaOH solution

Answer: C

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5. Toluene $\xrightarrow{KmnO_4}$ A $\xrightarrow{SOCl_2}$ B $\xrightarrow[BaSO_4]{H_2IPd}$ the product 'C' is



Answer: B

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6. The increasing order of the rate of HCN addition of compound a-d is

(i) $HCHO$

(ii) CH_3COCH_3

(iii) $PhCOCH_3$

(iv) $PhCOPh$

A. $iv < ii < iii < i$

B. $iv < iii < ii < i$

C. $iii < iv < ii < i$

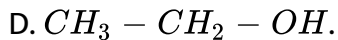
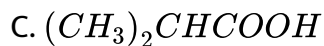
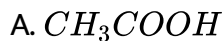
D. $i < ii < iii < iv$.

Answer: B



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7. Among the following acids, which has the lowest pK_a value?

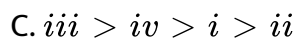
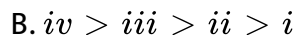
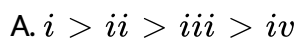
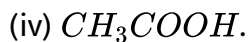
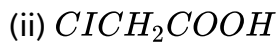
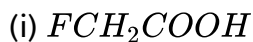


Answer: B



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8. The correct order of acidity in given compounds



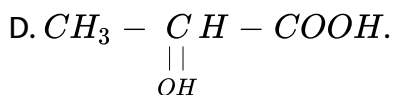
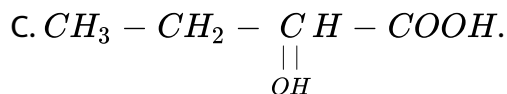
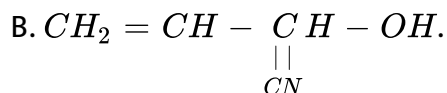
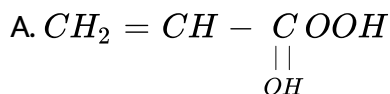
D. $iii > i > ii > iv$.

Answer: D

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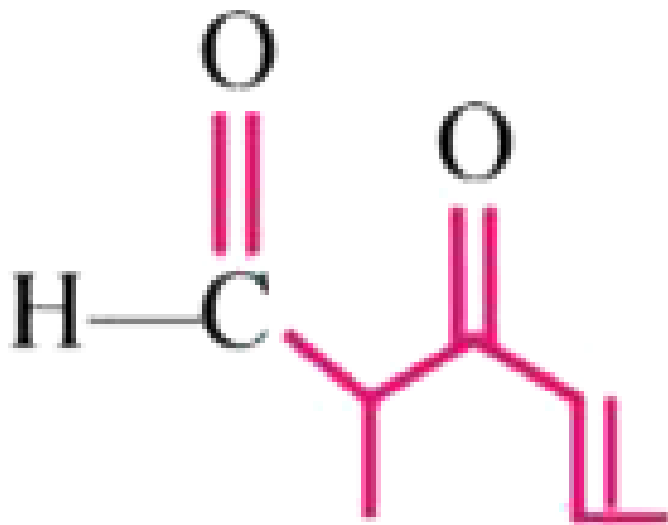
the structure of compound B is



Answer: A

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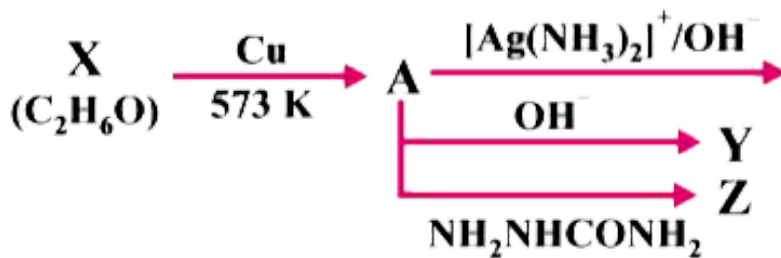
10. The IUPAC name of compound is :



- A. 2-Formylhex-2-ene-3-one
- B. 5-methyl-4-oxo-hex-2-en-5-al
- C. 3-keto-2-methylhex-5-enal
- D. 3-keto-2-methylhex-4-enal.

Answer: D

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11. Identify

X,A,Y,Z.

- A. A-methoxymethane, X-ethanol, Y-ethanoic acid, Z-semicarbazide
- B. A-ethanol, X-ethano, Y-but -z-enal, Z-semicarbazone.
- C. A-ethanol, X-Acetaldehyde, Y-Butanone, Z-Hydroazone
- D. A-Methoxymethane, X-ethanoic acid, Y-acetate ion and Z-Hydrazine.

Answer: B

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

A. Cannizaro's reaction

B. Wurtz reaction

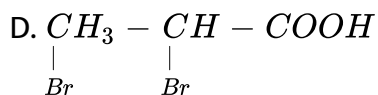
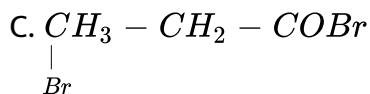
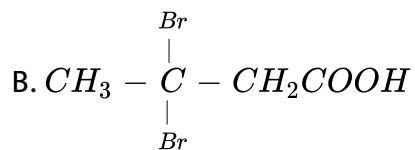
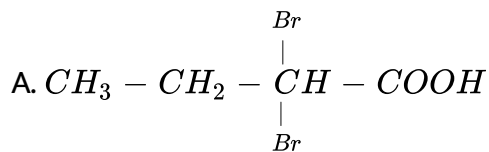
C. Friedel craft reaction

D. Reimer Tiemann reaction

Answer: A

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13. Propionic acid with Br_2/P yields a dibromo product. Its structure would be



Answer: A

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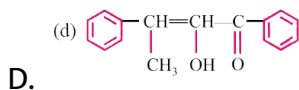
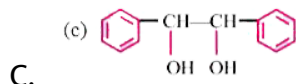
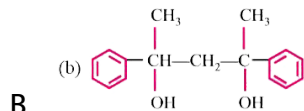
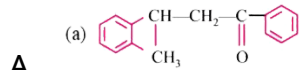
14. Reduction of aldehydes and ketones into hydrocarbons using $Zn - Hg + HCl$ called.

- A. Dow process
- B. Cope reduction
- C. Wolf -kishner reduction
- D. Clemmenson's Reduction

Answer: D

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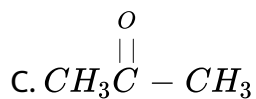
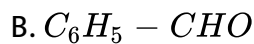
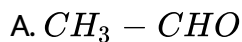
15. Acetophenone when reacted with a base C_2H_5ONa yields a stable compound which has the structure

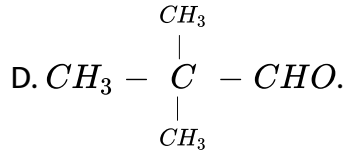


Answer: D

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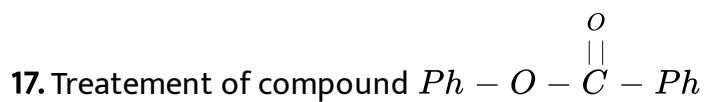
16. Which of the following compounds do not undergo aldol condensation?





Answer: B::D

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with NaOH solution yields

- A. Phenol
- B. Sodium phenoxide
- C. Sodium benzoate
- D. Benzophenone

Answer: B::C

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

- A. Benzaldehyde to benzyl alcohol
- B. Cyclohexanone to cyclohexane
- C. Benzoylchloride into benzaldehyde
- D. Benzophenone to diphenyl methane.

Answer: B::D

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

- A. Grignard reagent
- B. Cannizaro reaction

C. Aldol condensation

D. HVZ reaction.

Answer: A::C

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20. Benzophenone can be obtained by

A. Benzoyl chloride + Benzene + anhy. $AlCl_3$.

B. Benzoyl chloride + Diphenylanion

C. Benzoyl chloride + Phenyl magnesium chloride

D. Benzene + carbon monoxide + $ZnCl_2$.

Answer: A::B

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21. Assertion (A) Formaldehyde is a planar molecule.

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

A. Assertion and reason both are CORRECT and reason is the CORRECT explanation of the 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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22. 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 and reason is the CORRECT explanation of the 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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23. Match the reactions given in Column I with the suitable reagents given in Column II.

| Column I (Reactions) | Column II (Reagents) |
|--|------------------------------|
| A. Benzophenone \rightarrow Diphenylmethane | 1. LiAlH_4 |
| B. Benzaldehyde \rightarrow 1-phenylethanol | 2. DIBAL-H |
| C. Cyclohexanone \rightarrow Cyclohexanol | 3. Zn(Hg)/Conc. HCl |
| D. Phenyl benzoate \rightarrow Benzaldehyde | 4. CH_3MgBr |

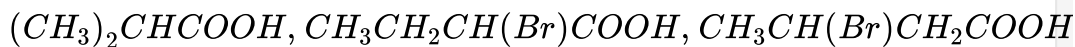
cyclohexanone, 1-phenyl propanone, butan-1-ol, 2,2-Dimethylbutanal.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|

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Very Short Answer Type Questions 1 Mark

1. Arrange the following compounds in an increasing order of their acid strengths :



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2. Draw the structure of the compound whose IUPAC name is 4-chloropentan-2-one

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3. Which type of aldehyde can go Cannizzaro reaction ?

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4. Name the aldehyde which does not give Fehling's solution test.

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

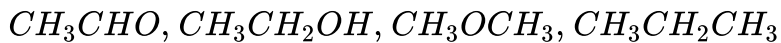
CH_3CHO , CH_3COCH_3 , $HCHO$, $C_2H_5COCH_3$

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6. Mention industrial product obtained from HCHO.

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



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8. How is acetone obtained from ethanol ?

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9. Why do aldehydes and ketones have lower boiling point than alcohols ?

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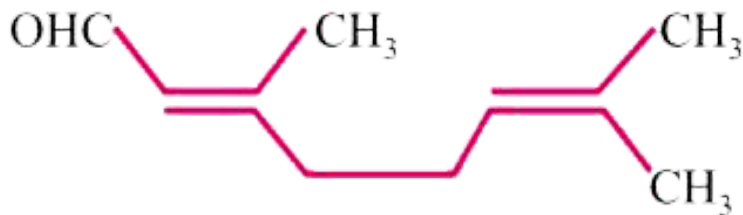
10. Write reaction between acetyl chloride and dimethyl cadmium.

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11. What happens when CH_3CHO is treated with $K_2Cr_2O_7$ in presence of H_2SO_4 ?

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12. Write the IUPAC name of



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13. Give balanced equation and name of products when CH_3COOH is treated with PCl_5 ?

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14. What product is obtained when ethyl benzene is oxidized with alkaline $KMnO_4$?

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15. CH_3CHO is more reactive than CH_3COCH_3 towards reaction with HCN. Give reason.

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16. What is RDX ?

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17. $HOOC - CH = CH - COOH$

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18. Write the IUPAC name of



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19. Why does benzoic acid not undergo Friedel-Craft reaction ?

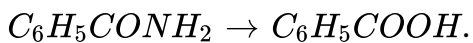
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1. How will you convert :



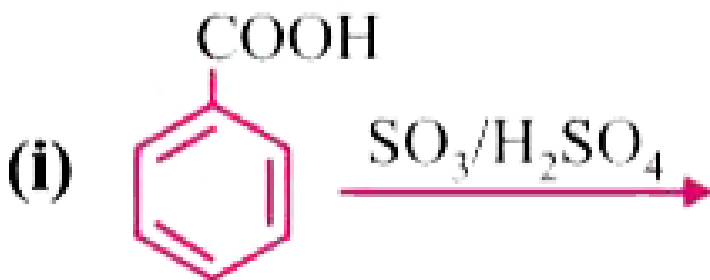
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2. How will you convert :



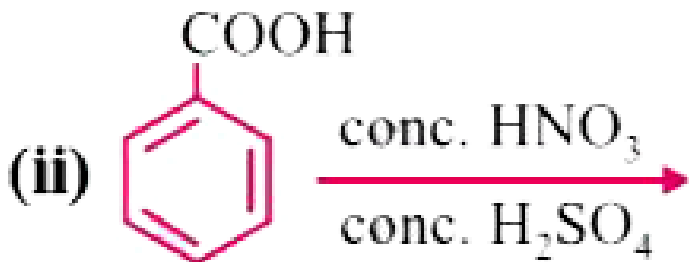
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3. Complete the following :



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4. Complete the following :



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5. An organic compound X has molecular formula $C_5H_{10}O$. It does not reduce Fehling's solution but forms a bisulphite compound. It also gives positive Iodoform test. What are possible structure of X ? Explain your reasoning relating structure.

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6. Give the chemical test of distinguish between :



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7. Give the chemical test of distinguish between :



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

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9. Which acid of each pair shown here would you expect to be stronger

? CH_3CO_2H or CH_2FCO_2H



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10. Which acid of each pair shown here would you expect to be stronger

? CH_2FCO_2H or CH_2ClCO_2H



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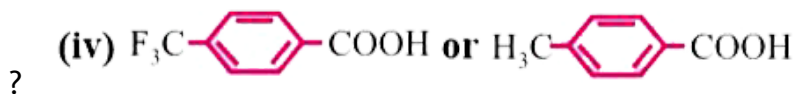
11. Which acid of each pair shown here would you expect to be stronger

? $CH_2FCH_2CH_2CO_2H$ or $CH_3CHFCH_2CO_2H$.



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12. Which acid of each pair shown here would you expect to be stronger



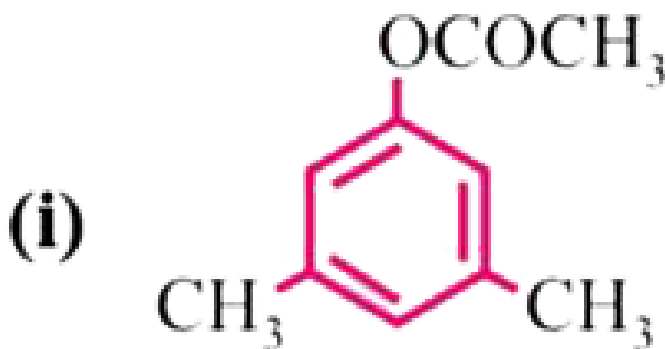
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13. Carboxylic acids do not give reactions of aldehydes and ketones why

?

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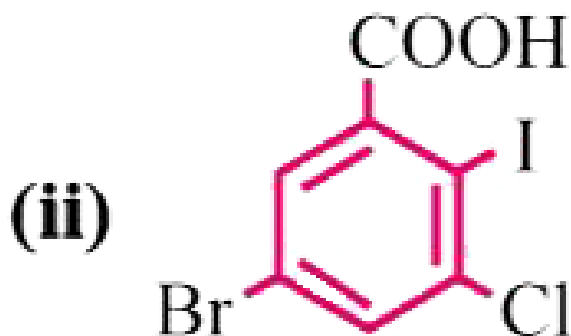
14. Write IUPAC name of the following :





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15. Write IUPAC name of the following :



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16. Account for the following : (i) Oxidation of toluene to C_6H_5CHO with CrO_3 is carried out in presence of acetic anhydride.



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17. Account for the following : (ii) Melting point of an acid with even number is higher than those of its neighbours with odd number of carbon atoms.

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18. Distinguish between : (i) C_2H_5OH and CH_3CHO .

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19. Distinguish between : (ii) $C_6H_5COCH_3$ and $C_6H_5CH_2CHO$.

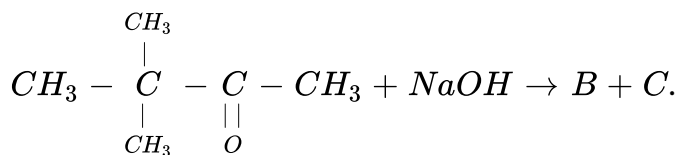
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20. Complete the following reactions by identifying A:



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21. Complete the following reactions by identifying B and C: (ii)



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22. Benzaldehyde gives a positive test with Tollen's reagent but not with Fehling's and Benedict solutions. Why?

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23. Aldehydes usually do not form stable hydrates but chloral normally exists as chloral hydrate. Give reason.

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24. Give possible explanation for the following : (i) Cyclohexanone forms cyanohydrins in good yield but 2,2,6 trimethyl-cyclohexanone does not .

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25. Give possible explanation for the following : (ii) There are two - NH_2 groups in semicarbazide . However, only one is involved in formation of semi carbonzone.

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26. Aldehydes are easily oxidisable yet propanal can conveniently be prepared by the oxidation of propanol by acid $K_2Cr_2O_7$.

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27. Do the following conversions in not more than two steps. (i) Benzoic acid to Benzaldehyde (ii) Propanone to propene.

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28. Write the reactions involved in the following reactions:

(i) Clemmensen reduction

(ii) Cannizzaro reaction

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29. Convert the following (i) Ethyl benzene to benzoic acid

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30. Convert the following (ii) Ethanal to but-2-enal.

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Short Answer II Type Questions 3 Marks

1. Illustrate the following name reactions : Hell - Volhard Zelinsky reaction

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2. Wolff-Kishner reduction is :

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3. ETARD REACTION

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4. Predict the organic products of the following reactions :



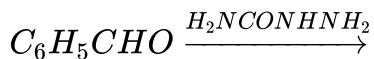
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5. Predict the organic products of the following reactions :



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6. Predict the organic products of the following reactions :



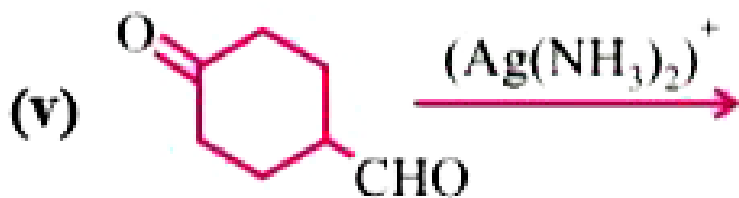
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7. Predict the organic products of the following reactions :



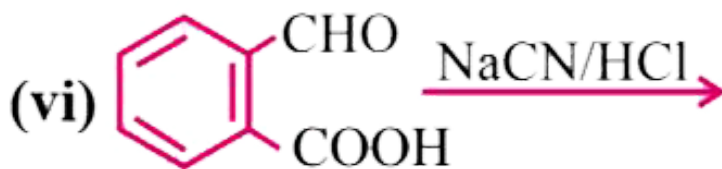
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8. Predict the organic products of the following reactions :



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9. Predict the organic products of the following reactions :



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10. Write chemical reaction to affect the following transformations :

Butan-1-ol \rightarrow Butanoic acid.

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11. Write chemical reaction to affect the following transformations :

Benzyl alcohol to phenylethanoic acid

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12. Write chemical reaction to affect the following transformations :

3-Nitrobromobenzene to 3-nitrobenzoic acid.

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13. Write chemical reaction to affect the following transformations :

4-Methylacetophenone to Terephthalic acid

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14. Write chemical reaction to affect the following transformations :

Cyclohexene \rightarrow Hexane-1,6 dioic acid

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15. Write chemical reaction to affect the following transformations :

Butanal \rightarrow Butanoic acid.



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16. Draw the structure of the following derivatives : 2,4-dinitrophenylhydrazone of C_6H_5CHO

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17. Draw the structure of the following derivatives : Cyclopropanone oxime

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18. Draw the structure of the following derivatives : Acetaldehydedimethylacetal

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19. Draw the structure of the following derivatives : Semicarbazone to cyclobutanone

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20. Draw the structure of the following derivatives : Ethylene ketal of hexan-3-one

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21. Draw the structure of the following derivatives : Methylhemiacetal of formaldehyde.

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22. Draw the structure of a carbonyl group and indicate :
hybridized state of carbon .

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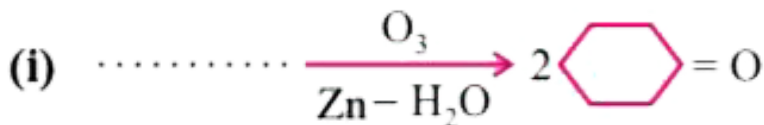
23. Draw the structure of a carbonyl group and indicate :
the σ and π bonds.

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24. Draw the structure of a carbonyl group and indicate :
the electrophilic and nucleophilic centres

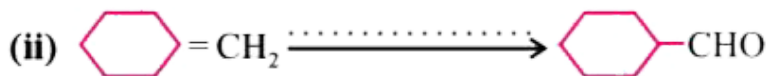
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25. Complete the following as missing starting material , reagent or
products :



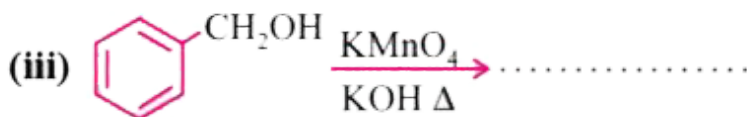
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26. Complete the following as missing starting material , reagent or products :



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27. Complete the following as missing starting material , reagent or products :



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28. How can the following be converted :

(i) Ethanol \rightarrow Acetone

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29. How will you convert Benzene to acetophenone ?

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30. How will you convert benzoic acid into benzaldehyde ?

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31. Give reasons for the following :

(i) Carboxylic acids do not give characteristic reactions of carbonyl group.

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32. Give reasons for the following :

(ii) Treatment of C_6H_5CHO with HCN gives a mixture of two isomers which cannot be separated even by fractional distillation.

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33. Give reasons for the following :

(iii) Sodium bisulphite is used for purification of ketones and aldehydes.

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34. Give the chemical test of distinguish between :
 CH_3CHO and C_6H_5CHO .

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35. Write tests of distinguish between :

(ii) $C_6H_5 - OH$ and CH_3COOH .

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36. Write tests of distinguish between :

(iii) Pentanal and Pentan-2-one

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37. Convert :

(i) Benzaldehyde to acetophenone

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38. Convert :

(ii) Malonic acid to acetic acid



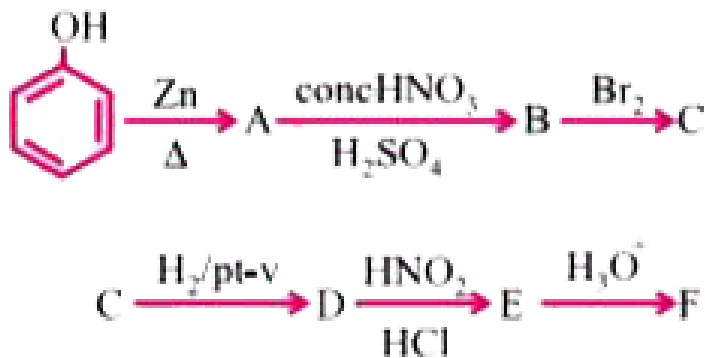
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39. Acetaldehyde to butan-1-ol



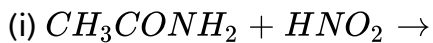
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40. Write the structures of organic compound A to F in the following sequence of reactions :



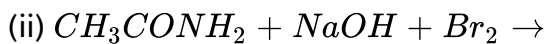
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41. Complete the following :



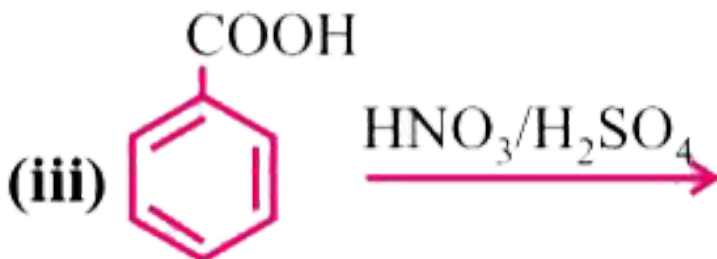
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42. Complete the following :



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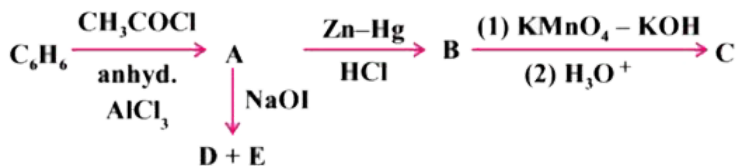
43. Complete the following :



(iii)

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44. Write the structures of A,B,C,D and E in the following reactions :



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Long Answer Type Questions 5 Marks

1. Which of the following compounds would undergo Aldol condensation, which the Cannizzaro reaction and which neither ? Write the structures of the expected products of aldol condensation and Cannizzaro reaction :

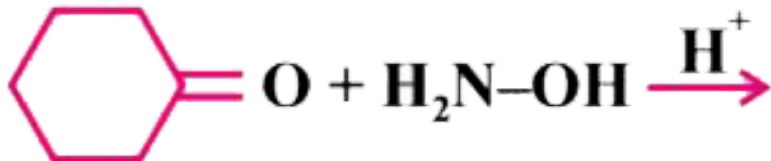
(i) Methanal (ii) 2-Methylpentanal (iii) Benzaldehyde (iv) Benzophenone
 (v) Cyclohexanone (vi) 1-Phenylpropanone (vii) Phenylacetaldehyde (viii)
 Butan-1-ol (ix) 2,2 Dimethylbutanal.

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2. An organic compound 'A' (C_3H_6O) is resistant to oxidation but forms compound 'B' (C_3H_8O) on reduction. 'B' reacts with HBr to form the compound 'C'. 'C' with Mg forms Grignard's reagent 'D' which reacts with 'A' to form a product which on hydrolysis gives 'E'. Identify 'A' to 'E'.

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3. Write the products of the following reactions : (i)



(ii) $2C_6H_5CHO + NaOH \xrightarrow{\text{Conc.}}$.

(iii) $CH_3COOH \xrightarrow{Cl_2/P}$.

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4. Give simple tests to distinguish between the following pair of compounds.

(i) Benzaldehyde and Benzoic acid

(ii) Propanal and propanone.

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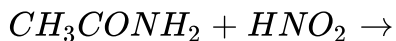
5. (i) How will you prepare (a) acetic anhydride and (b) acetyl chloride from CH_3COOH ? Write the equation involved in each case.

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6. (ii) Why is the boiling point of acid anhydride higher than the acid from which it is obtained?

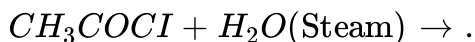
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7. Complete the following reactions and write main products : (i)



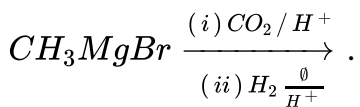
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8. Complete the following reactions and write main products : (ii)



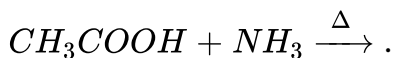
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9. Complete the following reactions and write main products : (iii)



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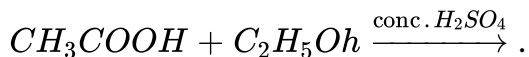
10. Complete the following reactions and write main products : (iv)





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11. Complete the following reactions and write main products : (v)



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12. Complete the following reactions and write main products : (vi)



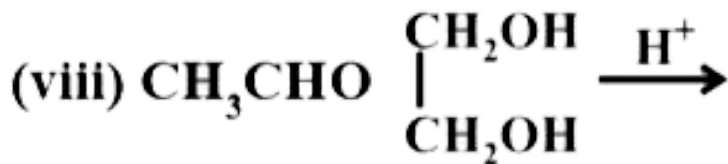
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13. Complete the following reactions and write main products : (vii)



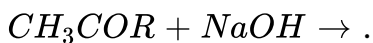
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14. Complete the following reactions and write main products : (viii)



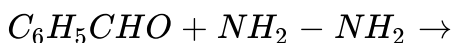
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15. Complete the following reactions and write main products : (ix)



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16. Complete the following reactions and write main products : (x)



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17. Give reasons for the following : (i) C_6H_5COOH is weaker than formic acid.

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18. Give reasons for the following : (ii) $HCOOH$ and CH_3COOH differentiated by Tollen's reagent.

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19. Give reasons for the following : (iii) $R - COOH$ do not give characteristic reaction with $> C = O$.

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20. Why is carboxylic acid a stronger acid than phenol ?

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21. Give reasons for the following : (v) Acid amides are weakly basic in nature .



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