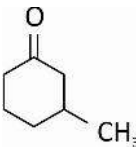
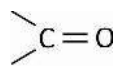
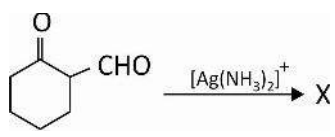
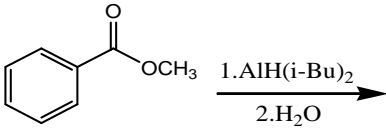
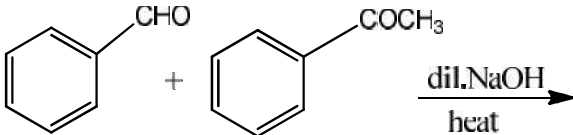
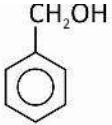
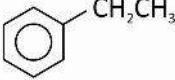
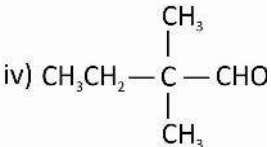

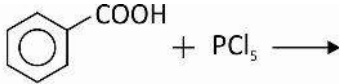
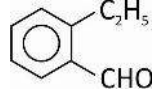


UNIT-12: ALDEHYDES, KETONES AND CARBOXYLIC ACIDS

One mark questions:	
1. Give the IUPAC name of $C_6H_5CH=CH-CHO$	K
2. Give the IUPAC name of : 	K
3. $CH \equiv CH + H_2O \xrightarrow[HgSO_4]{H_2SO_4} X$. Give the IUPAC name of X.	U
4. A (nitrile) + $C_6H_5MgBr \xrightarrow[2) H_3O^+]{1) Ether} C_6H_5COCH_3$. Write the structure of A.	U
5. Complete the following equation: $CH_3-CH=CH-CH_2-CN \xrightarrow[H_2O]{DIBAL-H}$	K
6. Name the oxidizing agent used in Etard reaction.	K
7. Complete the following equation: $2R'COCl + R_2Cd \longrightarrow$	K
8. Name the family of carbonyl compound formed by Friedel-Craft acylation reaction.	U
9. What type of attractive forces are there between molecules of aldehydes or ketones?	U
10. Why is there a large difference in the boiling points of Butanal (b.p. 348K) and Butan-1-ol (391K)?	U
11. Arrange the following compounds in increasing order of their boiling points: Propanal, acetone methoxyethane, n-butane and propan-1-ol	U
12. Lower members of aldehydes and ketones are miscible with water? Give reason.	U
13. Give reasons: Aldehydes are more reactive than ketones in nucleophilic addition reaction.	U
14. Arrange the following compounds in the increasing order of their reactivity in nucleophilic addition reaction: Ethanal, propanal, propanone, butanone.	U
15. What is the reducing agent used in Clemmensen reduction?	K
16. Write the equation to illustrate Wolff-Kishner reduction, for 	K
17. What is X? 	U
18. Between benzaldehyde and acetaldehyde, which one of these does not answer Fehling's test?	K
19. Write the general equation for haloform reaction.	K

20. Name a reaction given by carbonyl compounds due to the acidic nature of α -hydrogen atom.	K
21. Write the IUPAC name of : $\text{HOOC} - \text{COOH}$	K
22. Arrange the following in the decreasing order of their acid strength: CH_3COOH , FCH_2COOH , ClCH_2COOH .	U
Two mark questions:	
1. How is benzaldehyde prepared by Rosenmund reduction? Give the equation.	K
2. Explain Stephen reaction with the general equation.	K
3. Give the structure and the IUPAC name of the product (an aldehyde) in the following reaction:	
	U
4. In the following reaction identify A and B: $\text{C}_6\text{H}_5\text{CN} + \text{SnCl}_2 + \text{HCl} \longrightarrow \text{A} \xrightarrow{\text{H}_3\text{O}^+} \text{B}$	K
5. What is DIBAL-H? Give one specific use of it.	K
6. Identify A and B: $\text{A} + \text{CrO}_2\text{Cl}_2 \xrightarrow{\text{CS}_2} \text{B} \xrightarrow{\text{H}_3\text{O}^+} \text{Benzaldehyde}$.	K
7. Benzene is converted into acetophenone using acetylchloride in presence of anhydrous AlCl_3 . Give the equation. Name the reaction.	K
8. Write the two steps involved in the manufacture of benzaldehyde from toluene.	K
9. How do you prepare benzaldehyde by Gatterman Koch reaction? Write the equation.	K
10. What is the i) geometry of the intermediate ii) change in the hybridisation state of carbon, when a nucleophile attacks the carbonyl carbon of an aldehyde.	U
11. Between benzaldehyde and propanal which is more reactive in nucleophilic addition reaction? Justify your answer.	U
12. $\begin{array}{c} \text{R} \\ \diagdown \\ \text{C}=\text{O} \\ \diagup \\ \text{H} \end{array} + \text{NaHSO}_3 \xrightleftharpoons{\text{H}^+} \text{X (final product)}$. Write the structure of X. Mention one application of the reaction.	K
13. Name the reagents used to convert as directed: i) Aldehyde into an hemiacetal ii) ketone into a phenylhydrazone	K
14. Which of the following do not answer iodoform test? i) $\text{CH}_3\text{CHOHCH}_3$ ii) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ iii) $\text{C}_6\text{H}_5\text{COCH}_3$ iv) $\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_3$ v) CH_3CHO	U
15. Illustrate Clemmensen reduction with a general equation.	K
16. What is Tollens reagent? What observation is made in Tollens test?	K

17. What is Fehling's reagent? What observation is made in Fehling's test?	K
18. α -hydrogen atoms of carbonyl compounds are acidic. Give reasons.	U
19. Write the Aldol condensation reaction by taking ethanal as an example.	K
20. Complete the equation and name the product:	
	K
21. $\text{H}-\text{CHO} + \text{H}-\text{CHO} + \text{conc. KOH} \longrightarrow \text{A} + \text{B}$. Name the compounds A and B.	K
22. Which one of the following compounds would undergo aldol condensation and which one Cannizzaro's reaction?	
i)  ii) $\text{CH}_3\text{CH}_2\text{CHO}$ iii)  iv) 	U
23. Carboxylic acids are more acidic than phenols. Give reasons.	U
24. What is the effect of an electron releasing group on the acidity of acids? Give reason.	U
25. Illustrate Hell-volhard-Zelinsky reaction with a general equation?	K
26. Benzoic acid is less reactive towards electrophilic substitution reaction. Why? Name the product obtained when benzoic acid is brominated.	U
Three mark questions:	
1. What are A and B in the following reaction? Write the IUPAC name of B.	K
$\text{C}_6\text{H}_5\text{MgBr} + \text{CH}_3\text{CH}_2\text{CN} \xrightarrow{\text{ether}} \text{A} \xrightarrow{\text{H}_3\text{O}^+} \text{B}$	K
2. Write the equations for the steps involved in the mechanism of base catalysed addition of HCN to a carbonyl compound.	K
3. Write equations for the reactions:	
i) acetaldehyde with HCN	
ii) Benzaldehyde with Sodium hydrogen sulphite	
iii) Acetone with barium hydroxide and heat (an aldol).	K
4. Write the structure of any three cross aldol condensation products A, B, C:	K
$\text{CH}_3\text{CHO} + \text{CH}_3\text{CH}_2\text{CHO} \xrightarrow[\text{heat}]{\text{dil. NaOH}} \text{A} + \text{B} + \text{C}$	K
5. Benzaldehyde undergoes self oxidation- reduction on heating with concentrated alkali. What are the products formed and what is the name of the reaction?	K
6. Predict the main product formed when cyclohexanecarbaldehyde  reacts with	

<p>i) Tollen's reagent ii) NH_2OH iii) Zn-Hg HCl</p>	A
<p>7. Show how each of the following compounds can be converted to Benzoic acid:</p> <p>a) Ethyl Benzene b) benzamide c) benzoyl chloride?</p>	A
<p>8. Benzoic acid can be prepared starting from bromobenzene. Show this conversion using only inorganic reagents in the correct order (neglect organic solvent used in any step)</p>	A
<p>9. Complete the following equations:</p> <p>i) $\text{CH}_3\text{COOH} + \text{NaHCO}_3 \longrightarrow$</p> <p>ii)  \longrightarrow</p> <p>iii) $(\text{C}_6\text{H}_5\text{CO})_2\text{O} + \text{H}_2\text{O} \longrightarrow$</p>	K
<p>10. An aromatic acid X on reduction using diborane gives Benzyl alcohol. The sodium salt of X on heating with soda lime gives Y, and on electrolysis gives Z. Identify X,Y and Z?</p>	A
<p>11. Give one simple chemical test to distinguish between the following pairs of compounds.</p> <p>i) acetic acid and acetaldehyde</p> <p>ii) Pentan-2-one and Pentan-3-one</p> <p>iii) Benzaldehyde and Benzophenone</p>	U
Five mark questions:	
<p>1. Give the equations for the conversions of a) Ethanoic acid to Ethanoic anhydride</p> <p>b) phthalic acid to phthalimide</p>	K
<p>2. a) Name simple chemical tests to distinguish</p> <p>i) propanal and ethanal ii) benzoic acid and ethyl benzoate</p> <p>b) $\text{CH}_3\text{Br} \xrightarrow{\text{Mg, ether}} \text{A} \xrightarrow[2) \text{H}_2\text{O}]{1) \text{CO}_2} \text{B} \xrightarrow[\Delta]{\text{CH}_3\text{OH}/\text{H}^+} \text{C}$. Identify the compounds A, B and C</p>	U
<p>3. a) Given A = . Write the structures of the product formed when A reacts with</p> <p>i) $\text{NH}_2\text{-NH}_2$ ii) boiled with acidified KMnO_4.</p> <p>b) Name the reaction by which</p> <p>i) sodium benzoate is converted into benzene</p> <p>ii) Propanoic acid is converted into 2-bromopropanoic acid</p> <p>c) Arrange the following in increasing order of their acid strength:</p> <p>benzoic acid, 4-nitrobenzoic acid, 4-methoxybenzoic acid</p>	A

4. a) Give reasons:

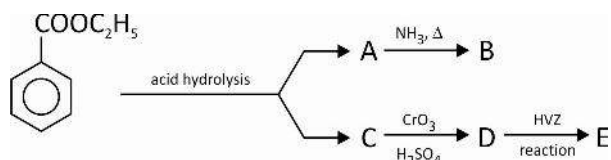
i) oxidation of toluene by CrO_2Cl_2 in CS_2 does not yield benzoic acid

ii) benzoic acid does not undergo Friedel-Craft reaction

iii) In $\text{NH}_2\text{CONHNH}_2$ (semicarbazide) the NH_2 group is not involved in formation of semicarbazone

b) Write a self explanatory equation for Clemmensen reduction of propanone.

5. Identify A, B, C, D and E in the following and write their names:

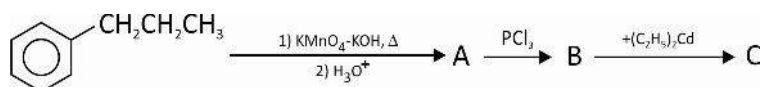


6. a) $\text{CH}_3\text{CHO} + \text{CH}_3\text{OH} \xrightleftharpoons[\Delta]{\text{dry HCl}} \text{A} \xrightleftharpoons{+\text{CH}_3\text{OH}} \text{B}$. Write the structures of A and B.

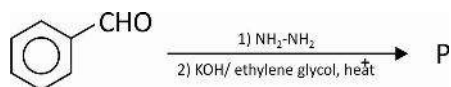
b) Write the general equation for the conversion of Grignard reagent into carboxylic acid

c) Arrange the following in increasing order of their reactivity towards HCN: acetone, acetaldehyde, methyl tert - butyl ketone, propanaldehyde

7. a) Identify the compounds A, B and C:



b) Give the IUPAC name of P. Name the reaction.



8. $\text{C}_6\text{H}_6 \xrightarrow[\text{anhy AlCl}_3]{\text{CH}_3\text{COCl}} \text{A} \xrightarrow{\text{Zn-Hg conc. HCl}} \text{B} \xrightarrow[2) \text{H}_3\text{O}^+]{1) \text{KMnO}_4 \text{ KOH}, \Delta} \text{C}$.

'A' reacts with NaOI to form D and E. Write the structures of A, B, C, D and E.

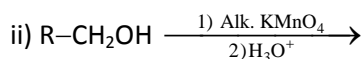
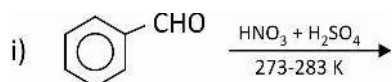
9. $\text{C}_7\text{H}_6\text{O}_2$ (A) $\xrightarrow{\text{PCl}_5} \text{P} \xrightarrow{\text{H}_2, \text{Pd}, \text{BaSO}_4} \text{Q} \xrightarrow{\text{NaBH}_4} \text{R}$.

(aromatic acid)

i) Identify P, Q, R

ii) Write the equation for the reaction between 'A' and 'R' in presence of H^+ and name the reaction.

10. a) Complete the following equations:



b) Mention one use each of : i) formaldehyde ii) acetone iii) ethanoic acid

U

A

K

A

A

A

K