

ORGANIC CHEMISTRY FUNCTIONAL GROUP II

Ethers, Aldehydes, Ketones, Acids and Acid derivatives

1. What are ethers ? What is meant by symmetrical and unsymmetrical ethers ?
2. How are the following prepared ?
 - a) Acetic acid from Ethyne. b) Ethyl alcohol from Acetic acid.
3. How would you distinguish between HCHO and CH₃CHO?
4. Give tests to distinguish the following compounds and write chemical equations involved?
 - a) C₆H₅COCH₃, b) C₆H₅CH₂CHO
 - c) C₆H₅COCH₂CH₃.
5. Illustrate the structural formula of
 - a) Paraldehyde b) Trioxane
 - c) Formalin. d) Formose.
6. Why are lower aldehydes and ketones soluble in water?
7. Why do aldehydes and ketones have higher boiling point than hydrocarbons and ethers of comparable molecular masses?
8. Illustrate Haloform reaction with a suitable example?
9. How can you distinguish between acetaldehyde and benzaldehyde?
10. Why is Chloro acetic acid stronger than acetic acid?
11. How is acetamide (Ethanamide) prepared? How does it react with
 - a) P₂O₅ b) Br₂ and KOH or NaOH?
12. How many isomeric ethers are possible for C₄H₁₀O? Also give their IUPAC names.
13. What are the main differences between Ethylenic double bond and carbonyl double bond?
14. Arrange the following acids in the increasing order of acidity. ClCHCOOH, CCl₃COOH, CH₃COOH, ClCH₂COOH.
15. Why are aliphatic carboxylic acids stronger than Phenols?
16. Why are the boiling points of acids higher than the corresponding alcohol's?
17. What is the hybridisation of carbon in the Carbonyl group?
18. Convert Propanal to
 - a) 2-Butanone b) 1-Phenyl-1-Propanol
19. Convert Ethylene to Propanoic Acid.
20. Identify **A** to **D** in the following reaction
$$\text{C}_6\text{H}_5\text{COOH} + \text{PCl}_5 \rightarrow \text{A} + \text{B} \rightarrow \text{C}_6\text{H}_5\text{CONH}_2 + \text{P}_2\text{O}_5 \rightarrow \text{C} + \text{H}_2/\text{Ni} \rightarrow \text{D}$$
21. How will you convert:
 - a) Phenol to Acetophenone
 - b) Acetic acid to Tertiary butyl Alcohol(2-Methyl-2-Propanol)
22. Complete the following equation's:
 - a) Ca(CH₃COO)₂ + Δ/Heat → ?
 - b) CH₃COOH + Cl₂/P → ?
 - c) 2CH₃CHO + NaOH → ?
23. Identify A, B & C.
$$\text{CH}\equiv\text{CH} + \text{H}_2\text{SO}_4/\text{HgSO}_4 \rightarrow \text{A} + \text{K}_2\text{Cr}_2\text{O}_7/\text{H}_2\text{SO}_4 \rightarrow \text{B} + \text{CH}_3\text{OH}/\text{H}^+ \rightarrow \text{C}$$
24. Account for the following
 - a) In the preparation of aldehyde by the oxidation of primary alcohol's the aldehydes is distilled out as it is formed.
 - b) Phenyl methyl ether reacts with HI to form methyl iodide and Phenol and not Phenyl iodide and methyl alcohol .

- c) In straight chain aliphatic carboxylic acid the one with even number of carbon atoms has a higher boiling point than the one with odd number of carbon atoms immediately above and below it.
25. Give examples for the following:
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| a) Cannizaro reaction | b) Aldol Condensation |
| c) Transesterification | d) Clemmenson Reduction |
| e) Wolff Kishner Reduction | f) Rosenmund Reduction |
| g) Hell Volhard Zelinsky reaction. | |
26. Give industrial method for the preparation of Formic Acid and Acetic Acid.
27. Give a method each for the preparation of Benzaldehyde and Acetophenone.
28. How will you convert Ethyl Acetate into
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| a) Ethyl Alcohol | b) Acetyl Chloride |
| c) Acetamide | d) Acetic Acid. |
29. Write names and structures of products formed in the following reaction
- Reactions of acetyl chloride with H_2 gas in presence of Pd as catalyst.
 - Oxidation of Toluene with chromic oxide in acetic anhydride.
 - Toluene and Acetyl chloride in presence of $AlCl_3$ and what is the reaction called.
 - Dehydration of propanol in presence on Cu at $300^\circ C$.
 - addition of HCN to Acetone.
30. Describe the following:
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| a) Acetylation | b) Kolbes Electrolysis |
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31. Distinguish between:
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| a) Acetaldehyde and propanone | b) Ethyl Alcohol and Acetic acid |
| c) Phenol and Benzoic acid. | |
32. How are the following compounds prepared?
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| a) Diethyl ether from Ethyl Iodide | b) Benzaldehyde from Benzyl Chloride |
| c) Acetophenone from Benzene. | d) 2- Propanol from propanone. |
33. How will you convert:
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| a) Propanoic acid to Acetic acid. | b) Acetophenone to ethyl Benzene. |
| c) Acetophenone to benzoic acid. | d) Anisole to Nitro Anisole. |
| e) Propanoic acid to propanol. | f) Acetaldehyde to isopropyl alcohol. |
34. Give the structures and names of products when Benzaldehyde is treated with:
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| a) Conc. HNO_3 and Conc. H_2SO_4 . | b) Cl_2 in presence of $FeCl_3$. |
| c) Fuming H_2SO_4 . | |
35. A liquid 'X' having molecular formula $C_6H_{12}O_2$ is hydrolysed with H_2O in presence of acid to give a carboxylic acid 'Y' and alcohol 'Z'. Oxidation of 'Z' with chromic oxide gives 'Y'. What are the structures of 'X' 'Y' & 'Z'?
36. How are Aldehydes and Ketones prepared from
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| a) Alcohol's | b) Carboxylic acid halides |
| c) Alkenes. | d) Alkynes. |
37. Discuss the Nucleophilic addition reaction of aldehydes and Ketones.
38. Discuss the general methods of preparation of acylhalides.
39. Write equations showing how benzoic acid may be prepared from:
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| a) Benzyl alcohol. | b) Benzaldehyde |
| b) Toluene. | d) Benzyl Chloride. |
40. What happens when aldehydes and Ketones are treated with Grignard Reagent and the product is hydrolysed.