CHEMISTRY

BOOKS - KALYANI CHEMISTRY (ENGLISH)

ALCOHOLS, PHENOLS AND ETHERS

Intext Questions

1. Give the common names of the following alcohols :

$CH_3(CH_2)_4OH$

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2. Give the common names of the following alcohols :

$H_2C = CH.CH_2OH$

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3. Give the common names of the following alcohols :

$(C_2H_5)_3COH$

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4. Give the IUPAC names of the following alcohols :

$-CH_3OH$

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5. Give the common names of the following alcohols :

$(CH_3)_2CHCH_2OH$

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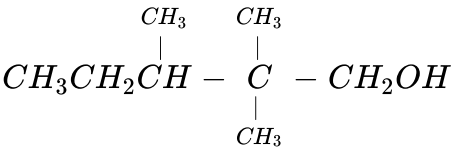
6. Give the common names of the following alcohols :



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7. Name the following alcohols by carbinol system:

$(CH_3)_3C.CH_2OH$

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8. Name the following alcohols by carbinol system:

$HO.CH_2CH_2CH_2CH_2Ph$

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9. Name the following alcohols by carbinol system:

$$(CH_3)_2\underset{\underset{Ph}{|}}{C}OH$$

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10. Name the following alcohols by carbinol system:

$$Ph.\,CH_2OH$$

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11. Name the following alcohols by carbinol system:

$$H_2C = CH - \underset{\underset{OH}{|}}{CH} - CH_3$$

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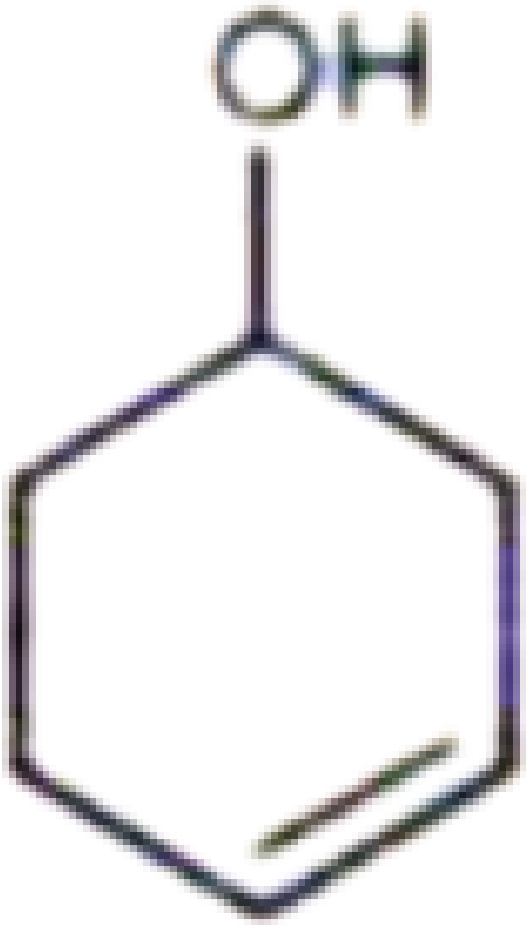
12. Give the IUPAC names of the following alcohols :



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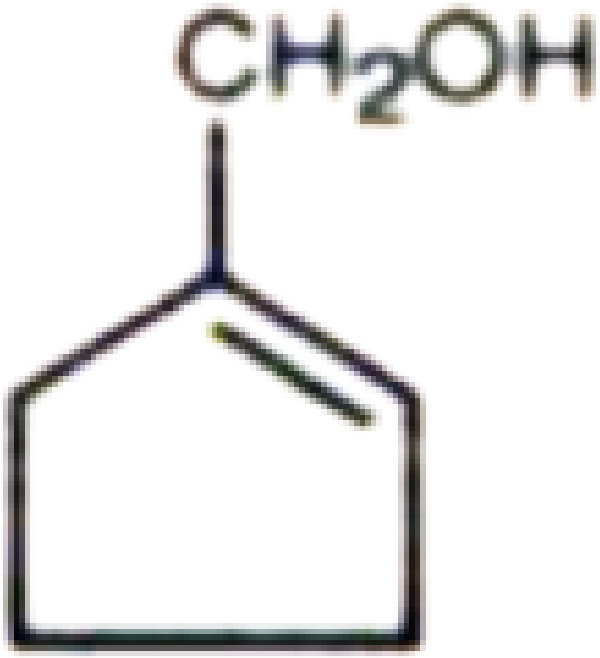
13. Give the IUPAC names of the following alcohols :



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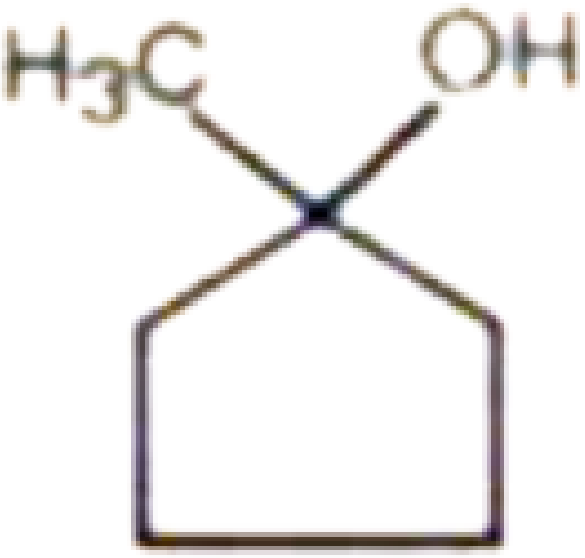
14. Give the IUPAC names of the following alcohols :



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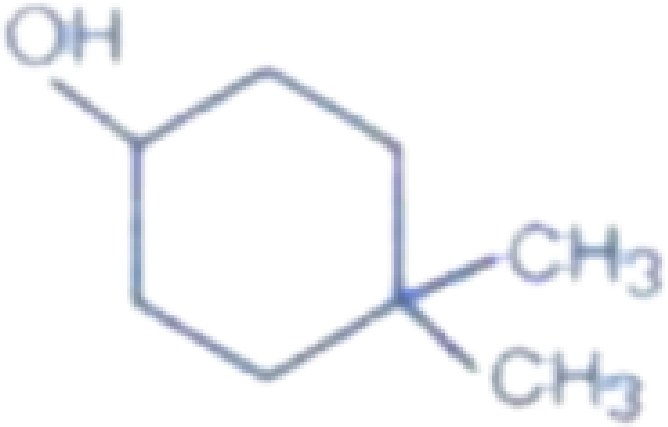
15. Give the IUPAC names of the following alcohols :



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16. Give the IUPAC names of the following alcohols :

$$CH_3(CH_2)_3 - \underset{\underset{OH}{|}}{CH} - CH(CH_3)_2$$

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17. Give the IUPAC names of the following alcohols :

$HOCH_2(CH_2)_2CH_2Ph$

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18. Draw the structures of all isomeric alcohols of molecular formula $C_5H_{12}O$ and give their IUPAC names

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19. Arrange compounds in each set according to specified order and give reasons for your answer.

Increasing order of boiling point.

(a) $C_3H_8, C_2H_5OH, (CH_3)_2O, CH_3CHOH.CH_2OH$

(b) 3-pentanol, n-pentane, 2,2-dimethylpropanol.

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20. Arrange compounds in each set according to specified order and give reasons for your answer.

Increasing order of solubility in water.

$C_6H_5CH_2OCH_3, C_6H_5CH_2CH_2CH_3,$

$p-CH_3C_6H_4COOH, p-OHC_6H_4CH_2OH$

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21. Which out of the following has the highest boiling point ?

$(i)C_2H_5OH \quad (ii)C_2H_5Br \quad (iii)CH_3OH$

$(iv)C_3H_6 \quad (v)CH_3OCH_3.$

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22. Why it is not possible to obtain a halide by reacting ROH with X^- ?

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23. Compare the acidities of H_2O and C_2H_5OH.

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24. Arrange $1^\circ, 2^\circ, 3^\circ$ liquid alcohols in decreasing order of acidities.

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25. Arrange the $1^\circ, 2^\circ$ and 3° alcohols in increasing order of basicities.

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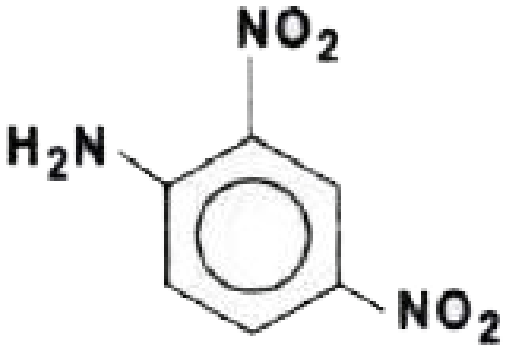
26. Write IUPAC names of the following compounds:



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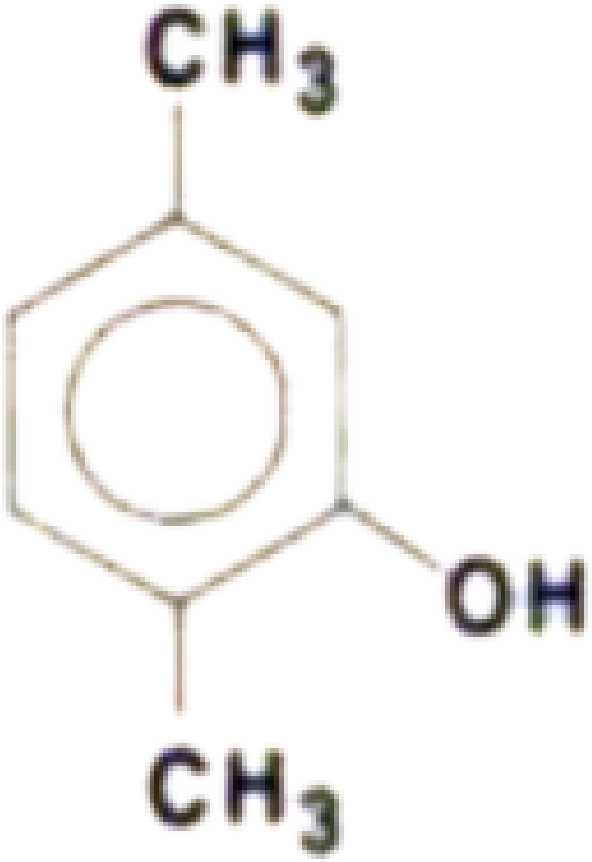
27. Give the IUPAC names of the following compounds :



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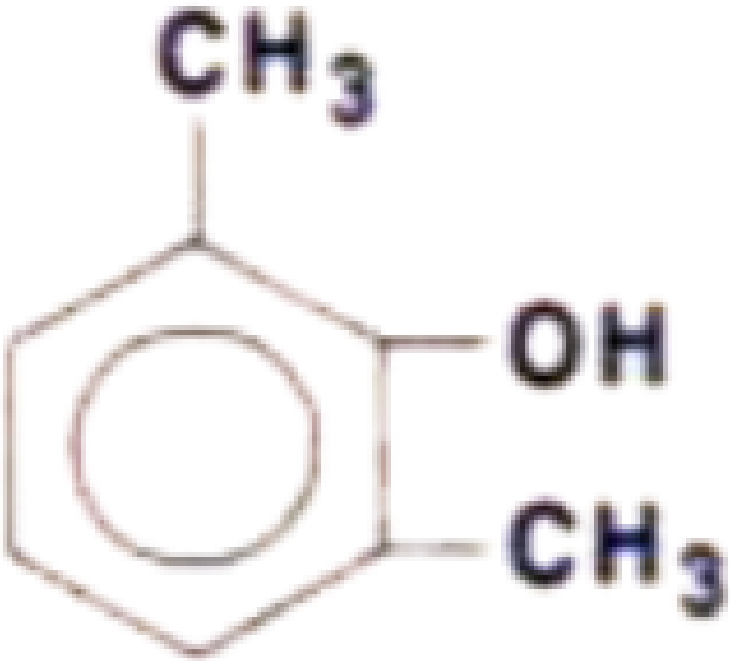
28. Give the IUPAC names of the following compounds :



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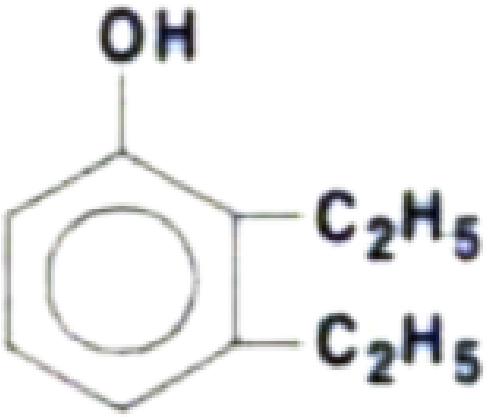
29. Give the IUPAC names of the following compounds :



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30. Give the structural formula of the following compounds:

Resorcinol

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31. Give the structural formula of the following compounds:

2-Naphthol

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32. Give the structural formula of the following compounds:

1-Naphthol

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33. Give the structural formula of the following compounds:

5-Methyl-2-nitrophenol

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34. Give the structural formula of the following compounds:

3-Methyl-4-nitrophenol.

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35. What happens when phenol reacts with benzenediazonium chloride?

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36. Arrange the following in the decreasing order of their acid strength, ethanol, p-nitrophenol, phenol.

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37. Which of the following has more acid strength than the other:

p-cresol and m-cresol

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38. Which of the following has more acid strength than the other:

o-Nitrophenol and m-Nitrophenl

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39. Which of the following has more acid strength than the other:

2,4-dinitrophenol and 2, 4, 6-Trinitrophenol

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40. Which out of the following substituent increases the acid strength of phenol.

- CN or -NH_2

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41. Draw the structural formula of Anisole.

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42. Draw the structural formula of Divinyl ether.

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43. Draw the structural formula of o-Nitrophenetole.

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44. Draw the structural formula of Di-isopropyl ether.

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45. Write the IUPAC names of :

$C_2H_5OC(CH_3)_3$.

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46. Write the IUPAC names of:

$CH_3OCH_2CH_2OCH_2CH_3$

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47. Write the IUPAC names of :

$C_6H_5OCH_2CH_3$

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48. Write the structural formula of isomeric ethers having molecular formula $C_4H_{10}O$.

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49. Write the IUPAC names of :

$C_2H_5OC(CH_3)_3$.

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50. Write the IUPAC names of:

$CH_3OCH_2CH_2OCH_2CH_3$

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51. Write the IUPAC names of :

$C_6H_5OCH_2CH_3$

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Exercise Part I Objective Questions

1. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3$, $ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Benzyl alcohol and phenol can be distinguished by using ..... reagent.

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2. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3ZnCl_2$, more, less, aldehydes, ketones,

Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Methyl alcohol is ..... toxic than ethanol.

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3. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet,

green)

Boiling points of alcohols are ..... than those of the corresponding alkanes.

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4. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

The catalytic dehydrogenation of secondary alcohols yields .....

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5. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

A mixture of conc. HCl and anhydrous $ZnCl_2$ is called ..... reagent.

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6. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones,

Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Amongest the three isomers of nitrophenols, the one that is least soluble in water is .....

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7. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate,

perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Ethanol when heated with conc. H_2SO_4 at 443 forms .....

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8. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Methyl alcohol is ..... for drinking purposes.

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9. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Tertiary alcohols can ..... oxidised easily.

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10. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones,

Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Phenol is ..... because of ..... of its conjugate base.

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11. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet,

green)

Phenol on ..... readily gives picric acid because the - OH group is ..... directing.

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12. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

The alcohols containing two - OH groups are called .....

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13. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

The higher boiling points of alcohols as compared to isomeric ethers are due to the existence of ..... between their molecules.

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14. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance

stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Phenols are ..... acidic than alcohols.

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15. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate,

perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Phenol gives a ..... colouration with ferric chloride.

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16. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

When ether is brought in contact with ....., a peroxide results.

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17. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

With PCl_5 ethers form.....

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18. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones,

Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Diethyl ether on heating with conc. HI gives two molecules of.....

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19. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet,

green)

Diethyl ether on warming with conc. H_2SO_4 gives.....

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20. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Ethers are..... derivatives of water.

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21. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Ethers act as Lewis base due to the presence of.....on oxygen.

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22. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene,

diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet, green)

Ether on treatment with excess of chlorine in presence of sunlight gives.....

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23. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.

(Monohydric, dihydric, trihydric, nitration, sulfonation, resonance stabilizaton, acidic, basic, $FeCl_3 ZnCl_2$, more, less, aldehydes, ketones, Tollens' reagent, Luca's reagent, o-nitrophenol, p-nitrophenol, ethene, diethyl ether, fit, unfit, be, not be, O_2, Cl_2, alkyl halides, oxonium, hydronium, alkyl, lone pairs of electrons, ethyl iodide, ethyl hydrogen sulfate, perchlorodiethyl ether, methyl iodide, ethyl hydrogensulfate, perchlorodiethyl ether, methyl iodide, dialkyl, hydrogen bonding, violet,

green)

Ether forms.....salts with concentrated acids at low temperature.

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24. Match the following :

(i)	Propane-1, 2, 3-triol	(a)	Bakelite
(ii)	Power alcohol	(b)	Denatured alcohol
(ii)	Methylated spirit	(c)	Terylene
(iv)	Ethane-1-2-diol	(d)	absolute ethanol + Petrol
(v)	Phenol	(e)	Dynamite

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25. Match the following:

(i)	Heating of alkyl halide and sodium alkoxide	(a)	Complex of ether with Lewis acid
(ii)	Lewis base	(b)	Combination of ether with inorganic acid
(iii)	Oxonium salt	(c)	Willamson synthesis
(iv)	Etherate	(d)	Ether
(v)	Tetrahydrofuran	(e)	Cyclic ether

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Exercise Part I Objective Questions Choose The Correct Alternative

1. An example of a compound with a functional group - O - is

A. Acetic acid

B. Ethanol

C. Diethyl ether

D. Methyl acetate.

Answer: C

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2. The central oxygen atom in ether is

A. sp hybridized

B. sp^2 hybridized

C. sp^3 hybridized

D. sp^3d^2 hybridized

Answer: C

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3. Ethyl alcohol has much higher boiling point than ether because

A. molecular weight of ether is higher

B. molecular weight of alcohol is lower

C. of hydrogen bonding between the molecules of alcohol

D. molecular weight of alcohol is higher

Answer: C

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4. The boiling point of ethyl alcohol should be less than that of

A. Propane

B. Formic acid

C. Dimethyl ether

D. None of the above.

Answer: B

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5. Order of reactivity of alcohols towards sodium metal is

A. Primary $>$ secondary $>$ tertiary

B. Primary $<$ secondary $<$ tertiary

C. Primary $<$ secondary $>$ tertiary

D. Primary $>$ secondary $<$ tertiary

Answer: A

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6. In the following reaction, 'X' refers to the compound:

$$HCHO + CH_3MgI \xrightarrow[\text{ether}]{\text{dry}} \text{Intermediate} \xrightarrow[H^+ / H_2O]{HCl} 'X'$$

A. CH_3OH

B. CH_3CH_2OH

C. CH_3COCH_3

D. CH_3OCH_3

Answer: B

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7. To prepare 2-propanol from methylmagnesium bromide, the other chemical required is

A. HCHO

B. CH_3CHO

C. C_2H_5OH

D. $O = C = O$

Answer: B

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8. n-propyl alcohol and isopropyl alcohol are examples of

A. chain isomerism

B. position isomerism

C. tautomerism

D. functional group isomerism.

Answer: B

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9. Compound 'A' with the formula C_3H_8O on vigorous oxidation produces an acid $C_3H_6O_2$. 'A' is

A. a tertiary alcohol

B. a secondary alcohol

C. a primary alcohol

D. not necessarily an alcohol

Answer: C

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10. When ethyl hydrogensulphate is heated at $140^\circ C$ with excess of alcohol, the product formed is

A. ethane

B. ethylene

C. diethyl ether

D. diethyl sulfate

Answer: C

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11. The compound that reacts fastest with Lucas reagent at room temperature is

A. butan-1-ol

B. butan-2-ol

C. 2-methylpropan-1-ol

D. 2-methylpropan-2-ol

Answer: D

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12. The reaction of Lucas reagent is fast with

A. $(CH_3)_3COH$

B. $(CH_3)_2CHOH$

C. $CH_3(CH_2)_2OH$

D. CH_3CH_2OH

Answer: A

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13. Which of the following reaction conditions is used for the conversion of ethanol to ethylene?

A. conc. $H_2SO_4 / 70^\circ C$

B. dil. $H_2SO_4 / 140^\circ C$

C. dil. $H_2SO_4 / 100^\circ C$

D. conc. $H_2SO_4 / 170^\circ C$

Answer: D

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14. Monochlorination of toluene in sunlight followed by hydroysis with aq. NaOH yiedls

A. o-Cresol

B. m-Cresol

C. 2,4-Dihydroxytoluene

D. Benzyl alcohol

Answer: D

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15. How many alcohos with molecular formula $C_4H_{10}O$ are chiral in nature?

A. 1

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

16. What is the correct order of reactivity of alcohols in the following reaction ?

$$R-OH+HCl \xrightarrow{ZnCl_2} R-Cl+H_2O$$

A. $1^\circ > 2^\circ > 3^\circ$

B. $1^\circ < 2^\circ > 3^\circ$

C. $3^\circ > 2^\circ > 1^\circ$

D. $3^\circ > 1^\circ > 2^\circ$

Answer: C

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17. CH_3CH_2OH can be converted into CH_3CHO by..... .

A. catalytic hydrogenation

B. treatment with $LiAlH_4$

C. treatment with pyridinium chlorochromate

D. treatment with $KMnO_4$

Answer: C

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18. The process of converting alkyl halids into alcohols involves

A. addition reaction

B. substitution reaction

C. dehydrohalogenation reaction

D. rearrangement reaction.

Answer: B

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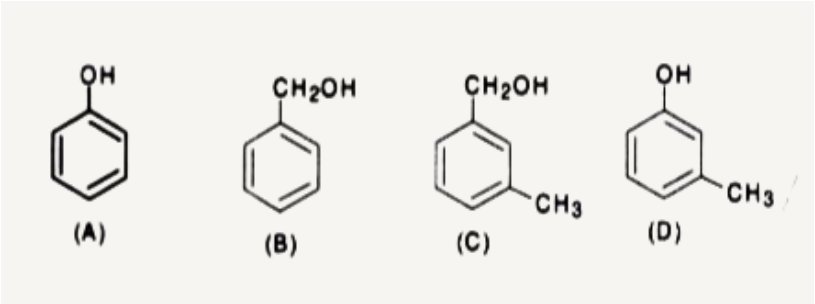
19. Which of the following compounds is aromatic alcohol ?



A. A,B,C,D

B. A,D

C. B,C

D. A

Answer: C

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20. Give IUPAC name of the compound given below.

$$CH_3 - \underset{\underset{Cl}{|}}{CH} - (CH_2) - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_3$$

A. 2-Chloro-5-hydroxyhexane

B. 2-Hydroxy-5-chlorohexane

C. 5-Chlorohexane-2-ol

D. 2-Chlorohexan-5-ol

Answer: C

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21. IUPAC name of m-cresol is..... .

A. 3-Methylphenol

B. 3-Chlorophenol

C. 3-Methoxyphenol

D. Benzene-1,3-diol

Answer: A

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22. IUPAC name of the compound $CH_3 - \underset{CH_3}{\underset{|}{CH}} - OCH_3$ is..... .

A. 1-Methoxy-1-methylethane

B. 2-Methoxy-2-methylethane

C. 2-Methoxypropane

D. Isopropylmethyl ether

Answer: C

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23. Which of the following species can act as the strongest base ?

A. $^{\Theta}OH$

B. $^{\Theta}OR$

C. $^{\Theta}OC_6H_5$

D. 

Answer: B

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24. Which of the following compounds will react with sodium hydroxide solution in water ?

A. C_6H_5OH

B. $C_6H_5CH_2OH$

C. $(CH_3)_3COH$

D. C_2H_5OH

Answer: A

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25. Phenol is less acidic than

A. ethanol

B. o-nitrophenol

C. o-methylphenol

D. o-methoxyphenol

Answer: B

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26. Which of the following is most acidic ?

A. Benzyl alcohol

B. Cyclohexanol

C. Phenol

D. m-Chlorophenol

Answer: D

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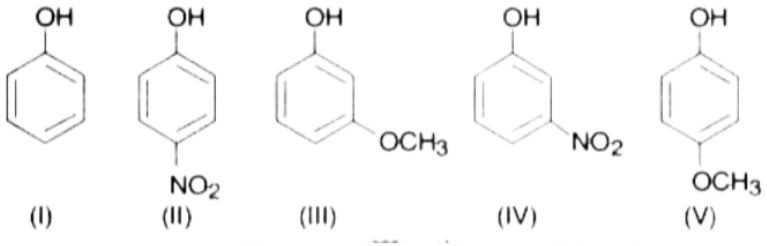
27. Mark the correct order of decreasing acid strength of the following compounds



(I) (II) (III) (IV) (V)

A. $(V) > (IV) > (II) > (I) > (III)$

B. $(II) > (IV) > (I) > (III) > (V)$

C. $(IV) > (V) > (III) > (II) > (I)$

D. $(V) > (IV) > (III) > (II) > (I)$

Answer: B

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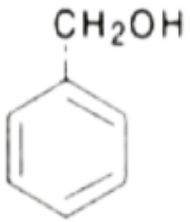
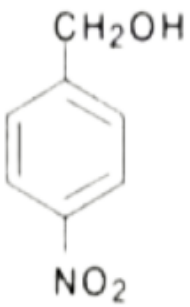
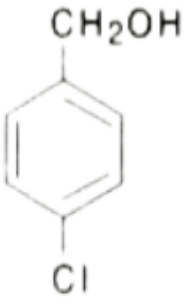
28. Mark the correct increasing order of reactivity of the following compounds with HBr/HCI.



(I)



(II)



(III)

A. $(I) < (II) < (III)$

B. $(II) < (I) < (III)$

C. $(II) < (III) < (I)$

D. $(III) < (II) < (I)$

Answer: C

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29. Arrange the following compounds in increasing order of boiling point.

Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

A. Propan-1-ol, butan-2-ol, butan-1-ol, pentan-1-ol

B. Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

C. Pentan-1-ol, butan-2-ol, butan-1-ol, propan-1-ol

D. Pentan-1-ol, butan-1-ol, butan-2-ol, propan-1-ol

Answer: A

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30. The reaction $C_2H_5ONa + C_2H_5I \rightarrow C_2H_5OC_2H_5 + NaI$ is called

A. Hoffmann's reaction

B. Williamson synthesis

C. Wurtz synthesis

D. Kolbe synthesis

Answer: B

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31. Diethyl ether on heating with excess of HI yields

A. C_2H_5OH

B. C_2H_5I

C. C_2H_4

D. C_2H_6

Answer: B

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32. When diethyl ether is heated with conc. sulfuric acid under pressure, it forms

A. Propanoic acid

B. Acetic acid

C. Ethyl alcohol

D. Acetic acid

Answer: C

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33. When vapours of ethyl alcohol are passed over Al_2O_3 at $250^\circ C$, it forms

A. Ethyl alcohol

B. Ethane

C. Diethyl ether

D. Glycol

Answer: C

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34. Tert. butyl chloride on treatment with sodium alkoxide yields

A. An ether

B. An alkene

C. An alcohol

D. An alkane

Answer: B

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35. Diethyl ether on treatment with Cl_2 in presence of sunlight gives

A. Trichlorodiethyl ether

B. Perchlorodiethyl ether

C. Trichloroacetaldehyde

D. 1, 1,4-dichlorodiethyl ether.

Answer: B

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36. Complete combustion of ether gives?

A. C_2H_5OH

B. CO_2 and H_2O

C. C_2H_4

D. C_2H_2

Answer: B

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37. Which of the following pairs of reagents will not form ether?

A. $C_2H_5Br + C_2H_5ONa$

B. $C_2H_5Br + C_6H_5ONa$

C. $C_2H_5Br + (CH_3)_2CHONa$

D. $C_2H_5Br + CH_3COONa$

Answer: D

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38. According to Lewis concept of acids and bases, ethers are

A. Neutral

B. Acidic

C. Basic

D. Amphoteric

Answer: C

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39. Oxygen atom of ether is

A. Very active

B. Replaceable

C. Active

D. Comparatively inert

Answer: D

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40. Williamson synthesis is used to prepare

A. Alcohols

B. Ethers

C. Ketones

D. Aldehydes

Answer: B

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41. Sometimes explosion may occur while distilling ether. It may be due to the presence of

A. Oxides

B. Alcohols

C. Peroxides

D. Chloroform

Answer: C

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42. Diethyl ether is soluble in

A. Water

B. Dilute HCl

C. Conc. H_2SO_4

D. Conc. KOH

Answer: C

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43. Ethoxyethane does not react with

A. HI

B. Conc. H_2SO_4

C. Na

D. PCl_5

Answer: C

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44. Which of the following statement is correct?

A. C_2H_5Br reacts with C_2H_5ONa to form diethyl ether

B. C_2H_5Br reacts with AgCN to form ethyl cyanide

C. C_2H_5Br reacts with alc. KOH to form C_2H_5OH

D. C_2H_5Br on treatment with Na gives C_2H_5OH

Answer: A

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45. Intermolecular hydrogen bonds are not present in ?

A. CH_3COOH

B. $C_2H_5NH_2$

C. CH_3CH_2OH

D. CH_3OCH_3

Answer: D

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46. When methyl iodide is heated with sodium ethoxide, it forms?

A. CH_3OH

B. $C_2H_5OC_2H_5$

C. CH_3OCH_3

D. $CH_3OC_2H_5$

Answer: D

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47. Diethyl ether can be decomposed with

A. HI

B. NaOH

C. $KMnO_4$

D. H_2O

Answer: A

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48. Diethyl ether absorbs oxygen to form

A. Acetic acid

B. Ether peroxide

C. Ether suboxide

D. Ethane

Answer: B

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49. Ethers in contact with air for a long time form peroxides. The presence of peroxide in ether can be tested by adding Fe^{2+} ions in it and then

A. KCNS is added

B. $SnCl_2$ is added

C. $HgCl_2$ is added

D. KI is added

Answer: A

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50. Product C in the reaction

$C_2H_5Br \xrightarrow[(\text{aqueous})]{NaOH} A \xrightarrow{Na} B \xrightarrow{CH_3I} C$ will be

A. Propane

B. Ethyl iodide

C. Ethane

D. Ethyl methyl ether

Answer: D

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51. Williamson synthesis is an example of

A. nucleophilic addition

B. electrophilic addition

C. electrophilic substitution

D. nucleophilic substitution reaction

Answer: D

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52. 2-Bromopentane is heated with potassium ethoxide in ethanol. The major product obtained is

A. 2-ethoxypentane

B. pentene-1

C. trans-pentene-2

D. cis-pentene-2

Answer: A

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Exercise Part I Objective Questions Correct The Following Statements

1. All monohydric alcohols are primary alcohols.

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2. Excess of ethanol on heating with sulfuric acid at 413 K forms ethene.

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3. All alcohols are equaly miscible with water.

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4. Primary, secondary and tertiary alcohols on oxidation either give an aldehyde or a ketone which on further oxidation give carboxylic acid with the same number of carbon atoms in all the cases.

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5. Phenol is a stronger acid than carbonic acid. (True/False)

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6. Secondary alcohols can be prepared by the reduction of ketones with zinc and hydrochloric acid.

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7. Primary alcohols when heated with copper at 573 K form alkenes.

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8. Ethyl alcohol has a lower boiling point than dimethyl ether.

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9. The catalytic dehydrogenation of primary alcohols yields a ketone.

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10. Assertion: The relative ease of dehydration of alcohols following order:

Tretiary $>$ secondary $>$ Primary

Reason : Formation of carbocation is the slowest step of reaction.

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11. Ethers are soluble in water.(True/False)

Watch Video Solution

12. Boiling point of dimethyl ether is higher than that of the ethanol.

Watch Video Solution

13. Ethers are non inflammable.

Watch Video Solution

14. Ethers act as Lewis acids.

Watch Video Solution

15. Williamson synthesis is an example of

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Exercise Part Ii Descriptive Questions Very Short Answer Questions

1. What are alcohols ?

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2. How alcohols differ from inorganic hydroxides?

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3. Name the types of isomerism shown by alcohols.

Watch Video Solution

4. Name the lowest molecular weight alcohol which is optically active.

Watch Video Solution

5. Write IUPAC name of aspirin.

Watch Video Solution

6. Write the IUPAC name of the following compound:

$$H_3C - \underset{\underset{CH_3}{|}}{C} = \underset{\underset{Br}{|}}{C} - CH_2 - OH$$

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7. Give the IUPAC name of the following compound:

$$H_2C = CH - \underset{\underset{OH}{|}}{CH} - CH_2 - CH_2 - CH_3$$

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8. Give the structural formula and IUPAC names of the isomers with the molecular formula C_3H_8O.

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9. Arrange propan-1-ol, propan-2-ol and methoxyethane in the increasing order of their boiling points.

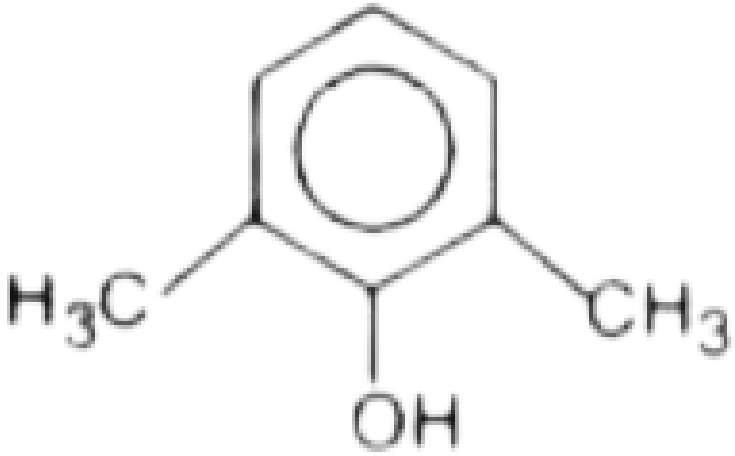
Watch Video Solution

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

$$C_2H_5OH, \underset{\underset{OH}{|}}{CH_2} - \underset{\underset{OH}{|}}{CH_2}, \underset{\underset{OH}{|}}{CH_2} - \underset{\underset{OH}{|}}{CH_2} - \underset{\underset{OH}{|}}{CH_2}$$

Watch Video Solution

11. Write IUPAC name of



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12. Phenol has smaller dipole moment than methanol. Why?

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13. How is that alcohol and water are miscible in all proportions?

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14. Of the two hydroxy organic compounds ROH and R'OH, the first one is basic and the other is acidic. How is R different from R'OH?

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15. Which of the following will have higher boiling point and why?

CH_3NH_2 or CH_3OH

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16. How will you convert ethanol to into ethylene?

Watch Video Solution

17. What is the order of dehydration of primary, secondary and tertiary alcohols?

Watch Video Solution

Watch Video Solution

18. Arrange the following in order of decreasing acid strength:

CH_3OH, H_2O, C_6H_5OH

Watch Video Solution

19. Name the only primary alcohol which gives iodoform test.

Watch Video Solution

20. Arrange the following in order of decreasing acidic strength:

H_2O, CH_3OH, butan-1-ol, butan-2-ol, and 2-methylpropan 2-ol.

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21. What is the major product obtained when butan-2-ol is heated with conc. H_2SO_4 at 443 K?

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22. Which structural isomer of $C_4H_{10}O$ cannot be dehydrogenated by copper at 573K?

Watch Video Solution

23. What products are obtained when ethylalcohol is heated with conc. H_2SO_4 at (i) 383 K (ii) 413 K and (iii) 443 K?

Watch Video Solution

24. Arrange the following in order of increasing reactivity to wards Luca's reagent: (i) Butan-1-o! (ii) Butan-2-ol (iii) 2-Methylpropan-2-ol

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25. Glycerol (propane-1, 2, 3-triol) is more viscous than ethylene glycol (ethane-1, 2-diol).

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26. Why ethanol has higher boiling point than C_2H_5Br?

Watch Video Solution

27. Arrange the following in the increasing order of acidity:

ethanol, ethanoic acid, 4-nitrophenol, phenol.

Watch Video Solution

28. Out of the primary, secondary and tertiary alcohols, which one is resistant to oxidation ?

Watch Video Solution

29. Name one reagent which is used for the distinction of primary, secondary and tertiary alcohols.

Watch Video Solution

30. Why are the lower members of alcohols soluble in water while the higher members are not?

Watch Video Solution

31. What is the function of anhydrous $ZnCl_2$ in Luca's test ?

Watch Video Solution

32. How primary, secondary and tertiary alcohols differ in their reaction with Luca's regent (1 : 1 mixture of HCl and anhydrous $ZnCl_2$).

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33. How will you distinguish between propan-1-ol and propan-2-ol by a chemical test?

Watch Video Solution

34. How will you distinguish between methanol and ethanol.

Watch Video Solution

35. Discuss briefly, the relative rates of reaction of HBr with respect to primary, secondary and tertiary alcohols.

Watch Video Solution

36. Which of the isomeric butyl alcohols gives the iodoform test?

Watch Video Solution

Watch Video Solution

37. Arrange the compounds A to D which have roughly the same molecular weight in order of decreasing boiling points.

(A) $CH_3CH_2CH(OH)CH_2CH_2CH_3$

(B) $CH_3(CH_2)_5CH_3$

(C) $CH_3CH_2C(OH)(CH_3)_2$

(D) $CH_3(CH_2)_5OH$

Watch Video Solution

38. How will you distinguish between the following pairs of alcohols by a chemical test?

$CH_2 = CHCH_2OH$ and $CH_2 = CH - CH_2CH_2OH$

Watch Video Solution

39. How will you distinguish between the following pairs of alcohols by a chemical test?

$CH_3(CH_2)_3OH$ and $CH_3CH = CH - CH_2OH$

Watch Video Solution

40. What is rectified spirit ?

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41. What is absolute alcohol ?

Watch Video Solution

42. What is usually added to ethyl alcohol to make it unfit for drinking purposes?

Watch Video Solution

43. What is methylated spirit or denatured alcohol?

Watch Video Solution

44. What is 'Power alcohol'?

Watch Video Solution

45. Why can't rectified spirit be converted into absolute alcohol by simple distillation ?

Watch Video Solution

46. Name any two reagents used for bringing about the oxidation of alcohols.

Watch Video Solution

47. What is the main product obtained when vapours of tert.-butyl alcohol are passed over copper at 573K?

Watch Video Solution

48. Why boiling points of phenols are higher than those of the corresponding aromatic hydrocarbons and alkyl halides?

Watch Video Solution

49. Give one reaction to show that phenol is acidic in character.

Watch Video Solution

50. Name the phenol with molecular formula C_7H_8O which on treatment with Br_2 water readily gives a precipitate of $C_7H_5OBr_3$.

Watch Video Solution

Watch Video Solution

51. Phenol is an acid but does not react with sodium bicarbonate solution.Why?

Watch Video Solution

52. Name the major product formed when sodium phenoxide is heated with CO_2 at 400 Kunder 4-7 atm. pressure. What is the name of the reaction?

Watch Video Solution

53. Phenol is heated with chloroform and NaOH at 340 K. What is the product formed ? Also give the name of the reaction involved.

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54. How many sigma bonds are present in 3-methylphenol.

Watch Video Solution

55. What is an enzyme ? Name two enzymes used in the preparation of alcohol from sucrose.

Watch Video Solution

56. Answer the following questions :

What is fermentation ?

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57. Mention an industrial product manufactured from methanol.

Watch Video Solution

58. Mention two important uses of methanol.

Watch Video Solution

59. Give the structural formula and name of the product of following reaction : Phenol is treated with aqueous bromine.

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60. How is phenol obtained from aniline ?

Watch Video Solution

61. How is phenolphthalein obtained?

Watch Video Solution

62. Arrange water, ethanol and phenol in increasing order of acidity and give reason for your answer.

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63. Give the IUPAC names of the following compounds

$CH_3OCH(CH_3)_2$

Watch Video Solution

64. Give the IUPAC names of the following compounds

$CH_2 = CH - OCH_3$

Watch Video Solution

65. Give the IUPAC names of $C_2H_5 - O - C_3H_7$

Watch Video Solution

66. Give the IUPAC names of $C_2H_5OC(CH_3)_3$

Watch Video Solution

67. Draw the structure of Phenetole.

Watch Video Solution

68. Draw the structure of Divinyl ether .

Watch Video Solution

69. Write the IUPAC name of diethyl ether. How will you obtain it from ethanol ?

Watch Video Solution

70. What is the hybridization of oxygen atom in ethers?

Watch Video Solution

71. Name the various types of isomerism exhibited by ethers.

Watch Video Solution

72. Give the structural formulae of 2-Propoxy-2-propane.

Watch Video Solution

73. Give the structural formulae of Perchlorodiethyl ether.

Watch Video Solution

74. Name the pair of alkyl halide and alkoxide for the preparation of ethyl tert-butyl ether.

Watch Video Solution

75. Write the reaction between tert-butyl-chloride and sodium ethoxide.

Watch Video Solution

76. What happens when diethyl ether is exposed to air and light for a long time?

Watch Video Solution

77. How would you detect the presence of peroxide in the old samples (kept for a long time) of ethers?

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78. How can we prevent the formation of peroxides in ethers ?

Watch Video Solution

79. How ethers can be freed from peroxides?

Watch Video Solution

80. Name the reagent used to convert bromoethane to ethoxyethane or diethyl ether.

Watch Video Solution

81. In absence of kerosene oil, can we store sodium in diethyl ether or ethyl alcohol or anhydrous hexanol ?

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82. What happens when diethyl ether is treated with PCl_5 ?

Watch Video Solution

83. Complete and balance the following chemical equation:

$C_2H_5OC_2H_5 + Cl_2 \xrightarrow{\text{Sunlight}} \ldots\ldots\ldots\ldots + HCl$

Watch Video Solution

84. Write the name of the product when tert.butyl methyl ether is heated with conc. H_2SO_4.

Watch Video Solution

85. Give one chemical test to distinguish between diethyl ether and n-Butyl alcohol.

Watch Video Solution

Watch Video Solution

86. Name two cyclic ethers.

Watch Video Solution

87. How ether fire is extinguished ?

Watch Video Solution

88. Why ether fire cannot be extinguished with water?

Watch Video Solution

89. Why ethers possess a net dipole moment even if they are symmetrical in structure?

Watch Video Solution

90. Why sodium metal cannot be used for drying alcohol?

Watch Video Solution

91. How do you account for the miscibility of ethoxyethane with water?

Watch Video Solution

92. Why is sulfuric acid not used during the reaction of alcohols in the conversion of an alcohol to the alkyl iodide?

Watch Video Solution

93. Phenyl methyl ether reacts with HI to give phenol and methyl iodide and not iodobenzene and methyl alcohol. Why?

Watch Video Solution

94. How would you convert ethanol to ethene?

Watch Video Solution

95. Draw the structure of 2, 6-dimethylphenol.

Watch Video Solution

96. Write the chemical equation for the preparation of phenol from benzene using oleum and sodium hydroxide.

Watch Video Solution

97. Explain the following with an example for each :

(i) Kolbe's reaction

(ii) Reimer-Tiemann reaction

(iii) Williamson ether synthesis

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98. Write the IUPAC name of the following compound:

$$CH_3 - O - CH_2 - \underset{\underset{CH_3}{|}}{CH} - CH_3$$

Watch Video Solution

99. Of the two alcohols, (a) $CH_2 = CH - CH_2OH$ and (b) $CH_2 = CH - CH_2 - CH_2OH$, which one will react more easily with conc. HCl in the presence of $ZnCl_2$?

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100. An alkoxide ion is a stronger base than hydroxide ion. Justify.

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101. What happens when ethyl chloride is treated with aqueous KOH?

Watch Video Solution

102. Ethanol is soluble in water. Why?

Watch Video Solution

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

4-nitrophenol, phenol, 2,4,6-trinitrophenol.

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104. Which of the following isomers is more volatile :

o-nitrophenol or p-nitrophenol ?

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Exercise Part Ii Descriptive Questions Short Answer Questions

1. What are alcohols ? How are they classified ?

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2. How many types of isomerism exist in alcohols ? Give one example of each of them.

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3. Give four methods of preparation of methyl alcohol.

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4. Give the reactions and experimental conditions for the preparation of primary alcohols from the following compounds:

(a) an alkyl hydrogen sulfate

(b) an ester

(c) a primary amine

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5. How does methyl alcohol react with :

(i) Sodium (i) PCl_5 (iii) Acetyl chloride (iv) $Na_2Cr_2O_7 / H_2SO_4$

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6. Write the chemical equations for the preparation of ethanol from the following compounds:

(i) Ethyl bromide (ii) Ethene (iii) Acetaldehyde

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7. Describe the reaction between ethanol and sulfuric acid under different conditions.

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8. Why is it not possible to obtain pure ethanol by fractional distillation ? What general name is given to binary mixture which show deviation from Raoult's law and whose omponents cannot be separted by fractional distillation. How many types of such mixture are there?

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9. Why tertiary alcohols react less rapidly with metallic sodium than do primary alcohols ?

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10. Write the structural formula of the main product formed when:

Methyl magnesium iodide reacts with water.

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11. Write the structural formula of the main product formed when:

Methyl alcohol reacts with conc. H_2SO_4 at $140^\circ C$

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12. Write an equation each for the reaction of conc. H_2SO_4 and PCl_5 on ethyl alcohol.

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13. Give the names of the chief products formed and write down the equations when the following substances react:

Ethyl alcohol and sodium

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14. State one relevant observation for the following reaction:

Addition of ethyl alcohol to acetic acid in the presence of concentrated Sulphuric acid.

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15. Indicate a method for the following conversions :

Ethyl alcohol to diethyl ether

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16. Indicate a method for the following conversions :

Ethyl alcohol to acetaldehyde

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17. Indicate a method by which each of the following conversions may be effected. Give one balanced equation for the reaction you choose in each case :

Ethyl alcohol to ethylene

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18. Indicate a method by which each of the following conversions may be effected. Give one balanced equation for the reaction you choose in each case :

Ethyl alcohol to ethyl acetate

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19. How will you distinguish between methanol and ethanol.

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20. Name the isomerism displayed by the two pairs of compounds:

CH_3CH_2OH and CH_3OCH_3

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21. Name the isomerism displayed by the two pairs of compounds:

$CH_3CH_2CH_2OH$ and $CH_3CHOHCH_3$

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22. Mention two important uses of methanol.

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23. Complete the following equation:

$C_2H_5OH + \ldots.. + KOH \rightarrow CHI_3 + \ldots 5KI + 5H_2O$

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24. Give balanced equation and name the product when methyl alcohol reacts with phosphorus pentachloride.

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25. Name two different compounds that can be prepared from ethanol without change in number of carbon atoms indicating the type of reaction used to produce them.

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26. Write the general formula of a Grignard reagent. To what general group of compounds does this reagent belong ?

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27. Write the balanced chemical equation for the preparation of ethanol using a Grignard reagent. Name the reactants used.

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28. Write the balanced chemical equation for the reaction between a Grignard reagent and ethanol. Name the compound formed.

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29. What are the possible organic compounds that can be formed by reacting ethanol with sulfuric acid ?

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30. How is n-propyl alcohol obtained from ethylene? How will you convert this alcohol into propylene and n-hexane?

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31. Convert phenol to phenetole.

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32. Convert C_2H_5OH to $C_2H_5OCH_3$?

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33. Write the structural formulae of the organic molecules A, B, C and D in the following sequence of reactions :

$$A + CH_3MgBr \xrightarrow{H_2O} CH_3CH_2 - \underset{\underset{OH}{|}}{CH} - CH_3 \xrightarrow[-H_2O]{H_2O} B \xrightarrow{Br_2} C \xrightarrow{\text{alc. KOH}} D$$

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34. How would you convert (write chemical equations):

Chlorobenzene to phenol

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35. How would you convert (write chemical equations):

Phenol to 4-bromophenol

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36. How would you convert (write chemical equations):

Phenol to 2-acetoxybenzoic acid.

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37. What products are obtained when primary, secondary and ertiary alcohols are passed over heated copper?

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38. How will you prepare ether by Willamson synthesis ?

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39. How will you synthesise diethyl ether from:

(i) Ethyl alcohol (ii) Ethyl iodide ?

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40. How is peroxide in ether detected and removed ?

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41. What happens when :

Ethyl bromide reacts with sodium ethoxide ?

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42. When vapours of ethyl alcohol are passed over Al_2O_3 at $250^\circ C$, it forms

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43. How does diethyl ether react with :

(i) HI (ii) PCI5?

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44. Write the structural formula of diethyl ether.

(a) Give the IUPAC name of $CH_3 - O - CH_3$.

(b) Indicate a method by which ethanol may be converted to diethyl ether.

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45. Write the equation for the reaction between ethyl chloride and sodium ethoxide.

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46. What is the action of monoiodoethane on sodium ethoxide ?

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47. Indicate a method for the following conversions :

Ethyl alcohol to diethyl ether

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48. Name two organic compounds which have the same molecular formula C_2H_6O. Will they react with phosphorus pentachloride ? If they react, what are the products formed?

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49. What is the IUPAC name of ter-butyl ether? Write one method each for the synthesis and cleavage of ethers. Give chemical equations.

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50. Diethyl ether on heating with excess of HI yields

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51. What happens when :

Anisole is treated with Br_2 in presence of $FeBr_3$ or CS_2 ?

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52. Illustrate with examples the limitations of Williamson synthesis for the preparation of certain types of ethers.

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53. Write the equation of the reaction of hydrogen iodide with: (i) 1-propoxypropane (ii) methoxybenzene and (iii) benzyl ethyl ether.

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54. Explain the fact that in aryl alkyl ethers (i) the alkoxy group activates the benzene ring towards electrophilic substitution and (ii) it directs the incoming substituents to ortho and para positions in benzene ring.

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55. Dimethyl ether is completely soluble in water, but diethyl ether is soluble in water to a small extent.

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56. What products are obtained when ethylalcohol is heated with conc. H_2SO_4 at (i) 383 K (ii) 413 K and (iii) 443 K?

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57. How are the following conversions carried out ? (Write the reactions and conditions in each case):

Ethanol to propan-2-ol

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58. How are the following conversions carried out ? (Write the reactions and conditions in each case):

Phenol to acetophenone.

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59. How are the following conversions carried out ?

Phenol to toluene

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60. How are the following conversions carried out ?

Ethanol to 1, 1- dichloroethane.

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61. How will you convert :

(a) Propene to Propan-1-ol ?

(b) Ethanal to Propan-2-ol ?

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62. Conversion of Phenol into salicylic acid

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63. How are the follwing conversinos carried out?

(i) Benzyl chloride to benzyl alchol,

(ii) Methyl magnesium bromide to 2-methylpropan-2-01.

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64. How are the following conversions carried out ?

Ethylmagnesium bromide to propan-1-ol

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65. How are the following conversions carried out?

(i)Propene to propan-2-ol

(ii) Ethyl chloride to Ethanal

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66. How are the following conversions carried out ?

Phenol to salicyldehyde

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67. How are the following conversions carried out ?

Anisole to phenol (write the reactions only)

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68. How are the following conversions carried out ?

Methylmagnesium bromide to propan-2-ol

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69. (a) Give the mechanism for the formation of ethanol from ethene.

(b) Predict the reagent for carrying out the following conversions:

(i) Phenol to benzoquinone

(ii) Anisole to p-bromoanisole

(iii) Phenol to 2,4.6-tribromophenol

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70. How would you account for the following :

Phenols are much more acidic than alcohols.

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71. How would you account for the following:

The boiling points of ethers are much lower than those of the alcohols of comparable molar mass.

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72. Describe the mechanism of alcohols reacting both as nucleophiles and as electrophiles in their reactions.

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73. Write the equation involved in the following reaction :

(i) Reimer -Tiemann reaction

(ii) Williamson synthesis

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74. Name the reagents which are used in the following conversions :

A primary alcohol to an aldehyde

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75. Name the reagents whch are used in the following conversions :

(i) A primary alcohol to an aldehyde

(ii) Butan-2-one to butan-2-ol

(iii) Phenol to 2, 4, 6-tribromophenol

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76. Name the reagents whch are used in the following conversions :

(i) A primary alcohol to an aldehyde

(ii) Butan-2-one to butan-2-ol

(iii) Phenol to 2, 4, 6-tribromophenol

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77. Write the names of reagents and equations for the preparation of the following ethers by Williamson's synthesis:

(i) 1-Propoxypropane (ii) Ethoxybenzene

(iii) 2-Methoxy-2-methylpropane (iv) 1-Methoxyethane

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78. Why do phenols not give protonation reactions readily?

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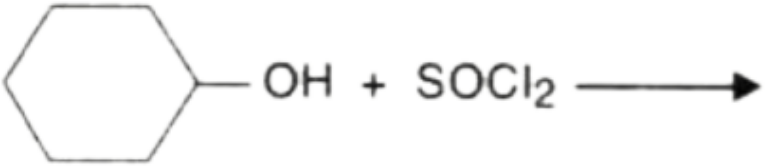
79. Complete the following reaction equations :



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80. Explain the mechanism of the following reactions :

Acid catalysed dehydration of an alcohol forming an alkene.

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81. Explain the mechanism of acid catalysed of an alkene to form corresponding alcohol.

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82. Give reason for the higher boiling point of ethanol in comparison to methoxymethane.

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83. Explain the following observations:

Phenol is more acidic than ethanol.

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84. Explain the following observations:

o-and p-nitrophenols are more acidic than phenol.

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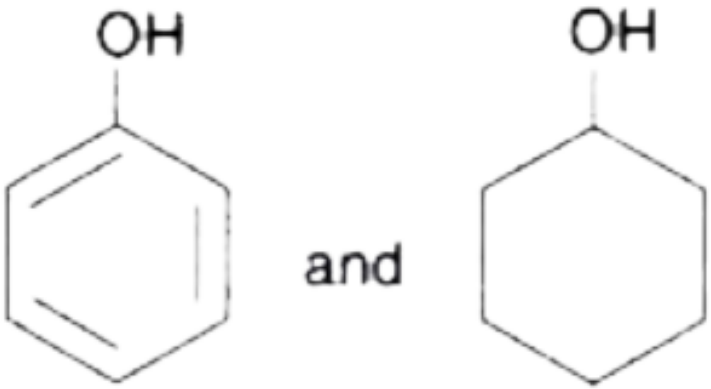
85. Give a chemical test to distinguish between the following pairs of compounds:



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86. Describe the mechanism of the formation of diethyl ether from ethanol in the presence of concentrated sulfuric acid.

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87. Give chemical tests to distinguish between compounds of the following pairs :

Phenol and benzyl alcohol

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88. Give chemical tests to distinguish between compounds of the following pairs :

Butan-2-ol and 2-methylpropan-2-ol

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89. Which is a stronger acid-phenol or cresol ? Explain.

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90. (a) Give mechanism of preparation of ethoxy ethane from ethanol.

(b) How is toluene obtained from phenol?

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91. Explain the following giving one example for each :

(i) Reimer-Tiemann reaction.

(ii) Friedel Craft's acetylation of anisole.

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92. Explain the following giving one example for each :

(i) Reimer-Tiemann reaction.

(ii) Friedel Craft's acetylation of anisole.

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93. How would you obtain

(i). Picric acid (2, 4, 6-trinitrophenol) from phenol,

(ii) 2-Methylpropene from 2-methylpropanol?

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94. How would you obtain :

2-Methylpropane from 2-methylpropanol ?

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95. How would you obtain :

2-Methylpropan-2-ol from methylmagnesium bromide

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96. How would you obtain :

Propan-2-ol from propane

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97. Explain why propanol has higher boiling point than that of the hydrocarbon, butane?

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98. Explain why is ortho nitrophenol more acidic than ortho methoxyphenol ?

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99. Preparation of ethers by acid dehydration of secondary or tertiary alcohols is not a suitable method. Give reason.

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100. Account for the following:

The boiling point of ethanol is higher than that of methanol

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101. Ethers have lower boiling points that their correseponding isomeric alcohols because of

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102. Write the mechanism of hydration of ethene to yield ethanol.

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103. Explain the following with an example for each :

(i) Kolbe's reaction

(ii) Reimer-Tiemann reaction

(iii) Williamson ether synthesis

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104. Write the mechanism of acid dehydration of ethanol to yield ethene.

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105. Write equations of the following reactions:

(i) Friedel-Crafts reaction – alkylation of anisole.

(ii) Nitration of anisole.

(iii) Bromination of anisole in ethanoic acid medium.

(iv) Friedel-Craft's acetylation of anisole.

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106. Alcohols are comparatively more soluble in water than hydrocarbons of comparable molecular masses. Explain this fact.

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107. Explain why is ortho nitrophenol more acidic than ortho methoxyphenol ?

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108. Explain the mechanism of acid catalysed of an alkene to form corresponding alcohol.

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109. Draw the structrue and name the product formed if the following alcohols are oxidized. Assume that an excess of oxidising agent is used.

(i) $CH_3CH_2CH_2CH_2OH$

(ii) 2-butenol

(iii) 2-methyl-1-propanol

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110. Explain the mechanism of the following reaction :

$$CH_3 - CH_2 - OH \xrightarrow[443K]{H^+} CH_2 = CH_2 + H_2O$$

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111. Write the equations involved in the following reactions :

(i) Reimer-Tiemann reaction

(ii) Williamson's ether synthesis

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112. Write the equation involved in the following reaction :

(i) Williamson ether synthesis

(ii)Kolbe's reaction

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113. Write the mechanism of the following reaction :

$$2CH_3CH_2OH \xrightarrow[413K]{\text{Conc. } H_2So_4} CH_3CH_2 - O - CH_2 - CH_3$$

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114. Suggest a reagent for conversion of ethanol to ethanoic acid.

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115. (A)Write the mechanism of the following raction :

$CH_3CH_2OH \xrightarrow{HBr} CH_3CH_2Br + H_2O$

(b) Write the equation involved in Reimer-Tiemann reaction.

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116. Write the equation involved in the following reaction :

(i) Reimer -Tiemann reaction

(ii) Williamson synthesis

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Exercise Part Ii Descriptive Questions Long Answer Questions

1. What are monohydric alcohols and how are they classified? Give any three methods of preparation of ethyl alcohol.

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2. How is methanol obtained from methyl bromide ? How would you convert methyl alcohol into

(i) Formaldehyde

(ii) Methyl chloride

(iii) Sodium methoxide

(iv) Methyl acetate ?

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3. What is fermentation ? Describe the manufacture of ethyl alcohol from molasses and starchy materials.

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4. How is ethyl alcohol prepared ? Give its important properties and uses.

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5. Explain the terms:

(i) Grignard reagent

(ii) Dow process

(iii) Absolute alcohol

(iv) Denatured alcohol

(v) Methylated spirit

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6. (a) How do primary, secondary and tertiary alcohols differ in their behaviour towards oxidising agents.

(b) How will you distinguish between primary, secondary and tertiary alcohols by Victor Meyer's method ?

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7. Name one reagent which is used for the distinction of primary, secondary and tertiary alcohols.

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8. (a) Write the industrial uses of methyl alcohol, ethyl alcohol and phenols.

(b) Convert ethanol to acetaldehyde.

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9. (a) Give one method each for the industrial preparation of:

(i) ethyl alcohol

(ii) phenol

(b) What is the action of each of the following on phenol?

(i) HNO_3 in presence of conc. H_2SO_4

(ii) Br_2 in presence of CS_2 at 278K

(iii) CO_2 at 400K and 4/7 atm. Pressure.

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10. Account for the following:

(i) In reaction involving cleavage of carbon-oxygen bond of alcohols some acid is added to facilitate the reaction.

(ii) The order of reactivity of halogen acids with alcohols is $HI > HBr > HCl$.

(iii) Phenols do not undergo substitution at the carbon of C-OH bond.

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11. (a) Write chemical equations and reaction conditions for the conversion

(i) Ethene to ethanol (ii) Phenol to phenyl ethanoate

(ii) Ethanol to propan-2-ol.

(b) Give an example for each of the following reactions:

(i) Kolbe's reaction (ii) Reimer-Tiemann reaction

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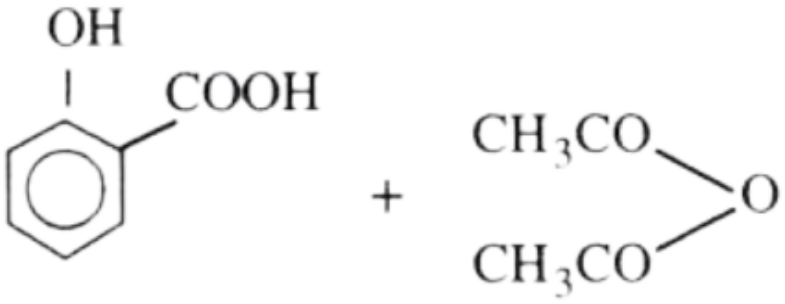
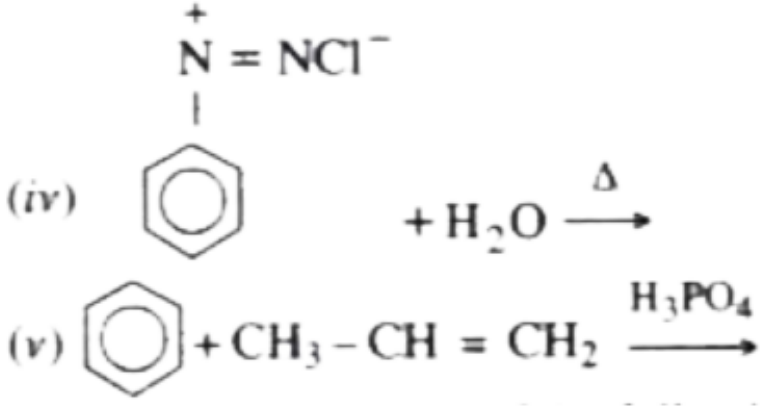
12. Complete the following reactions :

(i) $(CH_3)_2CO \xrightarrow{LiAlH_4}$



(ii)

(iii) $CH_3\underset{\underset{OH}{|}}{CH} - CH_3 + PCl_5 \rightarrow$ (iv)



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13. (a) Give the equations of the following reactions:

(i) Oxidation of propan-1-ol with alkaline $KMnO_4$ solution.

(ii) Propene to propan-2-ol

(iii) Benzyl chloride to benzyl alcohol

(iv) Ethylmagnesium chloride to propan-1-ol.

(b) Write the reactions and their conditions only for the commercial preparation of phenol from cumene.

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14. What are ethers? How are they classified ? Give two methods by which diethyl ether can be prepared from ethanol. Discuss its important properties.

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15. (a) Discuss Williamson method to prepare ethers. Give the limitations of this method.

(b) Under what conditions do ethers form oxonium salts?

(c) Give four important uses of diethyl ether.

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16. Phenyl methyl ether reacts with HI to give phenol and methyl iodide and not iodobenzene and methyl alcohol. Why?

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17. Write the names of reagents and equations for the preparation of the following ethers by Williamson's synthesis:

(i) 1-Propoxypropane (ii) Ethoxybenzene

(iii) 2-Methoxy-2-methylpropane (iv) 1-Methoxyethane

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18. (a) Explain why cleavage of phenyl ethers with HBr always produces phenol and alkyl bromides and not bromobenzene and alkanols.

(b) Give reasons for the following:

(i) The dipole moment of diethyl ether (1.18D) is lower than that of water (1.84D).

(ii) The C-O-C bond angle in ethers is higher than H-O-H angle in water though oxygen is sp3 hybridized in both the cases.

(iii) Dimethyl ether is completely miscible with water but diethyl ether is soluble in water to a small extent.

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19. How can you prepare diethyl ether in the laboratory? State its four physical properties. What is the action of diethyl ether on: (i) Conc. HCl (ii) PCl_5 (iii) Cl_2 (iv) Conc. H_2SO_4.

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20. Give the equations for the following reactions in case of anisole:

(i) Br_2 in ethanoic acid medium.

(ii) Mixture of conc. HNO_3 and conc. H_2SO_4

(iii) Friedel Craft's alkylation

(iv) Friedel Craft's acylation

(v) Conc. HI.

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Isc Examination Questions

1. Write the equation and name the following reaction :

Phenol with acetyl chloride in presence of $AlCl_3$.

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2. How will you convert the following (write the relevant equation):

Phenol to salicylic acid ?

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3. Write the chemical equation for the following reaction and name the main product:

Acetic anhydride with salicylic acid.

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4. Write the structures of the three compounds which have the same molecular formula of C_4H_8O but have different functional groups.

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5. How will you bring about the following conversion ? Diethyl ether to ethanol.

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6. Write the names and structures of three isomers which have the same molecular formula C_4H_8O.

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7. Conversion of Phenol into benzoic acid

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8. Give the name of the following reaction:

$C_2H_5Br + C_2H_5ONa \rightarrow C_2H_5OC_2H_5 + NaBr$

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9. Give balanced chemical equation for the following reaction :

Phenol heated with chloroform and sodium hydroxide.

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10. Give one good chemical test to distinguish between the following pairs of compounds:

1-propanol and 2-propanol.

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11. Identify the reagents W, X, Y and Z.

$$C_6H_6 \xrightarrow{W} C_6H_5SO_3H \xrightarrow{X} C_6H_5ONa \xrightarrow{Y} C_6H_5OH \xrightarrow{Z} C_6H_5OCOCH_3$$

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12. Give balanced chemical equation for the following reaction :

Chlorine is passed through diethyl ether.

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13. (a) Give an example (equation) for each of the following name reaction :

Reimer-Tiemann reaction

(b) Draw a pair of isomers of the following and name the type of isomerism : $C_4H_{10}O$.

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14. How can the following conversion be brought about : Benzene to phenol

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15. Complete the following reaction and name the reaction:

$\ldots\ldots\ldots + 3I_2 + 4KOH \rightarrow CHI_3 + CH_3COOK + 3KI + 3H_2O$

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16. Give balanced equation for the following reaction :

1-butanol and hydrogen chloride.

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17. Name the type of isomerism exhibited by the following pair of compounds:

1-Butanol and 2-methyl-1-propanol.

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18. Give one chemical test to distinguish between ethanol and 2-propanol.

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19. Give balanced equations for the following reactions :

Sodium ethoxide is treated with ethyl bromide.

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20. Give balanced equation for the following name reaction:

Reimer-Tiemann reaction.

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21. Give balanced equation for the following reaction :

Acetyl chloride is treated with ethyl alcohol.

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22. How can the following conversion be brought about?

Chlorobenzene to phenol.

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23. Write the structures of three ethers with molecular formula $C_4H_{10}O$.

Watch Video Solution

24. Give chemical test to distinguish dimethyl ether and ethyl alcohol.

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25. Glycerol (propane-1, 2, 3-triol) is more viscous than ethylene glycol (ethane-1, 2-diol).

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