



## CHEMISTRY

### BOOKS - A N EXCEL PUBLICATION

# ORGANIC CHEMISTRY-SOME BASIC PRINCIPLES AND TECHNIQUES

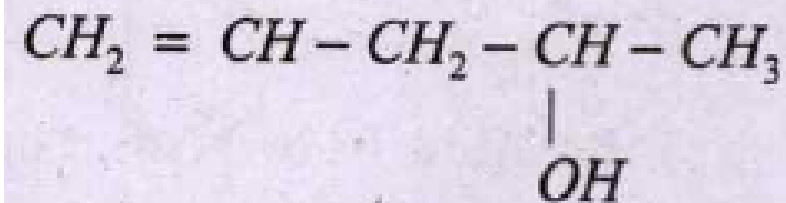
#### Question Bank

1. Give the IUPAC name of the following:



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2. Give the IUPAC name of each of the following: (iv)



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3. Give the structure of the 2,2-Dimethyl propane

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4. Give the structure of the 5-Oxohexanoic acid

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5. Give the structure of the 2-Methyl buta-1,3-diene

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6. Give the structure of the 3,4-Dimethylphenol

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7. What are hybridisation states of each carbon atom in the following compounds?

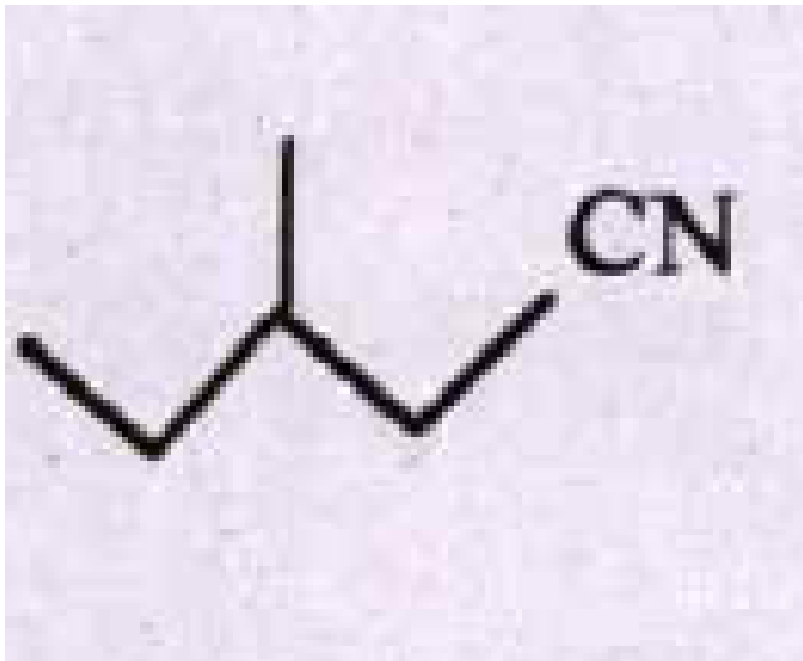
$CH_2 = C = O$ ,  $CH_3CH = CH_2(CH_3)_2CO$ ,  $CH_2 = CHCN$ ,  $C_6H_6$

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8. Write bond line formulae for (i) isopropyl alcohol, (ii) 2, 3-dimethylbutanal, (iii) heptan-4-one

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9. Give the IUPAC name of



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10. Give the IUPAC name of  $Cl_2CHCH_2OH$

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11. Which of the following represents the correct IUPAC name for the compounds concerned? 2,2-Dimethylpentane or 2-Dimethylpentane

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12. Which of the following represents the correct IUPAC name for the compounds concerned? 2,4,7-Trimethyloctane or 2,5,7-Trimethyloctane

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13. Which of the following represents the correct IUPAC name for the compounds concerned? 2-Chloro-4-methylpentane or 4-Chloro-2-methylpentane

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14. Which of the following represents the correct IUPAC name for the compounds concerned? But-3-yn-1-ol or But-4-ol-1-yne

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15. Write the formulae of the first 5 members of homologous series starting with the underlined  $H - \underline{COOH}$

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16. Write the formulae of the first 5 members of homologous series starting with the underlined  $\underline{CH_3COCH_3}$

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17. Write the formulae of the first 5 members of homologous series starting with the underlined  $\underline{CH_2} = CH_2$

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18. Give the condensed and bond line formulae and identify the functional groups present if any for 2,2,4-Trimethylpentane

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19. Give the condensed and bond line formulae and identify the functional groups present if any for 2-hydroxy 1,2,3-propane tricarboxylic acid

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20. Give the condensed and bond line formulae and identify the functional groups present if any for Hexane dial

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21. Which is expected to be more stable,  $O_2NCH_2CH_2O$  or  $CH_3CH_2O$  and why?

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22. Explain why alkyl groups are electron donors when attached to a  $\pi$  system?

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23. Identify the reagents shown in brackets as nucleophile or electrophile  $CH_3COOH + [OH^-] \rightarrow CH_3COO^- + H_2O$

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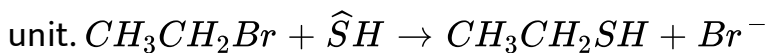
24. Identify the reagents shown in brackets as nucleophile or electrophile  $CH_3COCH_3 + [CN^-] \rightarrow (CH_3)_2C(CN)(OH)$

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25. Identify the reagents shown in brackets as nucleophile or electrophile  $C_6H_6 + [CH_3 - CO] \rightarrow C_6H_5 - CO - CH_3$

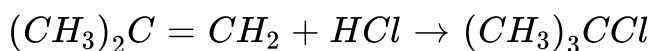
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26. Classify the reactions in one of the reaction type studied in this



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27. Which type of reaction is given below.



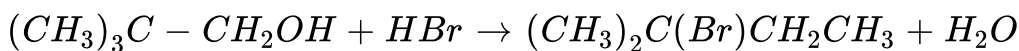
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28. which type of reactions is given below.



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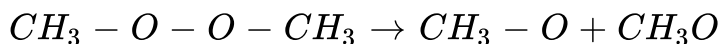
29. Which type of reaction is given below.



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30. For the following bond cleavages, use curved arrows to show the electron flow and classify each as homolysis or heterolysis.

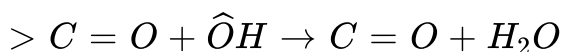
Identify the reactive intermediates produced in



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31. For the following bond cleavages, use curved arrows to show the electron flow and classify each as homolysis or heterolysis.

Identify the reactive intermediates produced in





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32. Explain 'Inductive effect' and electromeric effect. Which electron displacement explains the following correct orders of acidity of caboxylic acids?  $Cl_3COOH$  gr  $Cl_2CHCOOH$  gr  $ClCH_2COOH$



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33. Explain 'Inductive effect' and electromeric effect. Which electron displacement explains the following correct orders of acidity of caboxylic acids?

$CH_3CH_2COOH$  gr  $(CH_3)_2CHCOOH$  gr  $(CH_3)_3COOH$



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**34.** Why is nitric acid added to sodium extract before adding silver nitrate for testing halogens?

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**35.** Explain the reason for the fusion of an organic compound with metallic sodium for testing nitrogen, sulphur and phosphorus.

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**36.** Name a suitable method for separation of components from a mixture of camphor and calcium sulphate.

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**37.** Explain why an organic liquid vapourises at a temperature below its boiling point in steam distillation.

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**38.** Will  $CCl_4$  give a precipitate of  $AgCl$  on heating with  $AgNO_3$ ?  
Why?

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**39.** Why is solution of  $KOH$  used to absorb  $CO_2$  gas evolved during estimation of carbon in an organic compound?

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40. Why is it necessary to use acetic acid and not  $H_2SO_4$  for acidification of sodium extract for testing sulphur using lead acetate test?

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41. An organic compound contains 69% carbon and 4.8% hydrogen and the remaining is oxygen. Calculate the mass of  $CO_2$  and  $H_2O$  formed when 0.20 g of the compound is subjected to combustion?

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42. A sample of 0.50 g of an organic compound was treated according to Kjeldahl's method. Ammonia evolved was absorbed in 50 mL of 0.5 M  $H_2SO_4$ . The residual acid required 60 mL of 0.5 M

NaOH solution for neutralisation. Find the percentage composition of nitrogen in the compound.

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**43.** 0.3780 g an organic compound gave 0.5740 g AgCl in Carius method. Calculate the percentage of chlorine in it.

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**44.** In Carius method 0.468 g of a compound afforded 0.668 g barium sulphate. Find the percentage of S in the compound.

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45. Fill up the blank. In Lassaigne's test for N, Prussian blue colour is formed due to the formation of .....

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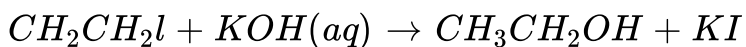
46. The most stable carbocation among  $(CH_3)_2\overset{+}{C}H$ ,  $(CH_3)_3\overset{+}{C}$ ,  $CH_3^+$ ,  $CH_3CH_2^+$  is .....

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47. The best and latest technique for isolation, purification and separation of organic compounds is: a) Crystallisation b) Distillation c) Sublimation d) Chromatography

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48. The following reaction is classified as:



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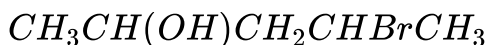
49. Draw the bond line structure of Cyclohexane

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50. Write the bond line structures of 2-Bromobutane

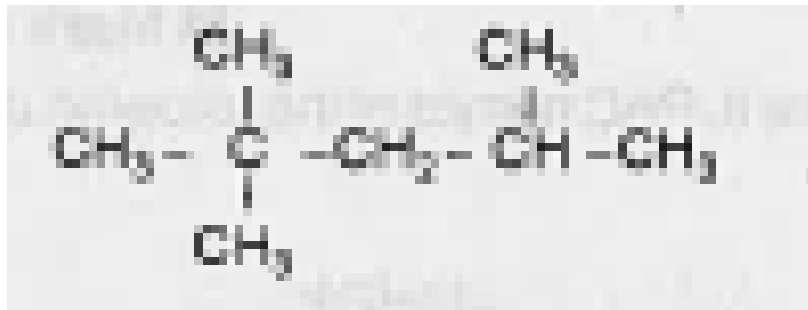
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51. Write the bond line structure of



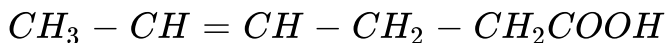
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52. Write the IUPAC names of the following.

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53. The IUPAC name of an organic compound is derived by identifying the functional group and parent hydrocarbon chain,

Write the IUPAC name of

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54. Give the structures of the following compounds. 3-Ethyl-4, 4-dimethylheptane

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55. Give the structures of the following compounds. 6-Methyloctan-3-ol

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56. Detection of elements like nitrogen, halogens and sulphur are done using Lassigne's test. Discuss the chemistry of Lassigne's test for the above elements

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57. Detection of elements like nitrogen, halogens and sulphur are done using Lassigne's test. Discuss the chemistry of Lassigne's test for the above elements

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58. Hybridization influences the bond length and bond enthalpy in organic compounds: Compare the bond length and bond strength of C-H bonds formed by  $sp$  and  $sp^3$  hybridized carbon atoms. Give reason.

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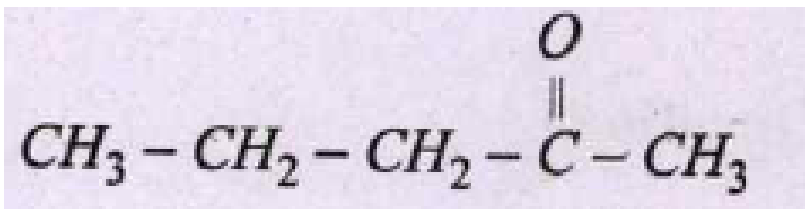
59. How many  $\sigma$  and  $\pi$  bonds are present in the following molecules?  $CH_3 - CH_2 - CH_3$

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60. How many  $\sigma$  and  $\pi$  bonds are present in the following molecules?  $CH_3 - CH = CH_3$

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61. Give the IUPAC names of



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62. Write the general formula of the following homologous series:

alcohol

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63. Write the general formula of the following homologous series:

chloroalkane

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64. A group of organic compounds, each containing a characteristic functional group forms a homologous series.

Give an example for a homologous series.

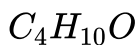
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65. Give the IUPAC name of the following compound:



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66. Write the metamers corresponding to the molecular formula



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67. Give the chemical name of the compound responsible for the blue colour in the Lassaigne's test for nitrogen.

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68. Briefly explain the principle involved in Kjeldahl's method for the estimation of nitrogen.

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69. Carbocations are formed by the heterolytic cleavage of a covalent bond.

a) What is heterolytic bond fission?

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70. Carbocations are formed by the heterolytic cleavage of a covalent bond.

b) Arrange the following carbocations in the increasing order of stability:  $(CH_3)_2CH^+$ ,  $CH_3^+$ ,  $(CH_3)_3C^+$ ,  $CH_3CH_2^+$

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71. Give the complete condensed and bond line formula of chlorocyclohexane.

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72. Give any three types of structural isomers. Give examples.

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73. How is sodium fusion extract prepared? Using this, how will you detect the presence of Nitrogen, Sulphur and Halogen in an organic compound?

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74. Name the method for estimation of Halogen

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75. Represent 1 - Methyl-3- propyl cyclohexane using bond line notation

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76. What is the type of hybridization of C in  $CH_3^+$ ? Also predict its shape.

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77. Name the type of bond fission resulting in the formation of free radicals

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**78.** Organic compounds have to be purified before analysis. Which type of liquids can be purified using distillation under reduced pressure? Suggest an example.

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**79.** Name the two main types of chromatographic techniques based on the principle of differential adsorption

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**80.** In the Lassaigne's test for halogens they are precipitated as

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**81.** In what form is nitrogen estimated in the Dumas method?



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82. Different methods are used to purify organic compounds.

Name any three methods of purification.



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83. On complete combustion, 0.246 g of an organic compound gave 0.198 g of  $CO_2$  and 0.1014 g of  $H_2O$ . Determine the percentage composition of carbon and hydrogen in the compound.



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84. What is a homologous series?



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85. Hyper conjugation is a general stabilising interaction. Write the hyper-conjugative structures of  $(CH_3 - CH_2^+)$  (ethyl cation).

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86. Write the structures of the following organic compounds. 2,5,6-Trimethyloctane. Hexane - 2,4 - dione. 5 - Oxoheptanoic acid.

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87. Draw the structures of the following compounds. a) 2,3 - Dibromo - 1 - phenylpentane b) 4-Ethyl - 1 - fluoro - 2- nitrobenzene

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**88.** Write all possible chain isomers of the compound with molecular formula  $C_5H_{12}$ .

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**89.** Write the complete, condensed and bondline structural formulae of 2-Bromobutane.

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**90.** In the Carius method of estimation of halogen, 0.15g of an organic compound gave 0.12g of AgBr. Find the percentage of Br in the compound.

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**91.** What do you mean by the term Homolytic fission

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**92.** What do you mean by the following terms? a) Homolytic fission  
, b) Heterolytic fission, c) Nucleophiles , d) Electrophiles

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**93.** What do you mean by the following terms? a) Homolytic fission  
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**94.** What do you mean by the following terms? a) Homolytic fission  
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**95.** Various methods for the purification of organic compounds are based on the nature of the compound and impurity present in it. Explain the principle involved in the following methods for the purification a) Distillation, b) Steam distillation



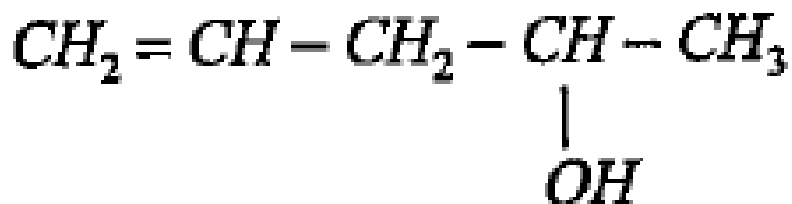
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**96.** Various methods for the purification of organic compounds are based on the nature of the compound and impurity present in it. Explain the principle involved in the following methods for the purification a) Distillation, b) Steam distillation



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97. Write the IUPAC names of the following compounds:



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98. Phenol exhibit resonance. Phenol exhibit resonance.

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99. Predict the directive influence of -OH group in Benzene ring

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**100.** Write the structural formula of the following compound. Pent-4-en-2-ol

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**101.** Write the structural formula of the following compound. 6-Hydroxy heptanal

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**102.** Reagents which attack organic compounds may be classified as electrophiles, nucleophiles and free radicals. Explain nucleophiles and electrophiles with suitable examples.

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**103.** Reagents which attack organic compounds may be classified as electrophiles, nucleophiles and free radicals. Explain nucleophiles and electrophiles with suitable examples.

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**104.** Name the type of the fission of a covalent bond which gives free radicals.

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