

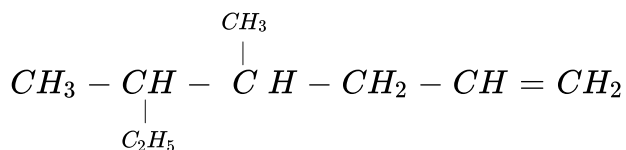
CHEMISTRY

BOOKS - NAGEEN CHEMISTRY (ENGLISH)

ORGANIC CHEMISTRY : SOME BASIC PRINCIPLES AND TECHNIQUES

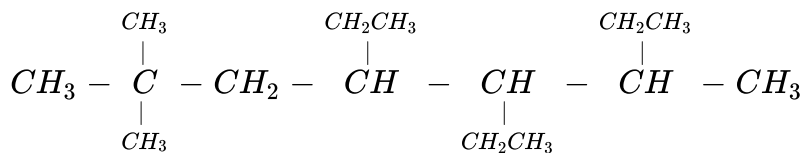
Examples

1. Write the IUPAC name of the following compound:



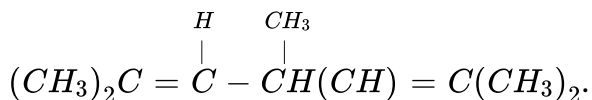
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2. Write the IUPAC names of the following compounds:



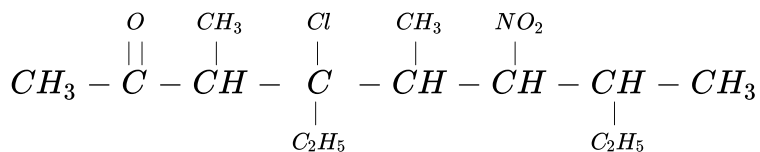
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3. Write the IUPAC names of the following compounds:



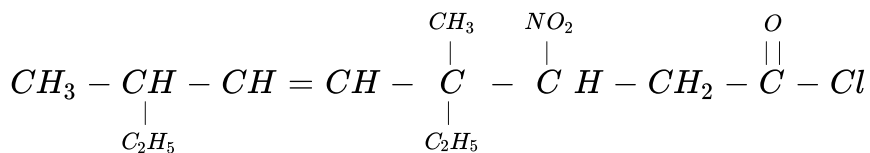
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4. Write the IUPAC name of the following compound:



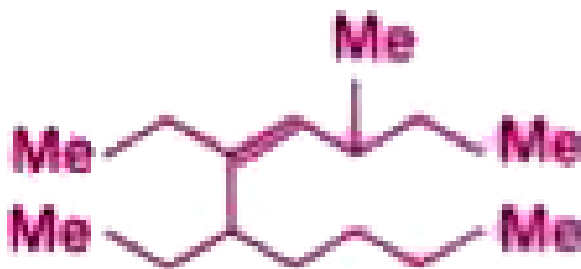
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5. Write the systematic IUPAC name of the following compound.



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6. Give the IUPAC name of the following compound:



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7. Derive the structure of the compound having IUPAC name 3-amino-4-methylpentan -1-oic acid.

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8. 0.29 g of an organic compound were analysed by Liebig's method. The increase in the mass of U-tube and the potash bulbs at the end of the experiment were found to be 0.27 g and 0.66 g respectively. Calculate the percentage of carbon and hydrogen in it.

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9. In Duma's method 0.206 g of an organic compound gave 18.8cm^3 of moist N_2 at 17°C and 760 mm Hg pressure. If aqueous at 17°C is 14.5 mm Hg, calculate the percentage of nitrogen in the given organic compound.

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10. 0.303 g of an organic compound was analysed for nitrogen by Kjeldahl's method. The ammonia evolved was absorbed in 50 ml of 0.1 N

H_2SO_4 . The excess acid required 25 ml of 0.1 N NaOH for neutralisation.

Calculate the percentage of nitrogen in the compound.

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11. 0.25g of an organic compound containing carbon hydrogen and oxygen only were analysed by the combustion method. The increase in the weights of the U tube and the potash bulbs at the end of the operation were found to be 0.15g and 0.1837g respectively. Determine the percentage composition of the compound.

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12. 0.246 g of an organic substance when heated with excess of fuming nitric acid and silver nitrate gave 0.2584 g of silver bromide. Calculate the percentage of bromine in the compound.

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13. In a Carius determination, 0.234 g of an organic substance gave 0.334 g of barium sulphate. Calculate the percentage of sulphur in the given compound

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14. 1.5 g of an organic compound in a quantitative determination of phosphorus gave 2.5090 g of $Mg_2P_2O_7$. Calculate the percentage of phosphorus in the compound.

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15. 0.1092 g of a dibasic acid is exactly neutralized by 21cm^3 of 0.1N NaOH. Calculate the molecular mass of the acid.

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16. 1.26 g of a dibasic acid were dissolved in water and the solution made up to 200 mL. 20 mL of this solution were completely neutralised by 10 mL of $\frac{N}{5}$ NaOH solution. Calculate the equivalent mass and molecular mass of the acid.

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17. 0.76 g of a silver salt of a dibasic acid on ignition gave 0.54 g of silver. Calculate the molecular mass of the acid.

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18. 0.400 g of chloroplatinate salt of a monoacid base on ignition gave 0.125 g of platinum. Find the molecular mass of the base.

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19. 0.2 g of a monobasic acid gave 0.5 g of CO_2 and 0.089 g of H_2O . 0.122 g of the same acid requires 10 mL of 0.1 N NaOH for complete neutralisation. Determine the molecular formula of the compound.

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20. A sample of 0.50 g of an organic compound was treated according to Kjeldahl's method. The ammonia evolved was absorbed in 50 mL of 0.5 M H_2SO_4 . The residual acid required 60 mL of 0.5 M solution of NaOH for neutralisation. What would be the percentage composition of nitrogen in the compound?

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21. A hydrocarbon contains 10.5g of carbon per gram of hydrogen. 1L of vapour of the hydrocarbon at $127^\circ C$ and 1 atm pressure weighs 2.8g. Find the molecular formula of the hydrocarbon.

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22. An organic liquid on analysis yielded the following results:

(i) Elements present: C , H , N and S

(ii) On combustion, C and H were found to be 41.37% and 5.75% respectively.

(iii) On Kjeldahlising, the ammonia obtained from 1.01 g of the substance was neutralised by 11.6 mL of $N-HCl$.

(iv) In the Carius estimation of sulphur, 0.2066 g of the substance resulted in the precipitation of 0.5544 g of $BaSO_4$

(v) 0.1015 g of the liquid, when vaporised displaced 27.96 mL of dry air measured at $15^\circ C$ and 750 mm pressure.

Find the molecular formula of the liquid.

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23. An acid of molecular mass 104 contains 34.6% carbon and 3.85% hydrogen. 3.812 mg of the acid required 7.33 cm of 0.01 N $NaOH$ for neutralisation. Suggest a structure for the acid.



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24. An organic compound containing carbon hydrogen and oxygen contains 52.2 % carbon and 13.04 % hydrogen .Vapour density of the compound is 23 .Its molecular formula will be



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25. The alkyl halide C_4H_9Br (A) reacts with alcoholic KOH and gives an alkene (B) which reacts with bromine to give a dibromide (C). (C) is transformed with sodamide into a gas (D) which forms a precipitate when passed through ammoniacal silver nitrate solution. Give the structural formulae of the compounds (A), (B), (C) and (D) and explain the reactions involved.



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26. A hydrocarbon (A) containing 90% carbon and having V.D. 20 reacts with dil. H_2SO_4 in the presence of H_2SO_4 to give (B). Compound (B) is reduced by $LiAlH_4$ to (C) which on heating with H_2SO_4 gives (D). Compound (A) can be converted into (D) directly by hydrogenation in the presence of deactivated palladium-calcium carbonate catalyst. Identify the compounds (A) to (D) and explain the reactions involved.

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27. Write the structural formula of the compounds having the following IUPAC names:

Butane-2, 3-dione

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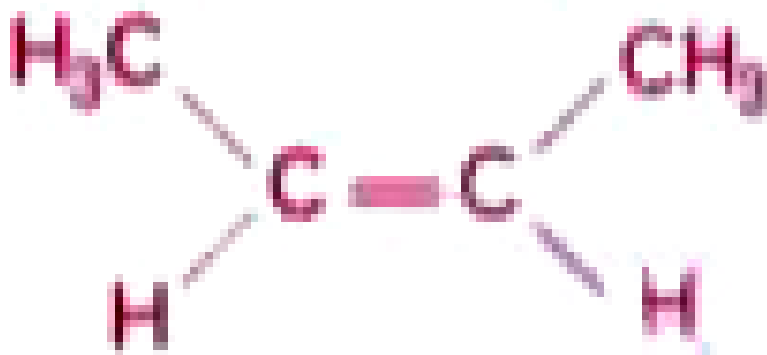
28. What type of salt is Ammonium Chloride?

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29. An organic compound (A) having molecular formula C_2HCl_3O reduces Fehling's solution and on oxidation gives a monocarboxylic acid (B) with molecular formula $C_2HCl_3O_2$. Upon distillation with sodalime, (B) gives a sweet smelling liquid (C) containing 89.12% chlorine. (C) can also be obtained by heating (A) with alkali. Identity (A), (B) and (C) and explain the reactions involved.

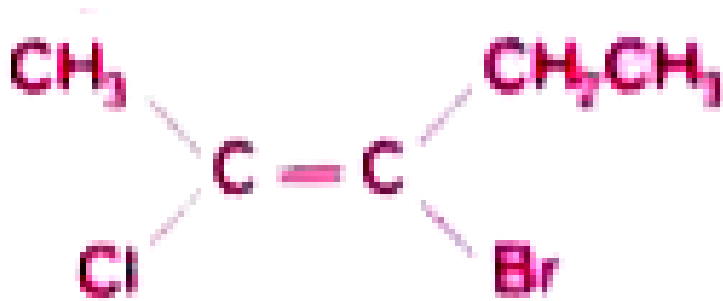
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30. Classify the following as Z or E isomers.



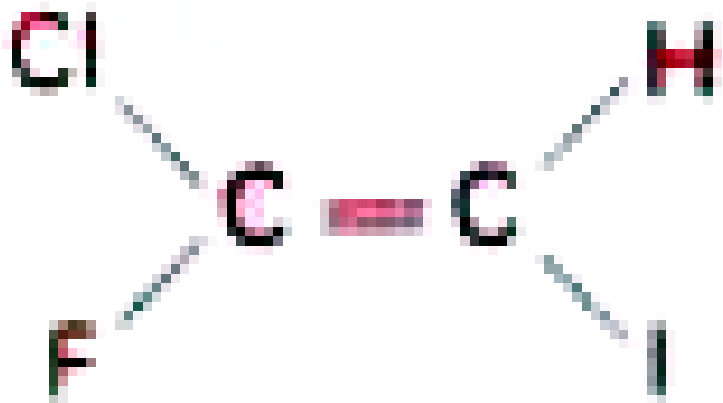
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31. Classify the following as Z or E isomers.



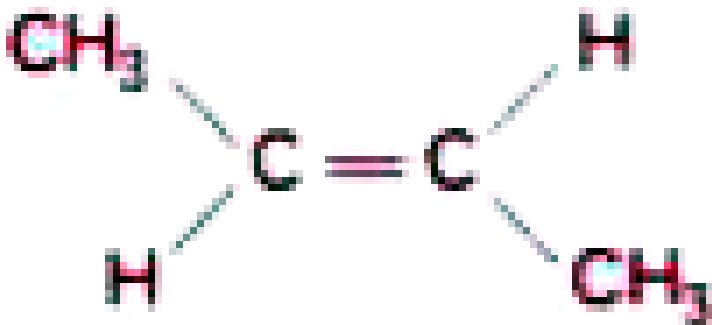
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32. Classify the following as Z or E isomers.



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33. Classify the following as Zor E isomers.



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Review Exercises

1. What is stone leprosy and how is it caused ?

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2. Why does carbon have a greater tendency of catenation than silicon although they belong to the same group of the periodic table?

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3. What do you understand by the terms catenation and isomerism?

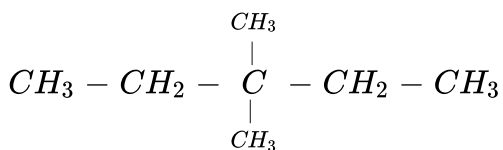
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4. Write the various types of formulae of the following compounds :

Butane, Isobutane, Ethyl alcohol, Methylamine.

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5. Find the types of all the carbon atoms present in the following compound.



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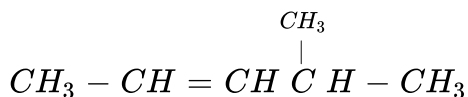
6. Why does propane give two alkyl groups whereas ethane only one?

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7. Write the first five members of alkane series.

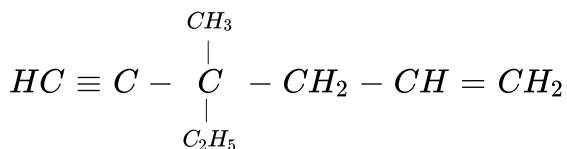
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8. Give the systematic IUPAC names of the following compounds :



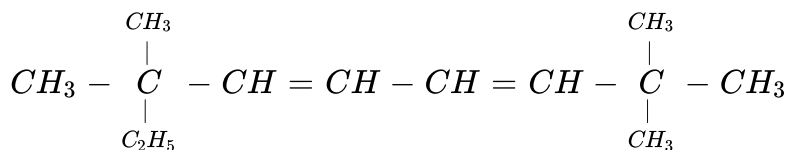
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9. Give the systematic IUPAC names of the following compounds :



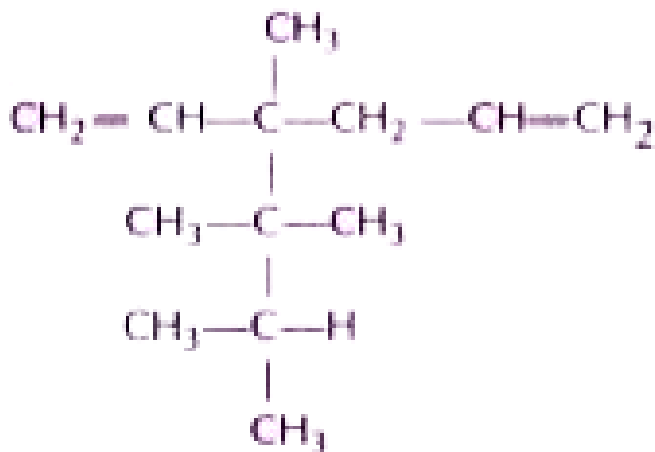
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10. Give the systematic IUPAC names of the following compounds :



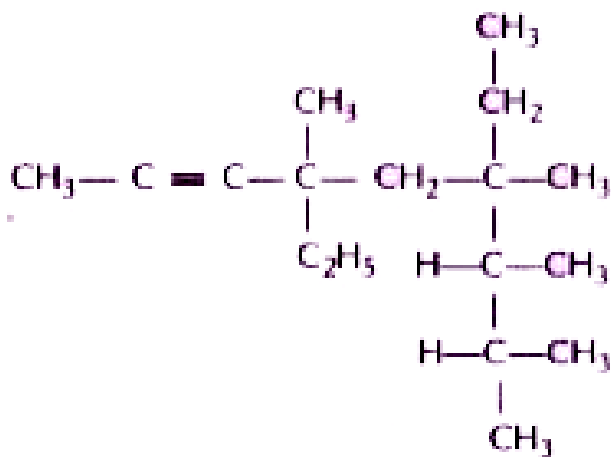
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11. Give the systematic IUPAC names of the following compounds :



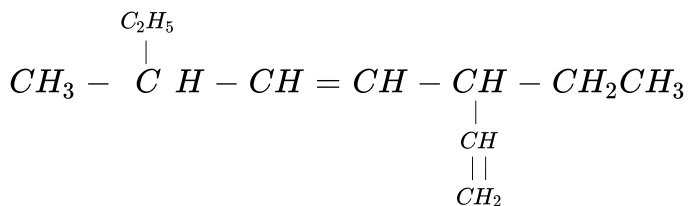
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12. Give the systematic IUPAC names of the following compounds :



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13. Give the systematic IUPAC names of the following compounds :



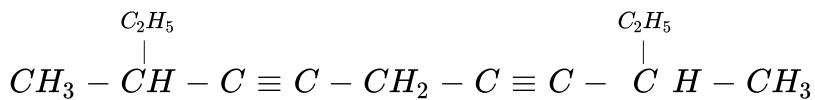
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14. Give the systematic IUPAC names of the following compounds :



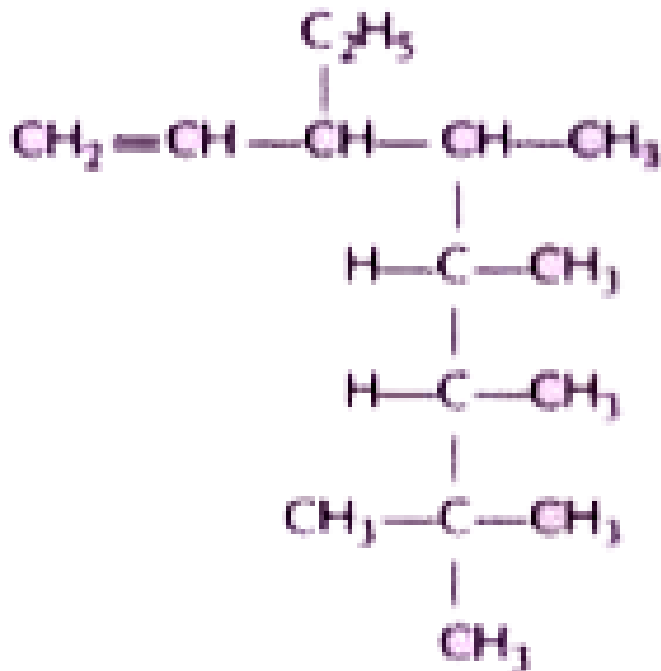
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15. Give the systematic IUPAC names of the following compounds :



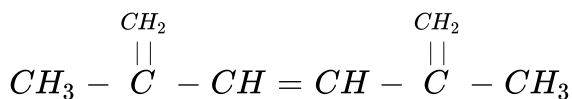
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16. Give the systematic IUPAC names of the following compounds :



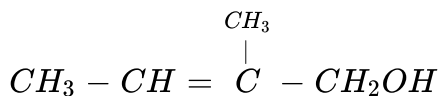
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17. Give the systematic IUPAC names of the following compounds :



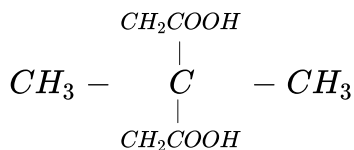
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18. Write the systematic IUPAC names of the following compounds :



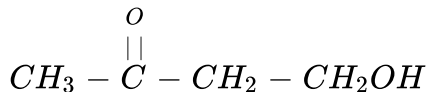
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19. Write the systematic IUPAC names of the following compounds :



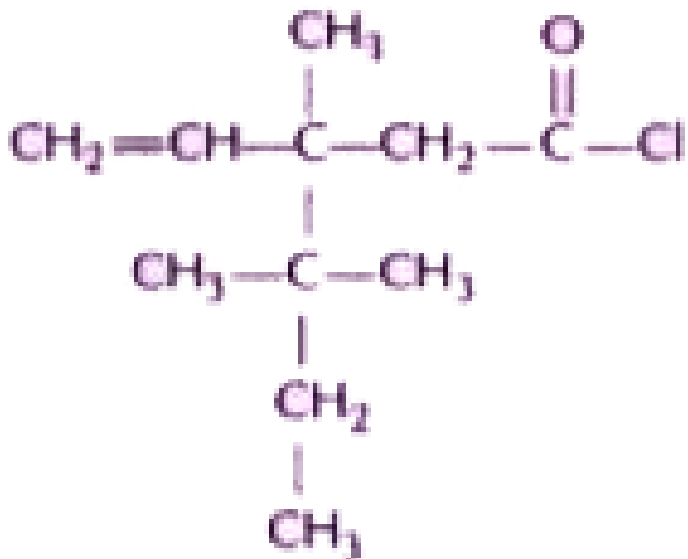
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20. Write the systematic IUPAC names of the following compounds :



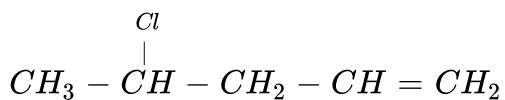
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21. Write the systematic IUPAC names of the following compounds :



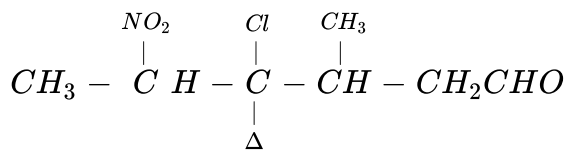
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22. Write the systematic IUPAC names of the following compounds :



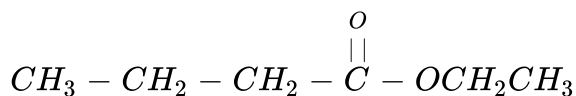
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23. Write the systematic IUPAC names of the following compounds :



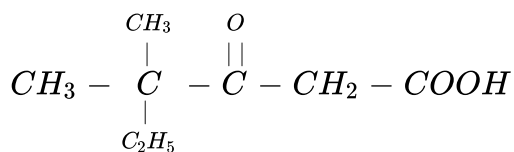
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24. Write the systematic IUPAC names of the following compounds :



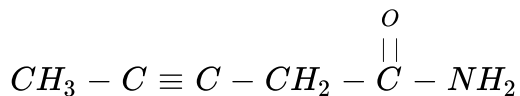
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25. Write the systematic IUPAC names of the following compounds :



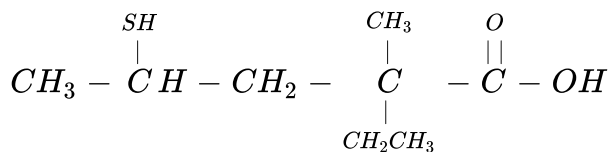
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26. Write the systematic IUPAC names of the following compounds :



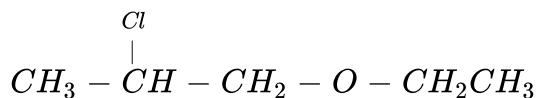
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27. Write the systematic IUPAC names of the following compounds :



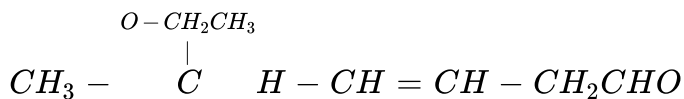
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28. Write the systematic IUPAC names of the following compounds :



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29. Write the systematic IUPAC names of the following compounds :



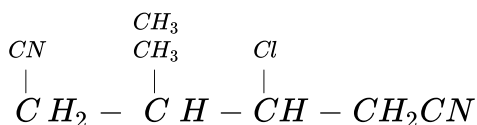
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30. Write the systematic IUPAC names of the following compounds :



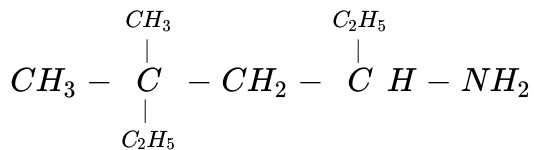
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31. Write the systematic IUPAC names of the following compounds :



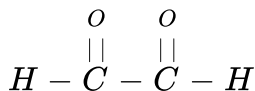
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32. Write the systematic IUPAC names of the following compounds :



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33. Write the systematic IUPAC names of the following compounds :



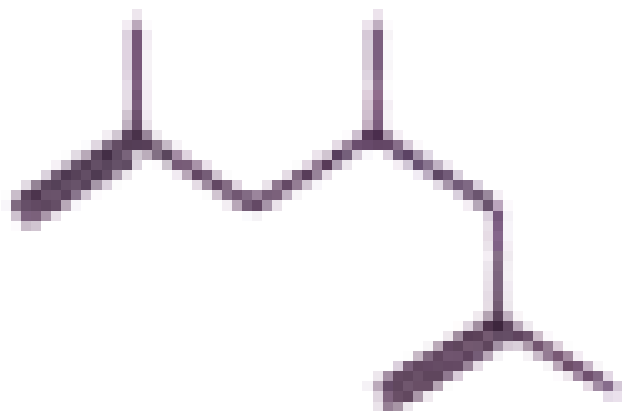
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34. Write the systematic IUPAC names of the following compounds :



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35. Write the systematic IUPAC names of the following compounds :



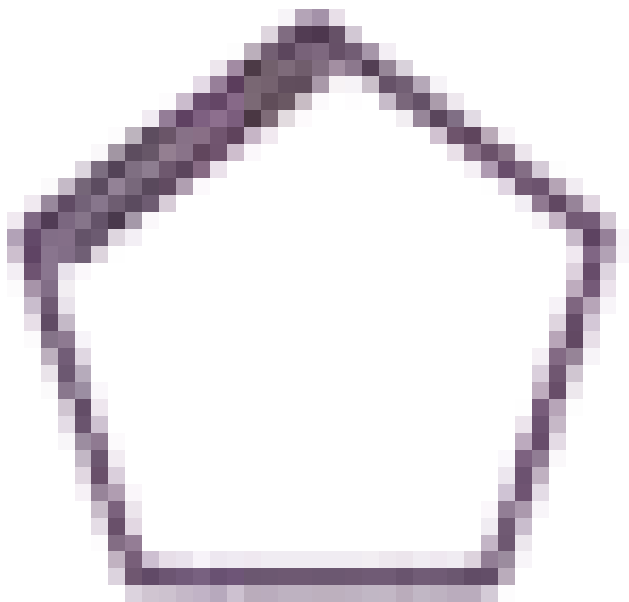
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36. Write the systematic IUPAC names of the following compounds :



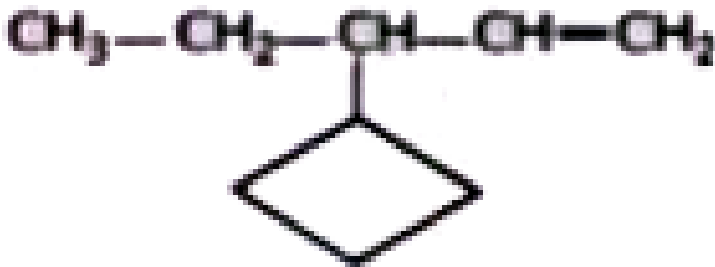
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37. Write the systematic IUPAC names of the following compounds :



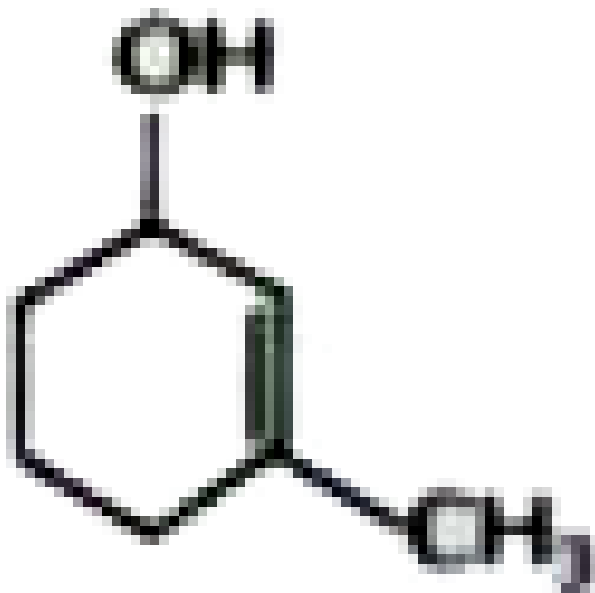
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38. Write the systematic IUPAC names of the following compounds :



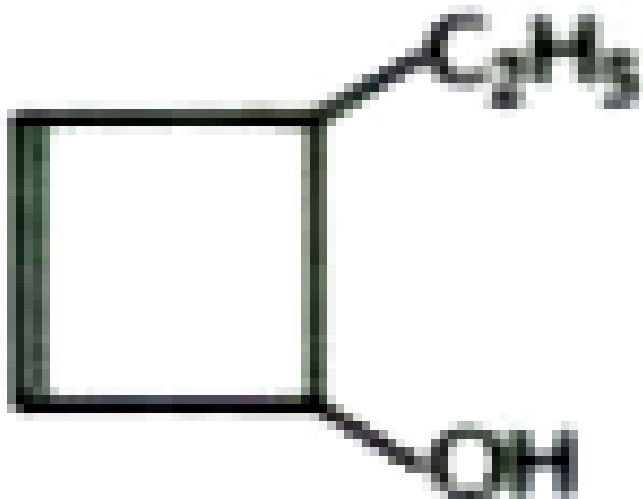
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39. Write the systematic IUPAC names of the following compounds :



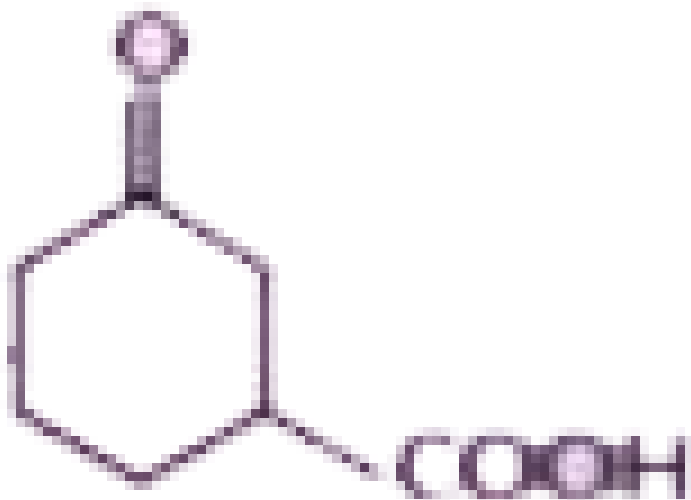
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40. Write the systematic IUPAC names of the following compounds :



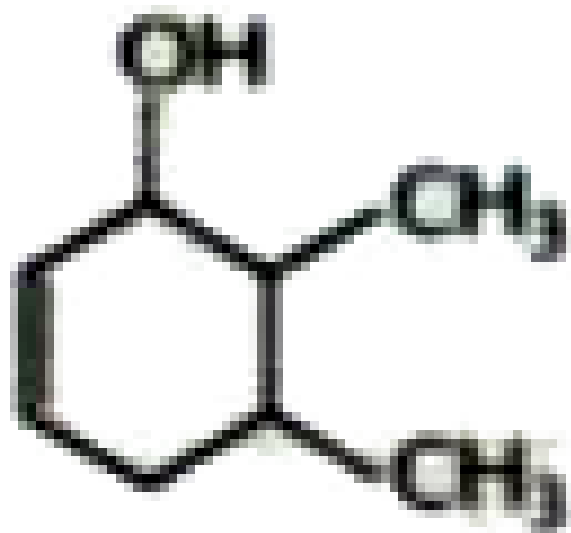
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41. Write the systematic IUPAC names of the following compounds :



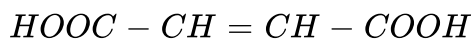
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42. Write the systematic IUPAC names of the following compounds :



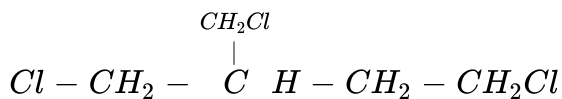
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43. Write the systematic IUPAC names of the following compounds :



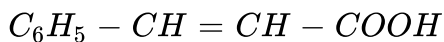
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44. Write the systematic IUPAC names of the following compounds :



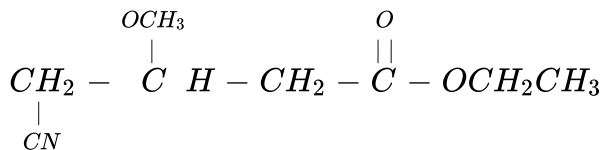
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45. Write the systematic IUPAC names of the following compounds :



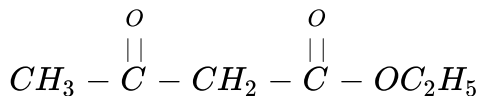
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46. Write the systematic IUPAC names of the following compounds :



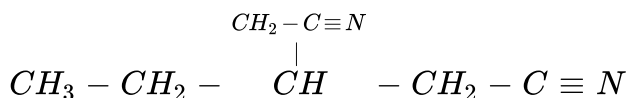
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47. Write the systematic IUPAC names of the following compounds :



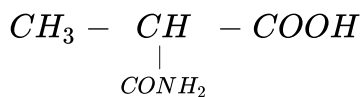
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48. Write the systematic IUPAC names of the following compounds :



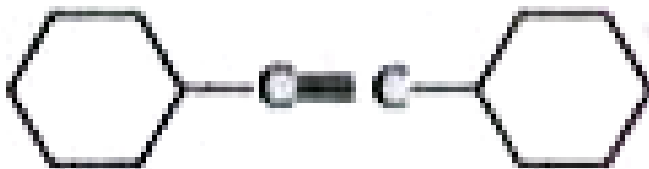
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49. Write the systematic IUPAC names of the following compounds :



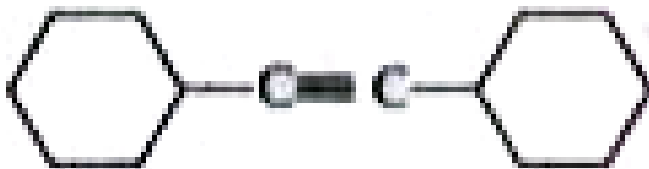
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50. Write the systematic IUPAC names of the following compounds :



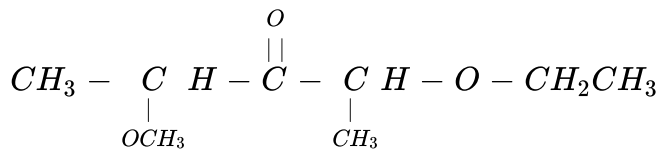
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51. Write the systematic IUPAC names of the following compounds :



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52. Write the systematic IUPAC names of the following compounds :



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53. Derive the structures of the compounds having the following IUPAC names.

5-methylhept-3-enal

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54. Derive the structures of the compounds having the following IUPAC names.

3-methyl-5-(1,2-dimethylpropyl)hept-6-en-1-oic acid

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55. Derive the structures of the compounds having the following IUPAC names.

4-oxopentan-1-al



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56. Derive the structures of the compounds having the following IUPAC names.

2-amino-3-hydroxy-4-oxopentan-1-oic acid



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57. Derive the structures of the compounds having the following IUPAC names.

2-ethyl-2-methylbutan-1-ol



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58. Derive the structures of the compounds having the following IUPAC names.

Prop-2-ene-1-nitrile

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59. Derive the structures of the compounds having the following IUPAC names.

2, 3-dimethylcyclopent-1-ene

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60. Derive the structures of the compounds having the following IUPAC names.

5, 6-dimethylcyclohex-2-en-1-one

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61. Derive the structures of the compounds having the following IUPAC names.

4-methylpent-3-en-2-one



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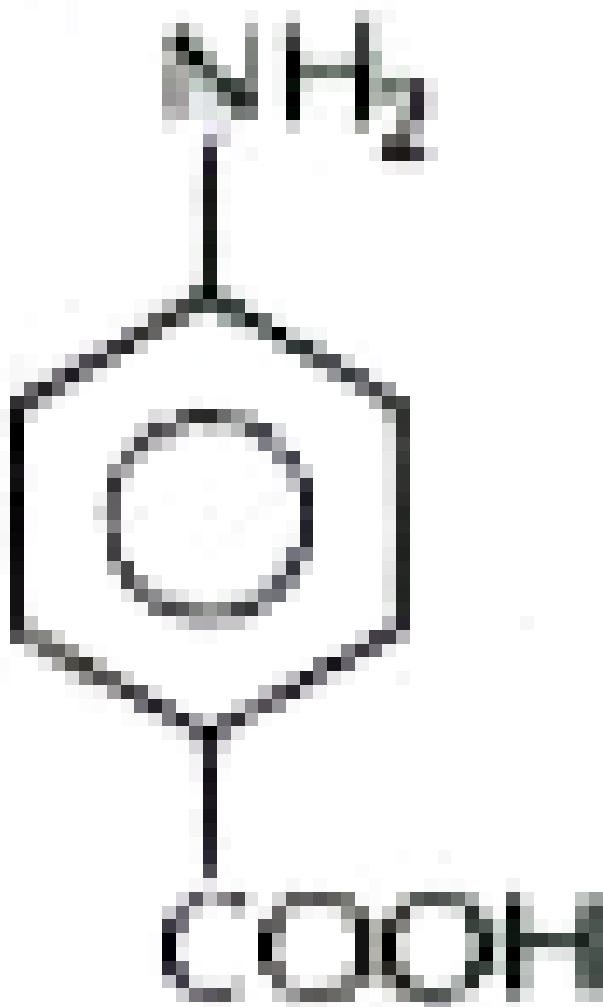
62. Derive the structures of the compounds having the following IUPAC names.

2, 3-dimethylcyclopentan-1-ol



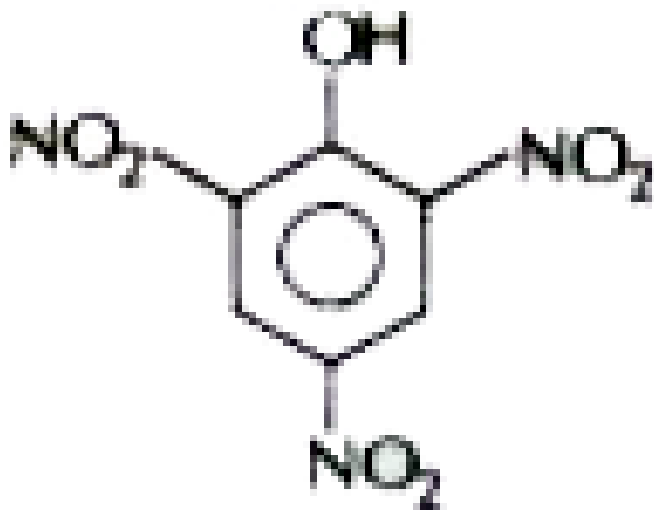
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63. Write the IUPAC names of the following compounds:



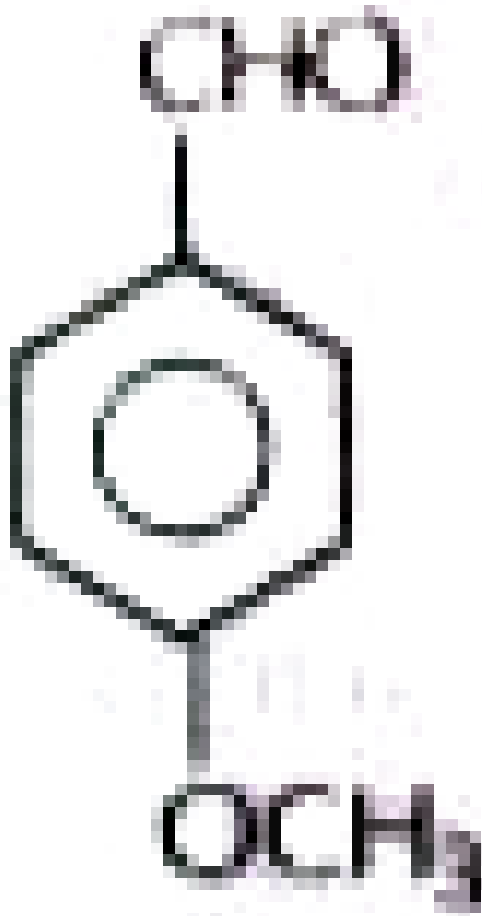
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64. Write the IUPAC names of the following compounds:



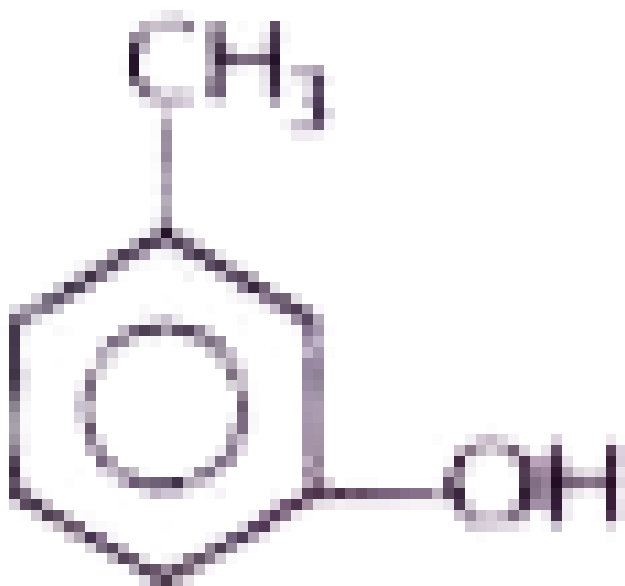
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65. Write the IUPAC names of the following compounds:



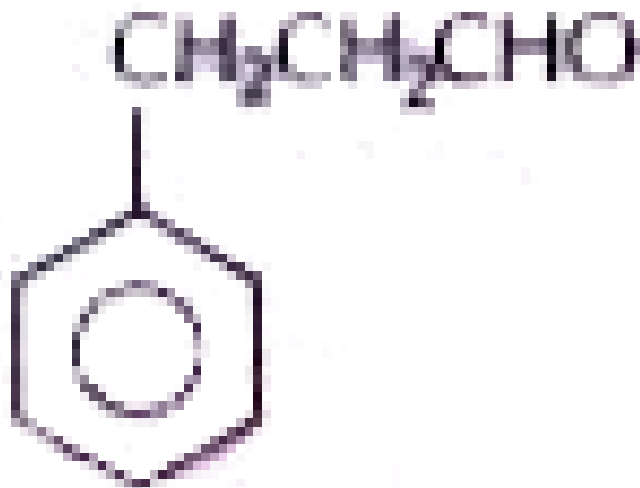
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66. Write the IUPAC names of the following compounds:



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67. Write the IUPAC names of the following compounds:



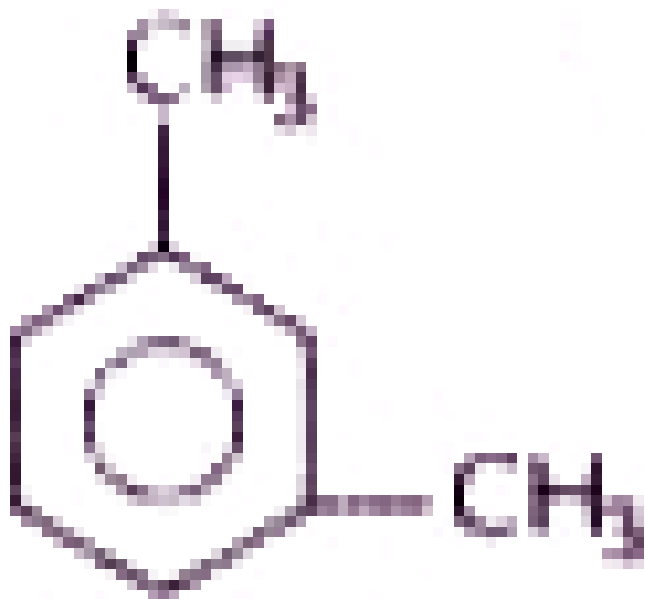
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68. Write the IUPAC names of the following compounds:



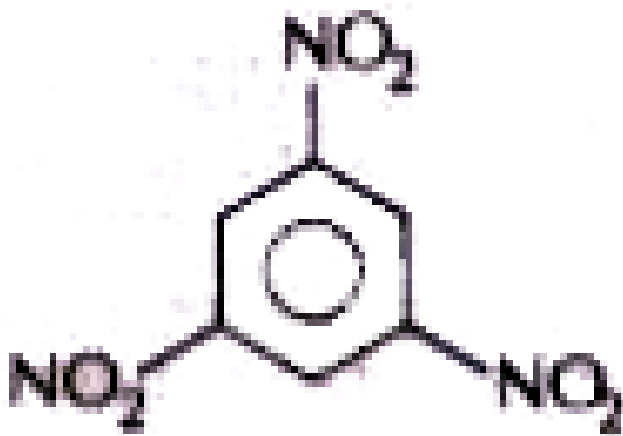
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69. Write the IUPAC names of the following compounds:



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70. Write the IUPAC names of the following compounds:



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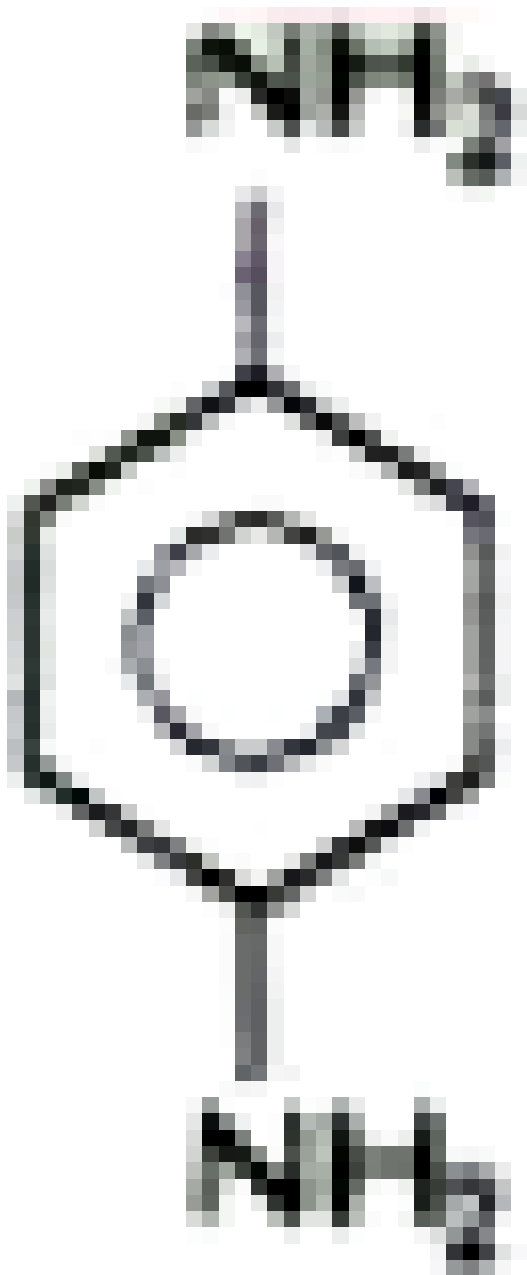
71. Write the IUPAC names of the following compounds:





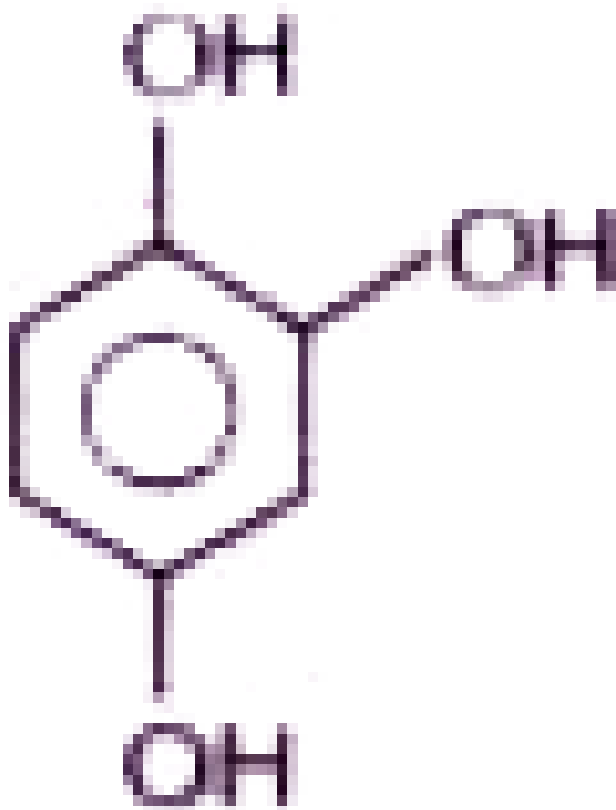
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72. Write the IUPAC names of the following compounds:



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73. Write the IUPAC names of the following compounds:



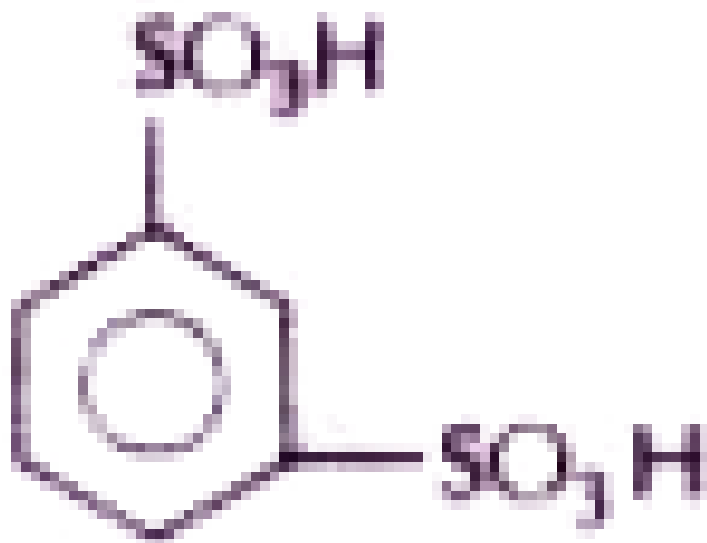
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74. Write the IUPAC names of the following compounds:



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75. Write the IUPAC names of the following compounds:



 [Watch Video Solution](#)

76. Write the IUPAC names of the following compounds:



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77. Write the IUPAC names of the following compounds:



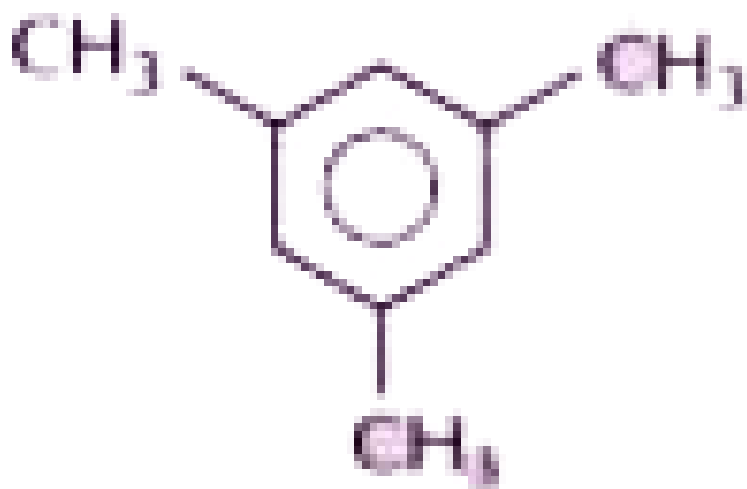
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78. Write the IUPAC names of the following compounds:



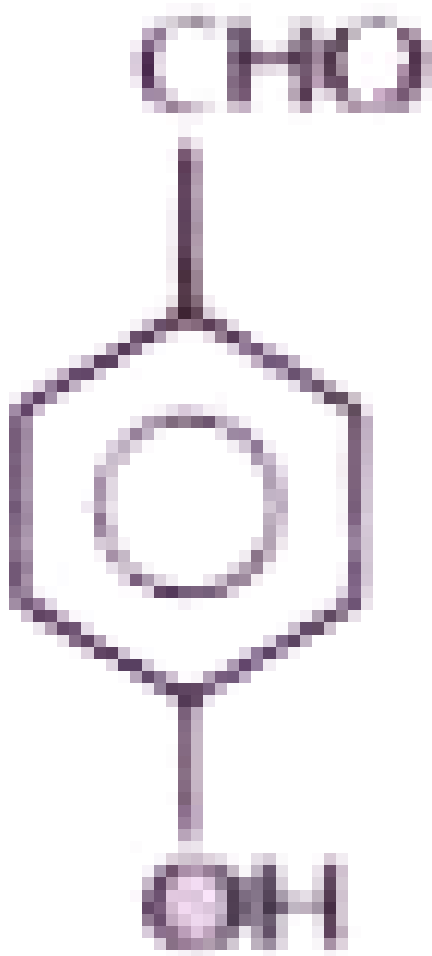
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79. Write the IUPAC names of the following compounds:



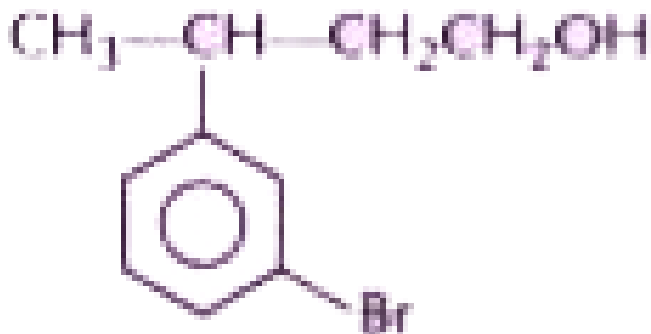
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80. Write the IUPAC names of the following compounds:



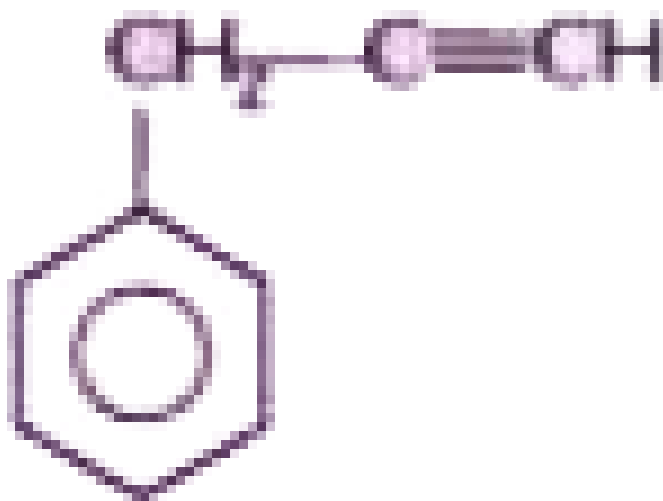
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81. Write the IUPAC names of the following compounds:



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82. Write the IUPAC names of the following compounds:





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83. Write the structures of the compounds having the following names:

Ethynylbenzene



[Watch Video Solution](#)

84. Write the structures of the compounds having the following names:

3-phenyl-1-bromopropane



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85. Write the structures of the compounds having the following names:

1-bromo-2-phenylethene



[Watch Video Solution](#)

86. Write the structures of the compounds having the following names:

2-methylbenzenamine

 [Watch Video Solution](#)

87. Write the structures of the compounds having the following names:

1, 3, 5-trihydroxybenzene

 [Watch Video Solution](#)

88. Write the structures of the compounds having the following names:

3-phenylpropanal

 [Watch Video Solution](#)

89. Write the structures of the compounds having the following names:

4-ethyl-2-fluoro-1-nitrobenzene





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90. Write the structures of the compounds having the following names:

Methylbenzoate



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91. Write the structures of the compounds having the following names:

1-phenylethanone



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92. Write the structures of the compounds having the following names:

p-tolylcarbylamine.



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93. What is isomerism? Give a precise definition and explain with examples.

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94. What type of isomerism is shown by the following pairs of compounds ? (i) Butan-1-ol and Butan-2-ol (ii) But-1-yne and Buta-1, 3-diene (iii) 1-aminobutane and 1-amino-2-methylpropane.

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95. What is the main difference between position isomerism and functional isomerism? Explain with an example.

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96. Write all the possible isomers which can be obtained from the molecular formula $C_4H_{10}O$.

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97. What is tautomerism ? Give two examples.

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98. What is the difference between tautomerism and resonance ? Explain with an example.

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99. Write the keto and enolic forms of acetone.

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100. Write all possible isomers of pentane and hexane.

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101. Define metamerism and give an example.

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102. What is ring-chain isomerism ? Give an example.

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103. Define stereo isomerism. Why does it arise ?

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104. What is geometrical isomerism and what type of compounds do exhibit it?

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105. Can a compound of the type $aaC = Cab$ show geometrical isomerism? If not, explain why?

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106. Write the structures of geometrical isomers of the following compounds : (1) $CHCOOH = CHCOOH$ (ii) $C_6H_5 - CH = CHCOOH$ (iii) $CH_2CH = CHCH_3$.

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107. Explain the cause of geometrical isomerism and state the properties of geometrical isomers.

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108. How many n-octene can show geometrical isomerism?

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109. What is optical activity ?

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110. How is the optical rotation of an optically active compound measured and how is it expressed ?

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111. Define chirality. How does it give rise to the phenomenon of optical activity?

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112. When is a molecule said to be dissymmetric ? Give a brief account of the elements of symmetry.

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113. Define optical isomerism and give a brief account of optical isomers.

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114. (i) What are disinfectants ? Given an example.

(ii) Given two example of macro-molecules that are chosen as drug

targets.

(iii) What are anionic detergents ? Give an example .

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115. Discuss the optical isomerism of lactic acid.

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116. Which of the following molecules would you expect to be optically active ?

(i) CCl_2

(ii) $CHClBrF$

(iii) 2-methylbutane

(iv) CH_3CH_2COOH

(v) Butan-2-ol

(vi) 2-hydroxypropanoic acid.

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117. What are enantiomers ? Describe their important properties.

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118. What is a fractionating column and how does it work?

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119. Why does a mixture of aniline and water boil at a temperature much below the individual boiling points of the two ?

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120. What technique would you use to separate the following mixtures ?

A solution of liquid A (b.p. 380 K) and liquid B (b.p.280 K)

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121. What technique would you use to separate the following mixtures ?

A solution of liquid X (b.p. 340 K) and liquid Y (b.p.332 K)

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122. What technique would you use to separate the following mixtures ?

A mixture of sugar and common salt

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123. What technique would you use to separate the following mixtures ?

A mixture of camphor and common salt

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124. What technique would you use to separate the following mixtures ?

A mixture of benzoic acid and naphthalene.





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125. How will you purify an impure sample of (i) aniline (ii) benzoic acid (iii) nitrobenzene?



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126. If a liquid compound decomposes at its boiling point, which method (s) can you choose for its purification. It is known that the compound is stable at low pressure, steam volatile and insoluble in water



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127. What is the basis of separation in chromatography ?



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128. Nitrobenzene ($C_6H_5NO_2$) can be distilled with steam under one atmosphere pressure at a temperature of 372.2 K. Calculate the amount of steam necessary to distil 0.1 kg of nitrobenzene. The vapour pressure of water at 372.2 K is 739 mm.

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129. In the steam distillation of an organic oil (immiscible with water), the mixture of oil and water boils at 372 K under 1 atm pressure. The vapour pressure of water is 595 mm of Hg at this temperature. The collected condensate contains 50% by weight of the oil. Calculate the molecular weight of the oil.

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130. Why is it necessary to fuse the compound with sodium in the detection of N, S or halogens by Lassaigne's test?

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131. On adding $AgNO_3$ to the Lassaigne solution of a compound, which colour will be obtained if the compound contains

(i) Cl (ii) Br (iii) (iv) N (v) S?

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132. What precaution would you take to detect the presence of a halogen in an organic compound by Lassaigne's test if the compound contains nitrogen or sulphur also ?

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133. Why is Beilstein's test not regarded as a reliable test for the detection of a halogen in an organic compound?

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134. 0.2346 g of an organic compound containing carbon, hydrogen and oxygen only were analysed by the combustion method. The increase in the weights of the U-tube and the potash bulbs at the end of the operation were found to be 0.2754 g and 0.4488 g respectively. Determine the percentage composition of the compound.

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135. 0.1986 g of an organic substance when analysed by Duma's method give 32.96 ml of moist nitrogen measured at 14°C and 755 mm pressure. Calculate the percentage of nitrogen in the substance. (Aqueous tension at 14° C = 12 mm)

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136. In Kjeldahl's method, the gas evolved from 1.325 g sample of a fertiliser is passed into 50 ml of 0.2030 N H_2SO_4 . 25.32 ml of 0.1980 N

NaOH are required for the titration of unused acid. Calculate the percentage of nitrogen in the fertiliser.

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137. 0.3780 g of an organic chloro compound gave 0.5740 g of silver chloride in Carius estimation. Calculate the percentage of chlorine present in the compound.

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138. 2.18g of an organic compound containing sulphur produces 1.02 g of $BaSO_4$. The percentage of sulphur in the compound is

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139. 0.14 g of a substance on evaporation by Victor Meyer's method, displaced 36 mL of air over water at $20^\circ C$ and 750 mm Hg. Calculate the

molecular mass of the substance. (Aqueous tension at $20^{\circ}C = 17.4 \text{ mm}$)

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140. An organic compound containing bromine gave the following results: (i) 0.125 g of the compound on complete combustion gave 0.1 g of CO_2 and 0.051 g of water. (ii) 0.185 g of the compound gave 0.32 g of AgBr. Calculate the empirical formula of the compound.

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141. An organic compound (A) contains 20% C, 46.66% N and 6.66% H. It gave NH_3 gas on heating with NaOH. The organic compound (A) could be

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142. A monobasic acid has 68.9% C and 4.8% H. 0.122 g of acid require 10 mL of N/10 caustic soda solution for neutralisation. What is the molecular

formula of the compound?

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143. An organic compound contains 69.4% carbon and 5.8% hydrogen. A sample of 0.303 g of this compound was analysed for nitrogen by Kjeldahl's method. The ammonia evolved was absorbed in 50 mL of 0.05 M H_2SO_4 . The excess acid required 25 mL of 0.1 M NaOH for neutralisation. Determine the molecular formula of the compound, if its molecular mass is 121.

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144. A volatile organic compound contains 10% C, 0.84% H and 89.12% Cl. In Victor Meyer's method, 0.6 g of the substance displaced 112 mL of air at S.T.P. Find out the molecular formula of the compound.

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145. 0.45 g of a dibasic acid on combustion gave 0.44 g of CO_2 and 0.09 g H_2O . The molecular mass of the acid is 90. Calculate the molecular formula. Suggest a structure for the acid.

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146. A mono acid base gave the following results :

(i) On combustion 0.20 g of the base gave 0.58 g of CO_2 and 0.15 g of water.

(ii) In Duma's method, 0.3 g of it gave 32.7 mL nitrogen at 288 K and 760 mm pressure.

(iii) 0.54 g of it required 12.50 mL of 0.4 N HCl for complete neutralisation.

Determine the molecular formula of the base.

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147. 0.76 g of a silver salt of a dibasic acid on ignition gave 0.54 g of silver. Calculate the molecular mass of the acid.

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148. 0.984 g of a chloroplatinate salt of a diacid base on ignition gave 0.39 g of platinum. Find the molecular mass of the base.

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149. 0.20 g of an anhydrous dibasic acid gave on combustion 0.040 g water and 0.195 g CO_2 . 0.5 g of its silver salt on ignition gave 0.355 g of silver. What is the molecular formula of the acid ?

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150. The silver salt of a monocarboxylic acid contains 55.1% silver. Find the molecular mass of the acid.

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151. 0.984 g of a chloroplatinate salt of a diacid base on ignition gave 0.39 g of platinum. Find the molecular mass of the base.

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152. An organic compound A containing C, H and O has a pleasant odour with boiling point of $78^{\circ}C$. On boiling A with concentrated H_2SO_4 , a colourless gas is produced which decolourless bromine water and alkaline $KMnO_4$. The organic liquid A is

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153. An organic compound (A) having C = 16.27%, H = 0.677%, Cl = 72.203% reduces Fehling solution and on oxidation gives an acid (B) having C = 14.679%, H = 0.612% and Cl = 65.137%. (B) on distillation with sodalime gives a sweet smelling liquid (C) which contains 89.12% chlorine. (C) can also be obtained by heating (A) with alkali. (A) can also be obtained by the

action of Cl_2 on $\text{C}_2\text{H}_5\text{OH}$. Identify (A), (B) and (C) and explain the reactions.

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154. A primary alcohol (A) with V.D. = 29 contains C = 62.1%, H = 10.3%. It reacts with bromine to form a derivative (B) which contains C = 16.5%, H = 2.7% and Br = 73.4%. Identify (A) and (B).

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155. A compound (X) having molecular formula C_6H_{10} gave 2-methylpentane on treatment with H_2 in the presence of Pd. When treated with dilute H_2SO_4 containing HgSO_4 , it yielded another compound having molecular formula $\text{C}_6\text{H}_{12}\text{O}$. Compound X did not react with ammonical CuCl and metallic sodium. Identify X.

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156. A dihaloalkane (A), $C_2H_8Cl_2$ on reaction with alc. KOH gives (B), C_6H_6 . (B) does not form white precipitate with ammonical silver nitrate and on hydrogenation absorbs two moles of hydrogen to give n-butane. Compound (B) reacts with two molecules of ozone to form a diozonide which on reductive hydrolysis gives two moles of formaldehyde and one mole of glyoxal. Identify (A) and (B) and explain the reactions.

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157. Establish the structure of a hydrocarbon C_5H_{10} from the following facts :

- (i) The hydrocarbon yields 2-methyl butane on catalytic reduction.
- (ii) The hydrocarbon adds HBr to form a compound (B) which on reaction with moist silver oxide produces an alcohol (C).
- (iii) The alcohol (C) on oxidation gives a ketone containing the same number of carbon atoms.

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158. A hydrocarbon (V.D. = 27) containing C = 88.88% decolourised $KMnO_4$ solution and bromine water with evolution of HBr. It gave no precipitate with either ammoniacal silver nitrate or cuprous chloride solution. When treated with dil. H_2SO_4 in the presence of $HgSO_4$, it gave methyl ethyl ketone. What is the hydrocarbon ?

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159. An organic compound (A) having V.D. = 30 contains C = 60.0% and H = 13%. On treatment with PCl_5 it gave another compound (B) which contained 45.2% chlorine and on hydration it produced a hydrocarbon (C) containing 85.7% C and 14.3% hydrogen. On successive treatment with HI and moist silver oxide, (C) gave a compound (D) which was isomeric with (A). Identity (A), (B), (C) and (D) and explain the reactions.

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160. An organic compound $E(C_5H_8)$ on hydrogenation gives compound $F(C_5H_{12})$. Compound E on ozonolysis gives formaldehyde and 2-ketopropanal. Deduce the structure of compound E.

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161. An aliphatic hydrocarbon (A) of molecular weight 58 yields on chlorination a monochloroderivative (B) which on treatment with aqueous alkali gives an alcohol (C). The alcohol shows positive Lucas test immediately and easily dehydrated to form the compound (D) which on ozonolysis yields a ketone (E) as one of the products. Dry distillation of the calcium acetate as well as heating of two molecules of acetic acid with MnO at $250^\circ C$ also gives the same ketone (E). Identity compounds (A) to (E) and explain the reactions.

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162. Arrange the following in the order as mentioned :

$(CH_3)_3C - (CH_3)_2CH - CH_3CH_2 - CH_3$ - groups in the order of increasing + I-effect,

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163. Arrange the following in the order as mentioned :

$-CN, -CI, -OH, -NO_2$ groups in the order of decreasing -I-effect,

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164. Arrange the following in the order as mentioned :

$CH_3CH_3CH_2^+, (CH_3)_2CH^+, (CH_3)_3C^+$ carbocations in the order of increasing reactivity,

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165. Arrange the following in the order as mentioned :

1° , 2° , 3° free radicals in the order of decreasing stability.

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166. What are the main points of difference between inductive and electromeric effects ?

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167. Explain the

I-effect leads to the development of partial charges while the E-effect to the full positive and negative charges.

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168. Explain the

Hyperconjugation effect is also termed as 'no bond resonance'.



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169. Explain the

$\dot{C}H_3$ is more reactive than $CH_3\dot{C}H_2$ free radical.



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170. Explain the

The carbanions are very reactive species although their central carbon atom possesses an octet.



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171. Explain the

BF_3 acts as an electrophile.



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172. Explain the

CH_3NH_2 acts as a nucleophile.

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173. Why is in the presence of diethyl peroxide, the addition of HBr to propene is against Markownikoff's rule?

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174. Why is chloroacetic acid is a stronger acid as compared to acetic acid ?

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175. Explain the

$(CH_3)_3C^-$ is less stable than $\bar{C}H_3$.

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176. Explain the

A singlet carbene has a bent structure.



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Very Short Answer Type Questions

1. Name the organic compound that was first prepared in the laboratory,

Who did prepare this compound?



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2. Define organic chemistry.



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3. What do you understand by isomerism?

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4. What are aromatic compounds ? Give at least two examples.

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5. Write the structural and graphic formulae of the compounds having the following molecular formulae.



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6. Write the structural and graphic formulae of the compounds having the following molecular formulae.





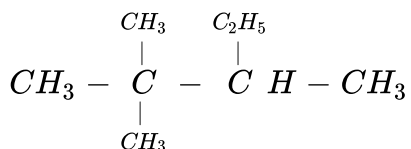
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7. Write the structural and graphic formulae of the compounds having the following molecular formulae.



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8. Identify primary, secondary, tertiary and quaternary carbon atoms in the following compound :



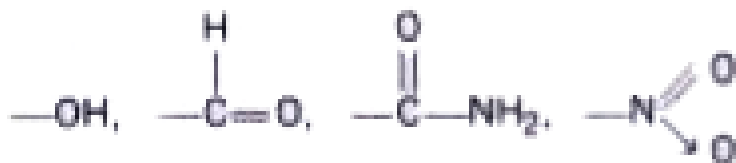
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9. Write the graphic formulae of the following alkyl groups : ethyl, n-propyl, iso-propyl, sec-butyl, t-butyl.



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10. What suffixes or prefixes are used for the following functional groups ?



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11. Alicyclic compounds are

[▶ Watch Video Solution](#)

12. What are the special names used for naming 1,2, 1,3, and 1, 4 disubstituted derivatives of benzene?

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13. Write the structure and IUPAC names of the following compounds:

Isobutane

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14. Write the structure and IUPAC names of the following compounds:

Neopentane

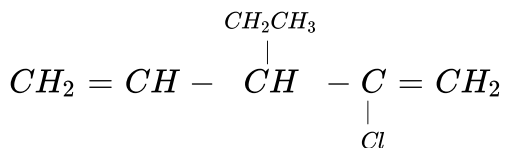
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15. Write the structure and IUPAC names of the following compounds:

Succinic acid.

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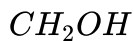
16. Give the IUPAC names of the following compounds:





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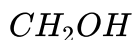
17. Give the IUPAC names of the following compounds:



|

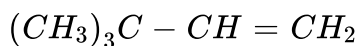


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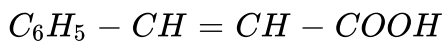
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18. Give the IUPAC names of the following compounds :



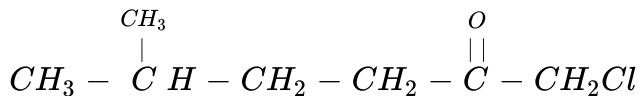
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19. Write the systematic IUPAC names of the following compounds :



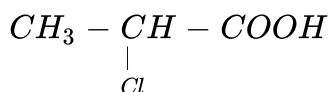
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20. Write the IUPAC names of the following compounds :



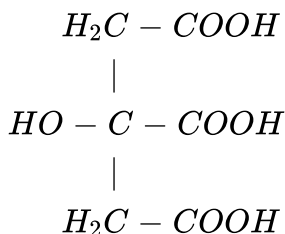
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21. Write the IUPAC names of the following compounds :



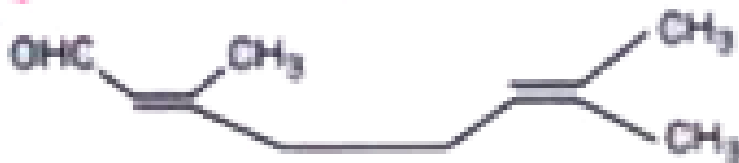
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22. Write the IUPAC names of the following compounds :



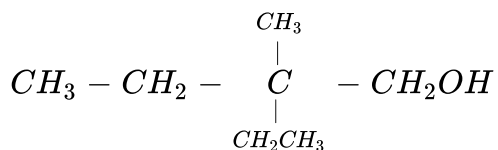
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23. Write the IUPAC names of the following compounds :



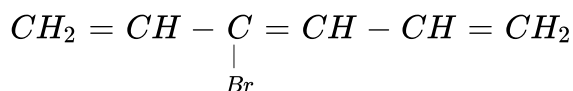
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24. Write the IUPAC names of the following compounds :



[▶ Watch Video Solution](#)

25. Write the IUPAC names of the following compounds :



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26. Write the IUPAC names of the following compounds :

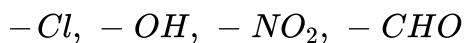


|



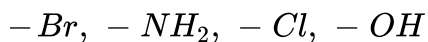
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27. Select the principal group when the following groups are present in a molecule.



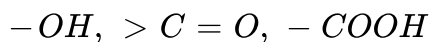
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28. Select the principal group when the following groups are present in a molecule.



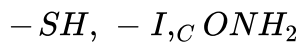
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29. Select the principal group when the following groups are present in a molecule.



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30. Select the principal group when the following groups are present in a molecule.



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31. Write the structural formula of the following compounds:

1-chloropent-1-ene-4-yne

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32. Write the structural formula of the following compounds:

4-ethyl-2, 2, 6-trimethylheptane

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33. Write the structural formulae of the following compounds :

Ethane-1, 2-dial

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34. Write the structural formulae of the following compounds :

5-methylhept-3-ene.

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35. Correct the following names :

2-ol-2, 3-dimethylbutane



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36. Correct the following names :

1-chloro-4-pentyne-1-ene



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37. Correct the following names :

4, 4, 3-trimethyl-1-hexyne



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38. Correct the following names :

3-ethyl-2-chloro-1, 4-pentadiene.



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39. Do structural isomers possess similar chemical properties?

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40. What type of isomerism is shown by isopentane and neopentane?

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41. What type of isomerism is shown by 1-butene and 2-butene?

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42. Write the possible functional isomers having the formula $C_3H_6O_2$

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43. What is the functional isomer of ethanol ?



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44. Write the metamers having the formula $C_4H_{11}N$.



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45. How many chain isomers are possible with the formula C_7H_{16} ?



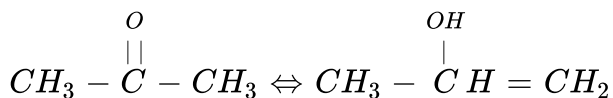
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46. Give an example of ring-chain isomerism.



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47. What type of isomerism is exhibited by the following equilibrium ?



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48. What type of change is involved in tautomerism ?

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49. Is geometrical isomerism shown by alkynes ?

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50. Out of cis and trans isomers, which isomer is more stable ?

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51. Can a compound of the type $\text{axC} = \text{Cay}$ show geometrical isomerism ?

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52. Explain the cause of geometrical isomerism and state the properties of geometrical isomers.

 [Watch Video Solution](#)

53. Do geometrical isomers possess similar physical properties?

 [Watch Video Solution](#)

54. Name the prism passing through which ordinary light changes into plane polarised light.

 [Watch Video Solution](#)

55. Name the instrument used to measure the optical activity of a substance.

 [Watch Video Solution](#)

56. Is the letter H chiral in nature ?

 [Watch Video Solution](#)

57. When is a molecule said to be chiral?

 [Watch Video Solution](#)

58. What is the necessary and sufficient condition for a molecule to be optically active ?

 [Watch Video Solution](#)

59. In which direction does a d-isomer rotate the plane of plane polarised light?

 [Watch Video Solution](#)

60. What is the effect of a dl-mixture on plane polarised light?

 [Watch Video Solution](#)

61. Why is the net rotation of meso-tartaric acid zero ?

 [Watch Video Solution](#)

62. Is 1-hydroxypropanoic acid optically active ?

 [Watch Video Solution](#)

63. What is soda-lime test for detection of nitrogen in a compound?

 [Watch Video Solution](#)

64. What do you understand by Lassaigne solution ?

 [Watch Video Solution](#)

65. In the Lassaigne's test for nitrogen in an organic compound, the Prussian blue colour is obtained due to the formation of:

- (a) $Na_4[Fe(CN)_6]$ (b) $Fe_4[Fe(CN)_6]_3$ (c) $Fe_2[Fe(CN)_6]$ (d) $Fe_3[Fe(CN)_6]_4$

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66. For testing halogens in an organic compound with $AgNO_3$ solution, sodium extract (Lassaigne's test) is acidified with dilute HNO_3 . What will happen if a student acidifies the extract with dilute H_2SO_4 in place of dilute HNO_3 ?

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67. During sodium extract preparation for Lassaigne's test both N and S present in organic compound change to



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68. What is chloroform layer test?



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69. What is the role of reduced copper gauze in the estimation of nitrogen by Duma's method ?



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70. In a Victor Meyer's determination, 0.32 g of a volatile substance displaced air which measured 120mL at S.T.P. Calculate the vapour density and molecular weight of the substance (1 litre of H_2 at S.T.P. weighs 0.09 g).



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71. How is the molecular formula of a compound related to its empirical formula ?

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72. What happens when the silver salt of a carboxylic acid is ignited ?

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73. What type of electrons get displaced in

(i) inductive effect

(ii) electromeric effect?

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74. What type of groups produce + I-effect ?

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75. Which of the following are permanent effects ? I-effect, E-effect, M-effect.

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76. Amongst $-OH$, $-CN$, CI , $-NO_2$ groups, which do exert + M-effect when present in conjugation with a double bond ?

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77. What type of reaction intermediates are obtained when a covalent bond undergoes homolytic fission?

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78. What is meant by a 1° carbon atom ?

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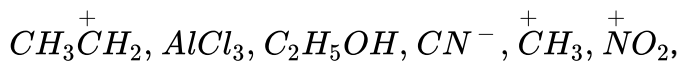
79. What is the state of hybridisation of the central carbon in a carbocation ?

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80. What is the state of hybridisation of the central carbon in a carbanion ?

 [Watch Video Solution](#)

81. Sort out electrophiles and nucleophiles among the following:



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82. Write the general rate law for an S_N2 reaction.

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83. What is the optical nature of the product obtained in an S_{N1} reaction if the substrate is optically active ?



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84. What is the reaction intermediate in a nitration process ?



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85. Define elimination reactions.



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86. What type of structure is possessed by a triplet carbene?



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87. Name a neutral electrophile and a neutral nucleophile.

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Short Answer Type Questions

1. State reasons for 'Justification of a separate branch' for 'Organic Chemistry'.

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2. What is catenation ? Why is it most prominent for carbon ?

 [Watch Video Solution](#)

3. What are isomers ? Write the isomers of butane and pentane.

 [Watch Video Solution](#)

4. What is the main difference between carbocyclic and heterocyclic compounds ?

 [Watch Video Solution](#)

5. Name the different types of hydrocarbons. Give two examples each.

 [Watch Video Solution](#)

6. What are alkyl groups ? Write the structures of all possible alkyl groups which can be obtained from propane and butane.

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7. What do you understand by gas?

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8. In what way does an alkane differ from other hydrocarbons ?

 [Watch Video Solution](#)

9. What do you understand by a homologous series ? Write its important characteristics.

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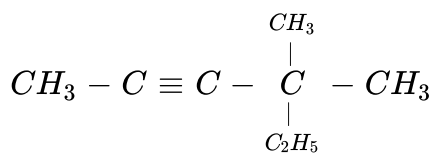
10. There is a large number of carbon compounds due to

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11. How would you decide whether the two given compounds are homologues or not?

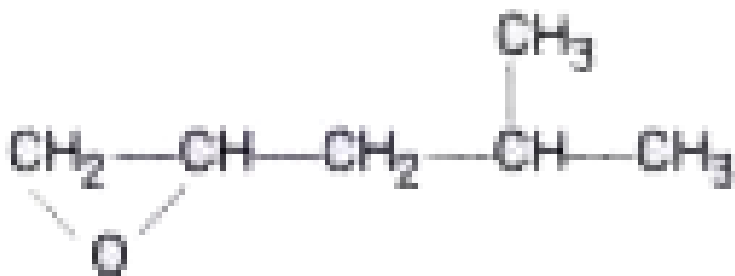
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12. Write the systematic IUPAC names of the following compounds:



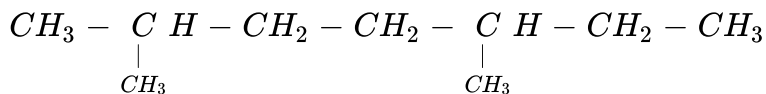
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13. Write the systematic IUPAC names of the following compounds:



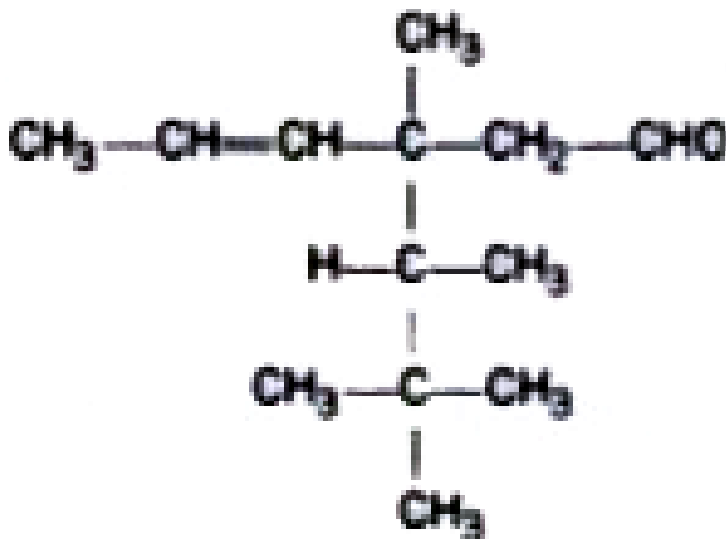
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14. Write the systematic IUPAC names of the following compounds:



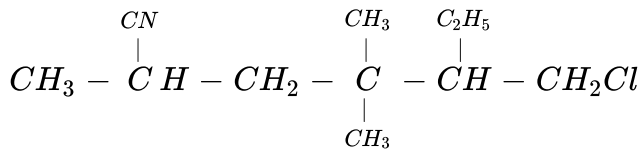
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15. Write the systematic IUPAC names of the following compounds:



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16. Write the systematic IUPAC names of the following compounds:



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17. Find out the error in the following names and write the correct IUPAC names:

3-methyl-4 ethyl-2-hexanol

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18. Find out the error in the following names and write the correct IUPAC names:

3-butanol-1-oic acid

 [Watch Video Solution](#)

19. Find out the error in the following names and write the correct IUPAC

names:

2-methyl-1-carboxypentene-3.



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20. Draw the structures of the following compounds:

4-nitropent-1-yne



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21. Draw the structures of the following compounds:

5, 5-diethyl-3-nonanol



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22. Draw the structures of the following compounds:

Butane-2, 3-dione

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23. Draw the structures of the following compounds:

2-keto-3-methylbutanamide

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24. Draw the structures of the following compounds:

1-bromo-3-chlorocyclohexane

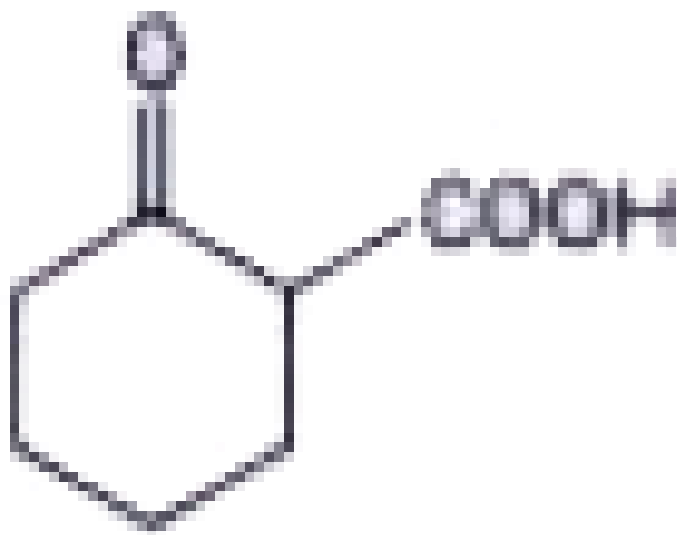
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25. Draw the structures of the following compounds:

3-methyl-2-oxobutanoic acid.

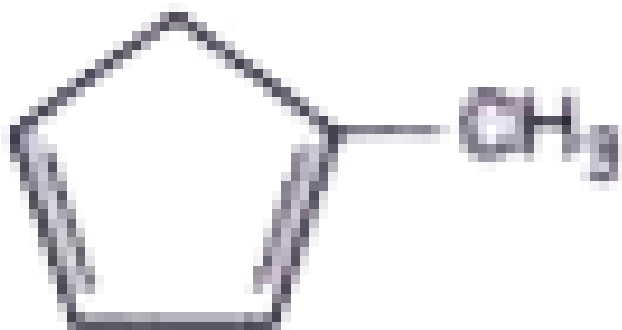
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26. Write the IUPAC names of the following compounds :



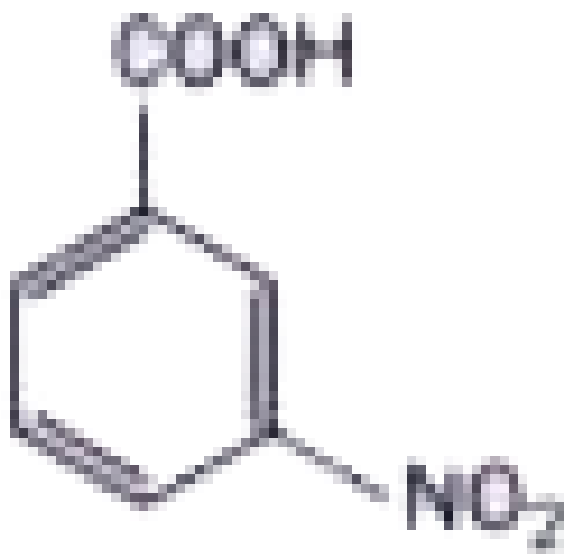
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27. Write the IUPAC names of the following compounds :



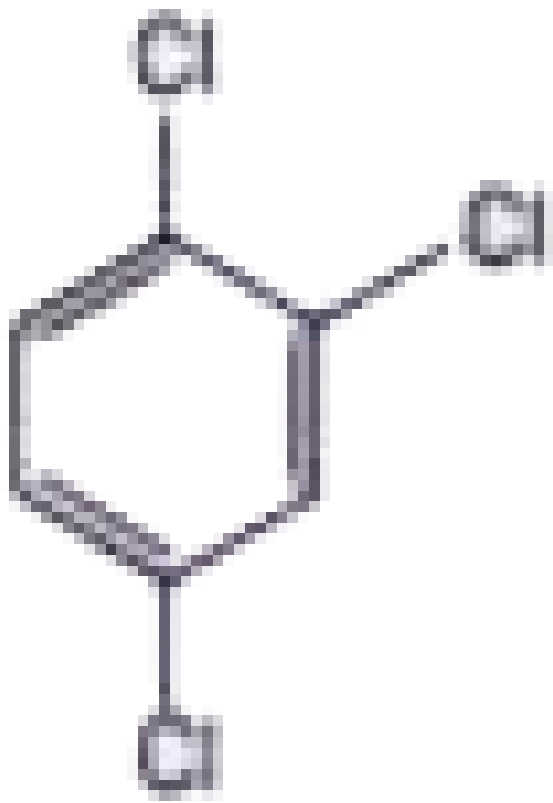
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28. Write the IUPAC names of the following compounds :



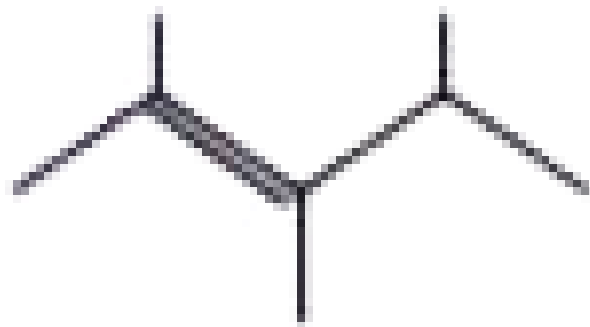
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29. Write the IUPAC names of the following compounds :



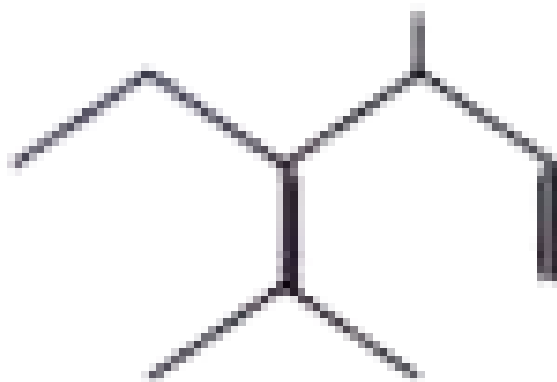
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30. Write the IUPAC names of the following compounds :



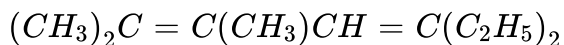
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31. Write the IUPAC names of the following compounds :



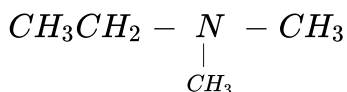
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32. Write the IUPAC names of the following compounds :



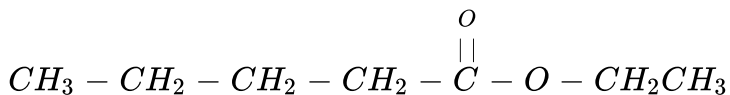
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33. Write the IUPAC names of the following compounds :



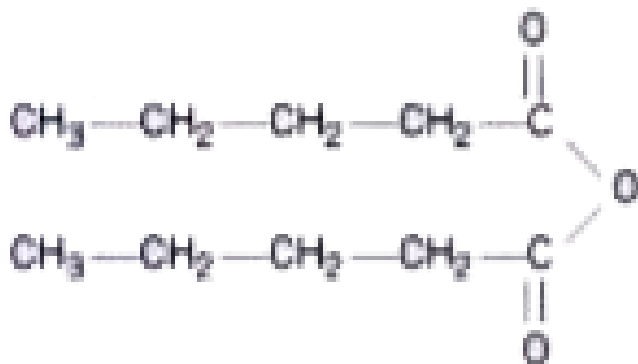
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34. Write the IUPAC names of the following compounds :



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35. Write the IUPAC names of the following compounds :



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36. What do you understand by primary, secondary and tertiary hydrogen atoms ?

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37. Write the IUPAC names of the following compounds : (i) t-butyl alcohol (ii) Lactic acid (iii) Isobutyl alcohol (iv) Glycerine (v) Glycine.

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38. Define isomerism and give an example.

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39. What is meant by structural isomerism ? Give an example.

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40. Define chain isomerism and give an example.

 [Watch Video Solution](#)

41. Give two examples of position isomerism.

 [Watch Video Solution](#)

42. What is meant by functional isomerism ? Explain with an example.

 [Watch Video Solution](#)

43. Define metamerism. What type of compounds do show it? Give an example.

 [Watch Video Solution](#)

44. Write the structural formulae of all isomers of hexane.

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45. What is ring-chain isomerism ? Give an example.

 [Watch Video Solution](#)

46. What is the difference between tautomerism and resonance ? Explain with an example.

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47. What are the characteristics of tautomeric changes ?

 [Watch Video Solution](#)

48. What is geometrical isomerism and what type of compounds do exhibit it?

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49. What are the conditions necessary for a compound to show geometrical isomerism ?

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50. Geometrical isomerism is caused



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51. Explain the cause of geometrical isomerism and state the properties of geometrical isomers.



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52. What is optical activity ?



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53. The constant k in Coulomb's law depends on



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54. Define specific rotation.

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55. What is meant by the chelate effect? Give an example.

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56. What is meant by chiral or asymmetric carbon?

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57. The complex that can show optical activity is :

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58. What are enantiomers ? Describe their important properties.

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59. Define optical isomerism and give a brief account of optical isomers.

 [Watch Video Solution](#)

60. What do you understand by a racemic mixture and why does it have no effect on plane polarised light?

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61. Describe briefly what do you understand by the terms racemisation and resolution?

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62. What is meant by asymmetric synthesis ? Give an example.

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 [Watch Video Solution](#)

63. Why is meso-tartaric acid regarded achiral in nature ?

 [Watch Video Solution](#)

64. Discuss the optical isomerism of lactic acid.

 [Watch Video Solution](#)

65. Why is the net rotation of meso-tartaric acid zero ?

 [Watch Video Solution](#)

66. What are diastereoisomers ? Mention their important properties.

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67. How would you detect the presence of carbon and hydrogen in a compound ?

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68. What is sodium extract and how is it prepared ?

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69. Lassaigne's test for the detection of nitrogen fails in

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70. Explain why :

A blood red colouration is obtained on addition of $FeCl_3$ to Lassaigne's solution when the compound contains both N and S.

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71. Explain why :

A black precipitate is obtained in the Lassaigne's test for the detection of sulphur.

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72. Explain why :

A blue or green colour in the flame is obtained during Beilstein's test for halogens.

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73. Explain why :

Presence of Cl in a compound cannot be detected by adding $AgNO_3$ solution to sodium extract if the compound contains nitrogen also.

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74. Explain why :

No precipitate is obtained on adding $AgNO_3$ to chloromethane.

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75. Describe the principle involved in the quantitative estimation of nitrogen by Kjeldahl's method.

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76. Describe the Carius method for the estimation of sulphur in a compound.

 [Watch Video Solution](#)

77. Describe the principle involved in the estimation of phosphorus in an unknown organic compound.

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78. Describe the principle and procedure of determining molecular mass of an acid by volumetric method.

 [Watch Video Solution](#)

79. Describe the principle involved in the determination of molecular mass of an organic acid by silver salt method.

 [Watch Video Solution](#)

80. On what principle is the chloroplatinate salt method for the determination of molecular mass of an organic base based ?

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81. What do you understand by inductive effect? Illustrate your answer with at least two examples.

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82. How is +I-effect different from -I-effect? Illustrate with examples.

 [Watch Video Solution](#)

83. Why is +I-effect of t-butyl group greater than that of isopropyl group?

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84. Why is dichloroacetic acid stronger than monochloroacetic acid ?

 [Watch Video Solution](#)

85. Define electromeric effect.

 [Watch Video Solution](#)

86. What type of effects are involved in the following reactions ?



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87. What are the main points of difference between inductive and electromeric effects ?

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88. When does mesomeric effect come into existence ? Illustrate with examples.

 [Watch Video Solution](#)

89. Define mesomeric effect and differentiate + M-effect from - M-effect.

 [Watch Video Solution](#)

90. Compare inductive effect with mesomeric effect.

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91. What do you understand by hyperconjugation effect ? Illustrate with an example.

 [Watch Video Solution](#)

92. Explain the

Hyperconjugation effect is also termed as 'no bond resonance'.

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93. Why is the hyperconjugation effect exerted by a methyl group greater than that exerted by an ethyl group?

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94. Define heterolytic fission of a covalent bond.

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95. Why is a 3° radical more stable as compared to 1° and 2° free radicals?

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96. What are carbocations ? Give two examples.

 [Watch Video Solution](#)

97. Discuss the orbital structure of a carbocation.

 [Watch Video Solution](#)

98. What is relative order of reactivity of various types of carbocations and carbanions ?

 [Watch Video Solution](#)

99. Define carbanion and discuss its orbital structure.

 [Watch Video Solution](#)

100. Why is 1° carbanion more stable than a 2° carbanion ?

 [Watch Video Solution](#)

101. What are carbenes ?

 [Watch Video Solution](#)

102. What are electrophilic reagents ? Give at least three examples.

 [Watch Video Solution](#)

103. Why do free radicals and carbenes act as electrophiles ?

 [Watch Video Solution](#)

104. What do you understand by nucleophilic reagents and what type of species act as nucleophiles ? Give at least two examples.

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105. Why does ether act as a nucleophile ?

 [Watch Video Solution](#)

106. What are nucleophilic substitution reactions ? Give an example.

 [Watch Video Solution](#)

107. What are the reactive species involved in S_N1 reactions ?

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108. Explain why does a S_N2 reaction involve an inversion in configuration.

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109. Give three examples of electrophilic substitution reactions.

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110. Discuss the mechanism of anti-Markownikoff addition of HBr to an unsymmetrical alkene.

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Essay Long Answer Type Questions

1. (b) Why are there very large number of organic compounds ?

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2. What are organic compounds and how are they classified ? Give two examples of each type.

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3. What are functional groups ? How are the organic compounds classified on the basis of functional groups ? Mention the functional group of each class and give at least one example.

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4. Discuss with examples the procedure of nomenclature of branched chain alkanes.

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5. How would you name a compound when it contains two functional groups of different types ? Illustrate your answer with examples.

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6. What is structural isomerism ? Define different types of structural isomerism and give an example of each.

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7. What is tautomerism ? Give two examples.

 [Watch Video Solution](#)

8. Define geometrical isomerism and discuss the conditions necessary for it. Explain with at least two examples.

 [Watch Video Solution](#)

9. Explain the cause of geometrical isomerism and state the properties of geometrical isomers.

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10. Give an example of the compound containing N=N bond and able to show geometrical isomerism. Write its geometrical isomers.

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11. How is the optical rotation of an optically active compound measured and how is it expressed ?

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12. Define chirality. How does it give rise to the phenomenon of optical activity?

 [Watch Video Solution](#)

13. Discuss the cause of optical activity in a molecule. Support your answer with two examples.

 [Watch Video Solution](#)

14. Define optical isomerism and give a brief account of optical isomers.

 [Watch Video Solution](#)

15. Discuss the optical isomerism exhibited by tartaric acids.

 [Watch Video Solution](#)

16. What is Lassaigne's solution and how is it prepared ? Discuss the chemistry of the tests used for the detection of following elements using

this solution.

N

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17. What is Lassaigne's solution and how is it prepared ? Discuss the chemistry of the tests used for the detection of following elements using this solution.

Cl

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18. What is Lassaigne's solution and how is it prepared ? Discuss the chemistry of the tests used for the detection of following elements using this solution.

Br

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19. What is Lassaigne's solution and how is it prepared ? Discuss the chemistry of the tests used for the detection of following elements using this solution.

(A) Sulphur

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20. Describe the principle used and the procedure for the estimation of C and H in an organic compound.

 [Watch Video Solution](#)

21. Describe Duma's method for the estimation of nitrogen in an organic compound.

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22. Describe the principle involved in the quantitative estimation of nitrogen by Kjeldahl's method.

 [Watch Video Solution](#)

23. Describe the Carius method for the estimation of sulphur in a compound.

 [Watch Video Solution](#)

24. Describe Victor Meyer's method for the determination of molecular mass of a volatile substance.

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25. Describe the principle involved in the determination of molecular mass of an organic acid by silver salt method.



 [Watch Video Solution](#)

26. Describe a chemical method commonly used for the determination of molecular mass of a base.

 [Watch Video Solution](#)

27. What do you understand by inductive effect? Illustrate your answer with at least two examples.

 [Watch Video Solution](#)

28. Define electromeric effect and differentiate between + E and - E-effects by taking suitable examples. What are the important features of this effect ?

 [Watch Video Solution](#)

29. Define mesomeric effect and differentiate + M-effect from - M-effect.

 [Watch Video Solution](#)

30. Explain the

Hyperconjugation effect is also termed as 'no bond resonance'.

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31. Give a brief account of the various reaction intermediates usually involved in organic reactions.

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32. The increasing order of stability of the following free radicals is

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33. What are carbocations ? Discuss their orbital structure and explain the relative order of the stability of various types of carbocations.

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34. What are carbanions ? Discuss their orbital structure and explain the cause of their reactivity. Why is ethyl carbanion more reactive than methyl carbanion ?

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35. What are carbenes ? Discuss the orbital structures of singlet and triplet carbenes.

 [Watch Video Solution](#)

36. What do you understand by electrophiles and nucleophiles and what type of substances act as these reagents? Explain with examples.

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37. What do you understand by S_{N1} and S_{N2} reactions ? Taking suitable examples, discuss their mechanism and stereochemistry.

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38. How is benzene prepared in the laboratory? Write a note on its electrophilic substitution reactions.

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39. Write short notes on
Free radical substitution reactions.





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40. What are addition reactions ? Discuss the mechanism of different types of addition reactions.



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41. What do you understand by elimination reactions ? Discuss the mechanism of E_1 and E_2 reactions.



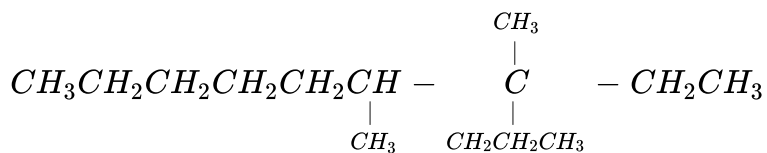
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42. What are intramolecular and intermolecular forces ? Explain with suitable examples.



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1. What is the correct IUPAC name of the following compound?



3, 4-dimethyl-3n-propylnonane

6,7-dimethyl-2-n-propylnonane

6,7-dimethyl-7-ethyldecane

4,5-dimethyl-4-ethyldecane.

A. 3, 4-dimethyl-3n-propylnonane

B. 6,7-dimethyl-2-n-propylnonane

C. 6,7-dimethyl-7-ethyldecane

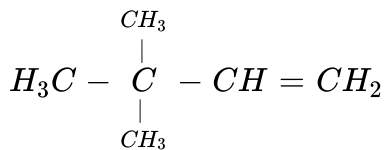
D. 4,5-dimethyl-4-ethyldecane.

Answer: D



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2. Name of the compound



as per IUPAC system is

- A. 3, 3, 3-trimethyl-1-propane
- B. 1, 1, 1-trimethyl-3-propanone
- C. 3, 3-dimethylbut-1-ene
- D. 1, 1-dimethyl-3-butene.

Answer: C



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3. The compound which has one isopropyl group is

2, 2, 3, 3-tetramethylpentane

2,2-dimethylpentane

2, 2, 3-trimethylpentane

2-methylpentane.

A. 2, 2, 3, 3-tetramethylpentane

B. 2,2-dimethylpentane

C. 2, 2, 3-trimethylpentane

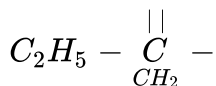
D. 2-methylpentane.

Answer: D



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4. The IUPAC name of the compound having structure



A. 3-methyl-2-ethylbutene-1

B. 2-ethyl-3-methylbut-1-ene

C. 3-ethyl-3-methyl-butene-1

D. ethyl isopropyl ethene.

Answer: B

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5. Which of the following IUPAC names is not correctly matched?

A. 2-methyl-3-ethylpentane

B. 2-ethyl-3-methylpentane

C. 3-ethyl-2-methylpentane

D. 3-methyl-2-ethylpentane.

Answer: C

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6. How many isomers are possible for the alkyl group – C_4H_9

A. 2

B. 3

C. 4

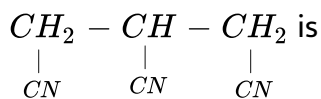
D. 5

Answer: C



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7. The IUPAC name of the compound



A. 1, 2, 3-tricyanopropane

B. 3-cyanopentane-1, 5-dinitrile

C. 1, 2, 3-cyanopropane

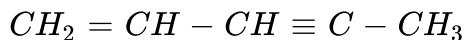
D. propanetrinitrile-1, 2, 3

Answer: A



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8. Write the IUPAC names of the compound:



A. 1, 1-dimethyl-2-propene

B. 3-methylbut-1-ene

C. 2-vinyl propane

D. 1-isopropyl ethylene.

Answer: B



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9. The IUPAC name of $CH_3 - \underset{OH}{CH} - CH_2 - \underset{CH_3}{CH} - CHO$ will be

A. 4-hydroxy-1-methylpentanal

B. 4-hydroxy-2-methylpentanal

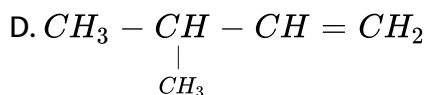
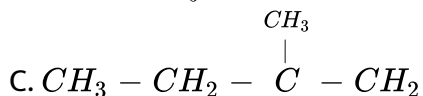
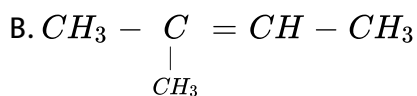
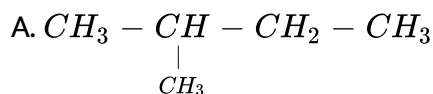
C. 3-hydroxy-2-methylpentanal

D. 3-hydroxy-3-methylpentanal.

Answer: B

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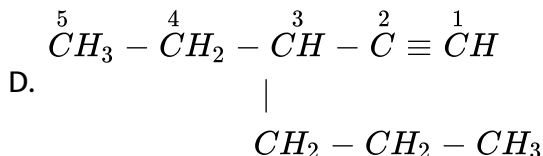
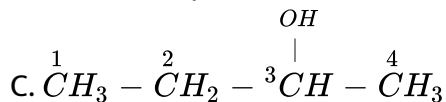
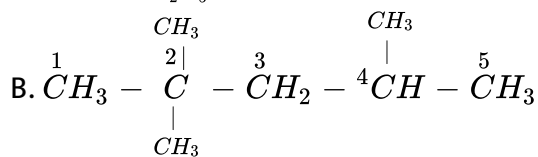
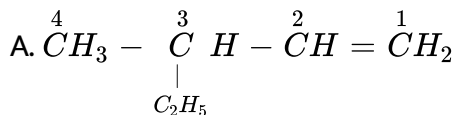
10. 2-methylbut-2-ene will be represented as



Answer: B

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11. In which of the following compounds is the numbering of carbon atoms in the chain correct?



Answer: B



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12. IUPAC name of $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{COOH}$ is

A. 4-hydroxypentanoic acid

B. 1-carboxy-3-butanol

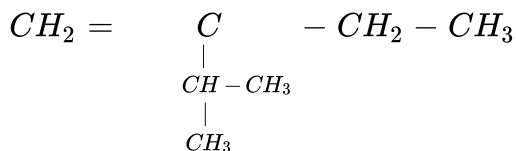
C. 1-carboxy-4-butanol

D. 4-carboxy-2-butanol.

Answer: A

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13. The IUPAC name of the following compounds is



A. 2-ethyl-3-methylbut-1-ene

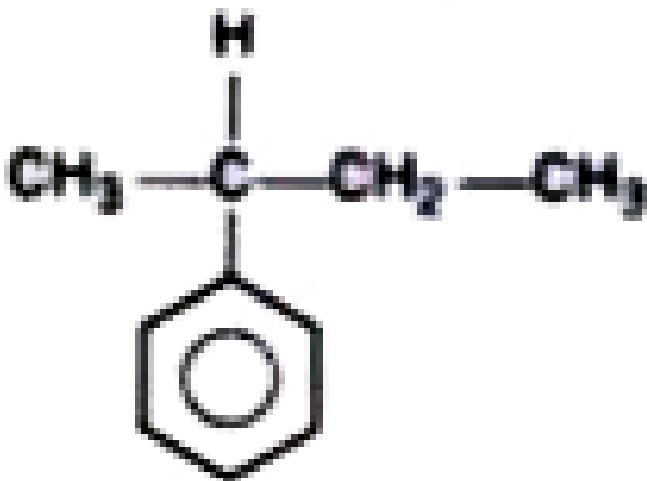
B. 2-isopropylbut-1-ene

C. 2-methyl-3-ethylbut-3-ene

D. ethyl isopropyl ethane.

Answer: A

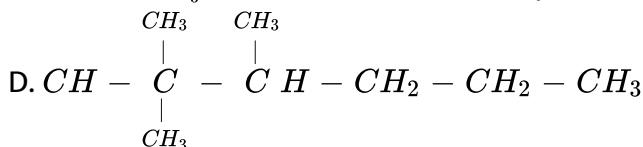
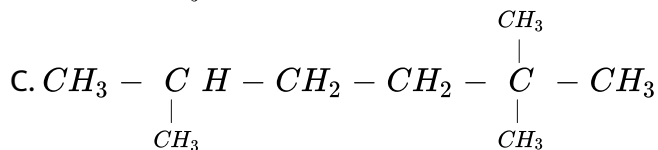
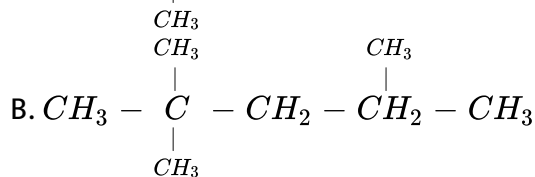
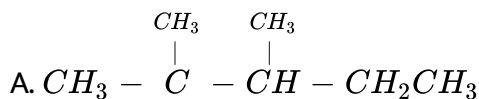
14. The IUPAC name of the compound



- A. 3-phenylbutane
- B. 3-cyclohexylbutane
- C. 2-cyclohexybutane
- D. 2-phenylbutane.

Answer: D

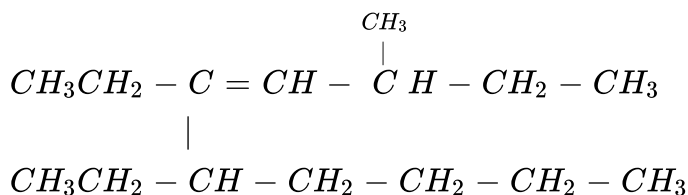
15. Which of the following compounds is 2,2,3-trimethylhexane?



Answer: D

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16. The correct name of the following compound is

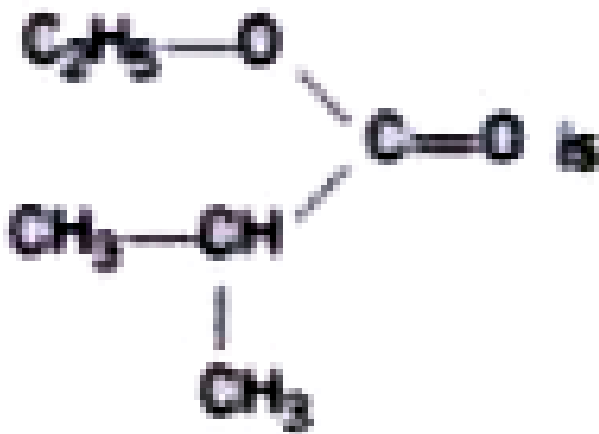


- A. 5, 6-diethyl-3-methyldec-4-ene
- B. 5, 6-diethyl-8-methyl-dec-6-ene
- C. 6-butyl-5-ethyl-3-methyl-oct-4-ene
- D. 2, 4,5-triethyl-3-nonene.

Answer: A

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17. The IUPAC name of



A. ethoxymethanone

B. 2-methylethylpropanoate

C. ethoxypropanone

D. 2-methylethoxypropanone.

Answer: B

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18. The IUPAC name of $CH_3 - C \equiv C \cdot CH(CH_3)_2$ is

A. 4-methylpent-2-yne

B. 4,4' -dimethyl-2-pentyne

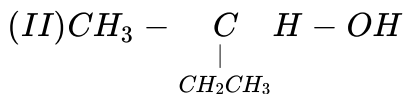
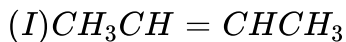
C. methyl isopropyl acetylene

D. 2-methyl-4-pentyne.

Answer: A

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19. Following types of compounds (as I, II)



are studied in terms of isomerism in

- A. chain isomerism
- B. position isomerism
- C. conformers
- D. stereo isomerism.

Answer: D

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20. The IUPAC name of $CH_3COCH(CH_3)_2$ is

- A. isopropylmethyl ketone
- B. 2-methylbutan-3-one

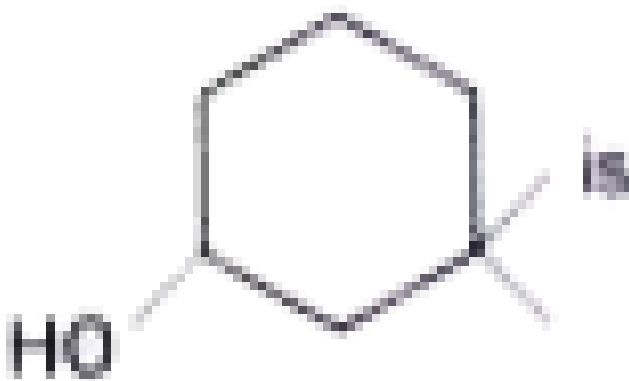
C. 4-methylisopropyl ketone

D. 3-methylbutan-2-one.

Answer: D

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21. The IUPAC name of the compound



A. 3,3-dimethyl-1-hydroxycyclohexane

B. 1,1-dimethyl-3-hydroxycyclohexane

C. 3,3-dimethylcyclohexan-1-ol

D. 1,1-dimethylcyclohexan-3-ol.

Answer: C

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22. Of the five isomeric hexanes, the isomer which can give two monochlorinated compounds is

2-methylpentane

2,2-dimethylbutane

2,3-dimethylbutane

n-hexane.

A. 2-methylpentane

B. 2,2-dimethylbutane

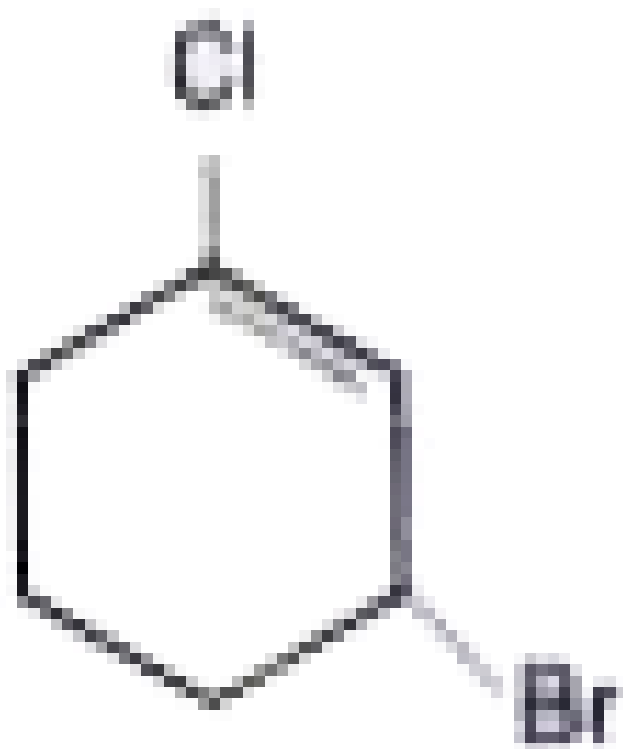
C. 2,3-dimethylbutane

D. n-hexane.

Answer: C

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23. The IUPAC name of the compound shown below is

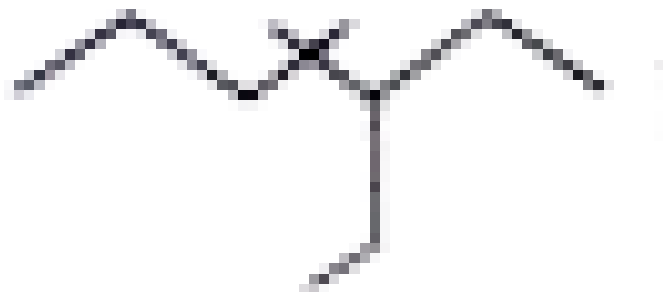


- A. 2-bromo-6-chlorocyclohex-1-ene
- B. 6-bromo-2-chlorocyclohexene
- C. 3-bromo-1-chlorocyclohexene
- D. 1-bromo-3-chlorocyclohexene.

Answer: C

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24. The IUPAC name of



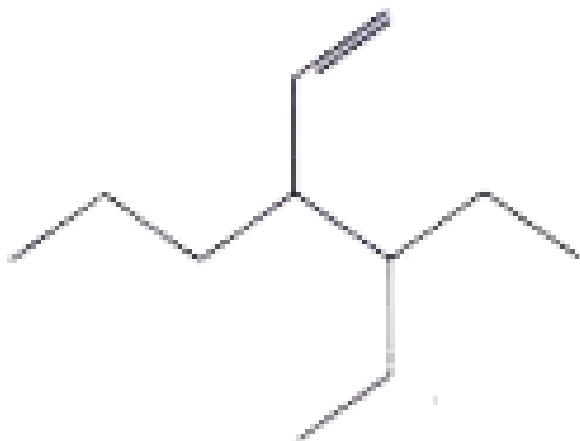
is

- A. 1,1-diethyl-2,2-dimethylpentane
- B. 4,4-dimethyl-5,5-diethylpentane
- C. 5,5-diethyl-4,4-dimethylpentane
- D. 3-ethyl-4,4-dimethylheptane.

Answer: D

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25. The correct IUPAC name of the compound



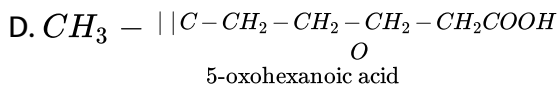
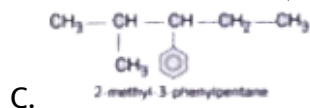
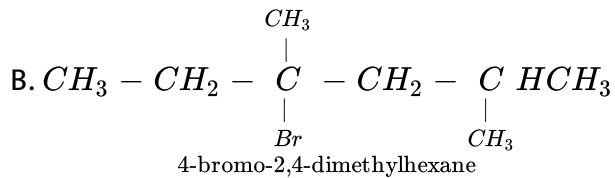
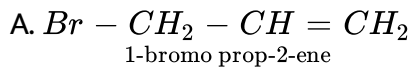
is

- A. 3-ethyl-4-ethenylheptane
- B. 3-ethyl-4-propylhex-5-ene
- C. 3-(1-ethyl propyl) hex-1-ene
- D. 4-ethyl-3-propylhex-1-ene

Answer: D

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26. Which nomenclature is not according to IUPAC system?



Answer: A

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27. The compounds butan-1-ol and 2-methylpropan-1-ol are

A. chain isomers

B. position isomers

C. functional isomers

D. metamers

Answer: A

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28. Which of the following statements is correct?

- A. Structural isomers have similar physical and chemical properties.
- B. Alcohols and ethers form functional pairs.
- C. The compound having formula $C_4H_{11}N$ has two metamers.
- D. Tautomerism and resonance are two different names for the same phenomenon.

Answer: B

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

A. 1

B. 2

C. 3

D. 4

Answer: C



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30. Propanal is the functional isomer of

A. propane

B. propan-1-ol

C. propan-2-ol

D. propan-2-one.

Answer: D

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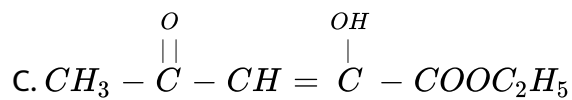
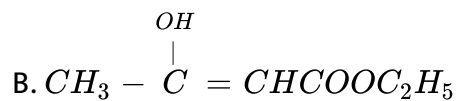
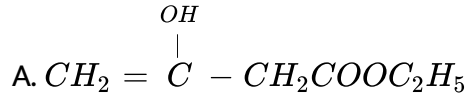
31. In tautomerism, the two tautomeric forms continuously change into each other through the oscillation of

- A. a proton
- B. π -electrons
- C. a proton and π -electrons
- D. none of the above.

Answer: C

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32. The enolic form of $\text{CH}_3 - \overset{\text{O}}{\text{C}} - \text{CH}_2\text{COOC}_2\text{H}_5$ is



D. none of the above.

Answer: B

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33. How many chain isomers are possible with the formula C_7H_{16} ?

A. 5

B. 7

C. 9

D. 18

Answer: C



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34. The isomerism shown by butan-1-amine and 2-methylpropan-1-amine is

- A. chain isomerism
- B. position isomerism
- C. functional isomerism
- D. metamerism

Answer: A



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35. The number of conformations exhibited by ethane is

- A. 1
- B. 2
- C. 3

D. infinite

Answer: D

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36. Which of the following statements is correct?

A. Ethane can have only three conformations.

B. In staggered conformation, the hydrogen atoms of the nearer methyl group just eclipse the hydrogen atoms of the farther methyl group.

C. The staggered conformer is more stable than the eclipsed conformer.

D. The staggered and eclipsed conformers of ethane can be isolated in the pure form.

Answer: C



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37. At room temperature, the staggered and eclipsed conformers of ethane continuously change into each other. This is because

- A. they are very unstable
- B. C-C bond is flexible
- C. the energy barrier between the two is not large enough to prevent rotation
- D. C atom in ethane has a tetrahedral nature.

Answer: C



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38. Which of the following letters possesses chirality ?

A

X

H

J

A. A

B. X

C. H

D. J

Answer: D



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39. A compound of the type $C_{abd} - C_{abd}$

A. does not show optical isomerism

B. has two optically active and one meso isomers

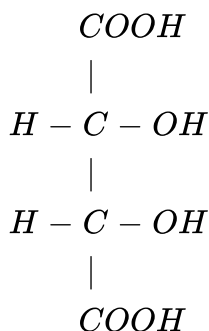
C. has two meso and one optically active isomers

D. has four optically active isomers.

Answer: B

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40. The compound represented by the following structure



is optically inactive because

- A. it contains no asymmetric carbon atom
- B. it contains two asymmetric carbon atoms and the molecule is chiral
- C. it has no element of symmetry
- D. it is an achiral molecule due to the presence of a plane of symmetry.

Answer: D

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41. Which of the following compounds does possess one or more asymmetric carbon atoms?

- A. Propan-1-ol
- B. Butan-2-ol
- C. Acetic acid
- D. Succinic acid

Answer: B

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42. The d- and l- forms of an optically active compound are called

- A. enantiomers
- B. diastereoisomers
- C. anomers

D. epimers

Answer: A

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43. Lactic acid (2-hydroxypropanoic acid) is an optically active compound.

It can be made optically inactive by

A. replacing its OH group by H

B. replacing its OH group by Cl

C. replacing its OH group by Br

D. none of the above.

Answer: A

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44. When pyruvic acid $\left(CH_3 - \overset{O}{\parallel} C - COOH \right)$ is reduced under normal conditions

- A. d-lactic acid is obtained
- B. l-lactic acid is obtained
- C. dl-lactic acid is obtained
- D. the process is called asymmetric synthesis.

Answer: C

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45. Which of the following types of compounds is unable to exhibit geometrical isomerism ?

- A. $abc = Cab$
- B. $axC = Cay$

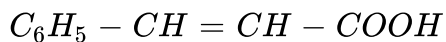
C. aaC = Cab

D. none of these

Answer: C

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46. Write the systematic IUPAC names of the following compounds :



A. geometrical isomerism

B. optical isomerism

C. both

D. none of the above.

Answer: A

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47. Which of the following compounds cannot exist in cis and trans forms?

- A. But-2-ene
- B. But-2-ene-1, 4-dioic acid
- C. 2-bromo-3-methylbut-2-ene
- D. But-2-enoic acid

Answer: C



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48. Which of the following statements is not correct?

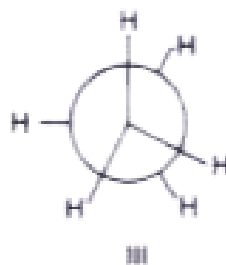
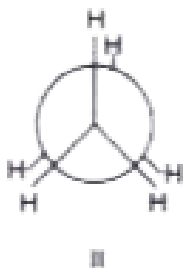
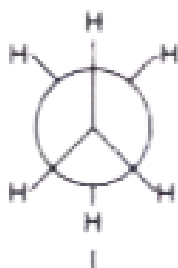
- A. Geometrical isomers possess different physical properties.
- B. Geometrical isomers can be separated by fractional distillation.
- C. cis-isomers are more stable than trans-isomers.

D. The chemical properties of geometrical isomers may or may not be similar.

Answer: C

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49. Consider the following conformations. Which of the following statements is correct?

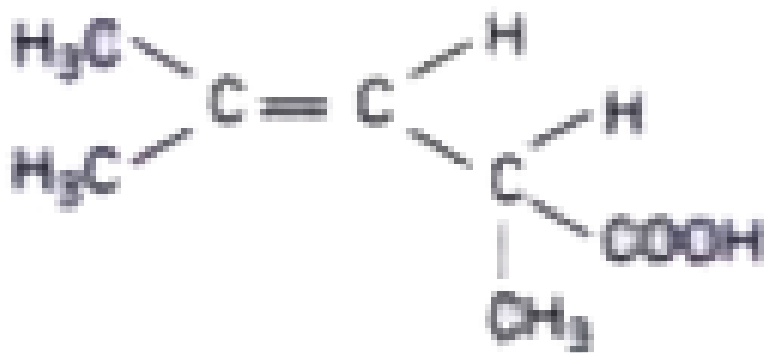


- A. Structure I represents staggered conformation.
- B. Structure II represents a skew conformation
- C. Structure III represents eclipsed conformation.
- D. I, II and III are the conformations of propane.

Answer: A

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50. The structure



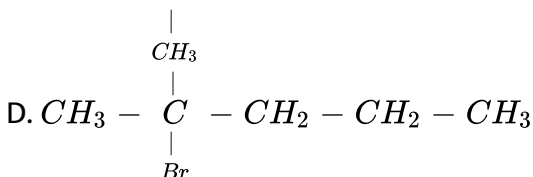
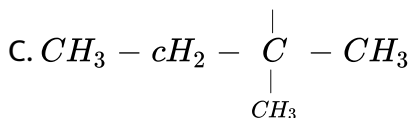
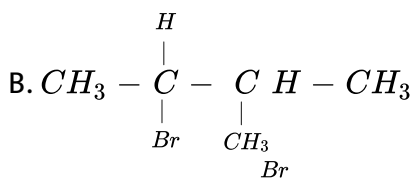
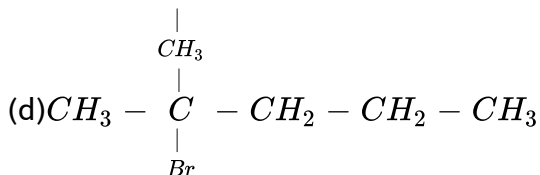
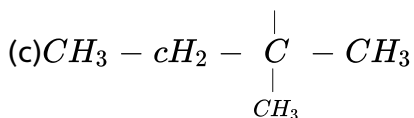
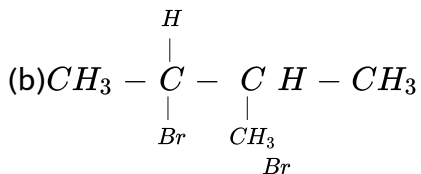
shows

- A. geometrical isomerism
- B. optical isomerism
- C. geometrical and optical isomerism
- D. tautomerism

Answer: B

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51. Which of the following has an asymmetric carbon atom ?

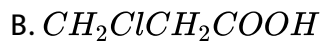


Answer: B



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52. The compound which does not exhibit optical isomerism is

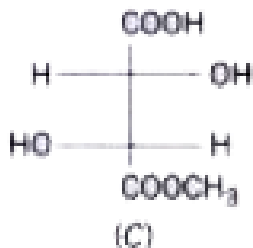
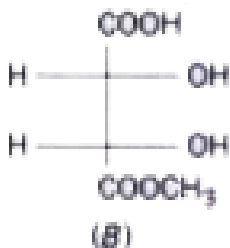
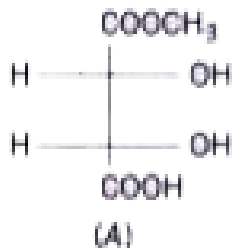


Answer: B



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53. The correct statements about the compounds A, B and C is



- A. A and B are identical
- B. A and B are diastereoisomers
- C. A and C are enantiomers
- D. A and B are enantiomers.

Answer: A



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54. How many optically active stereoisomers are possible for butane-2, 3-diol

1

2

3

4

A. 1

B. 2

C. 3

D. 4

Answer: B



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55. During debromination of meso-dibromobutane, the major compound formed is

n-butane

but-1-ene

cis-but-2-ene

trans-but-2-ene

A. n-butane

B. but-1-ene

C. cis-but-2-ene

D. trans-but-2-ene

Answer: D



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56. Which one of the following compounds will show geometrical isomerism ?

A. But-2-ene

B. Propene

C. Ethene

D. 2-methylbut-2-ene

Answer: A



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57. Out of the following, the alkene that exhibits optical isomerism is

3-methyl-2-pentene

4-methyl-1-pentene

3-methyl-1-pentene

2-methyl-2-pentene

A. 3-methyl-2-pentene

B. 4-methyl-1-pentene

C. 3-methyl-1-pentene

D. 2-methyl-2-pentene

Answer: C



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58. Identify the compound that exhibits tautomerism:

2-butene

lactic acid

2-pentanone

phenol

A. 2-butene

B. lactic acid

C. 2-pentanone

D. phenol

Answer: D



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59. How many chiral compounds are possible on monochlorination of 2-methyl butane?

- A. 8
- B. 2
- C. 4
- D. 6

Answer: B



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60. Which branched chain isomer of the hydrocarbon with molecular mass $72u$ gives only one isomer of mono substituted alkyl halide ?

- A. Tertiary butyl chloride
- B. Neopentane
- C. Isohexane

D. Neohexane

Answer: B

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61. Which of the following acids does not exhibit optical isomerism?

A. Maleic acid

B. α -amino acids

C. Lactic acid

D. Tartaric acid

Answer: A

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62. Lassaigne's test is used in the qualitative analysis to detect

A. nitrogen

B. sulphur

C. chlorine

D. all of these.

Answer: D



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63. A compound which does not give positive test for nitrogen is:

urea

azobenzene

glycine

phenyl hydrazine.

A. urea

B. azobenzene

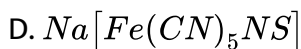
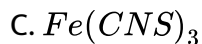
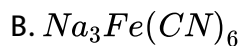
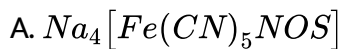
C. glycine

D. phenyl hydrazine.

Answer: B

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64. For detection of sulphur in an organic compound, sodium nitroprusside is added to the sodium extract. A violet colour is obtained which is due to the formation of



Answer: A

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65. In sodium fusion test of organic compounds, the nitrogen of an organic compound is converted to

- A. sodamide
- B. sodium cyanide
- C. sodium nitrite
- D. sodium nitrate.

Answer: B



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66. The Beilstein test for organic compounds is used to detect

- A. carbon
- B. halogens
- C. nitrogen
- D. sulphur

Answer: B

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67. In the Duma's method for estimating nitrogen in an organic compound, the gas finally collected is

A. N_2

B. NO

C. NH_3

D. None of these

Answer: A

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68. In Kjeldahl's method, nitrogen present is estimated as

A. N_2

B. NH_3

C. NO_2

D. none of these

Answer: B



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69. Carbon and hydrogen are estimated by

A. Liebig's method

B. Carius method

C. Duma's method

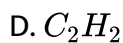
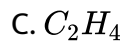
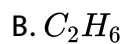
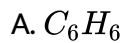
D. none of these.

Answer: A



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70. A compound containing 80% C and 20% H is likely to be:



Answer: B



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71. An organic compound is found to contain C - 40%. O = 53.34% and H = 6.66%. Its empirical formula is

A. CHO

B. CH_2O

C. C_2H_2O

D. CH_4O_2

Answer: B



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72. An organic compound has an empirical formula CH_2O . Its vapour density is 45. The molecular formula of the compound is

A. CH_2O

B. C_2H_5O

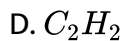
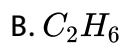
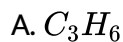
C. $C_3H_6O_3$

D. C_2H_2

Answer: C

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73. The empirical formula of a compound is CH_2 . One mole of this compound has a mass of 42 grams. Its molecular formula is

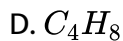
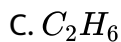
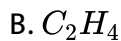


Answer: A

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74. The concentration of C = 85.45%, and H = 14.44% is not obeyed by the formula





Answer: C

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75. If two compounds have the same empirical formula but different molecular formula, they must have

A. different percentage composition

B. same viscosity

C. different molecular masses

D. same vapour density.

Answer: C

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76. 0.759 g of a silver salt of a dibasic organic acid on ignition gave 0.463 g of silver. The molecular mass of the acid is

- A. 70
- B. 140
- C. 108
- D. 216

Answer: B



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77. 0.400 g of chloroplatinate salt of a monoacid base on ignition gave 0.125 g of platinum. Find the molecular mass of the base.

- A. 104
- B. 107

C. 154

D. 214

Answer: B

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78. 0.500 g of the silver salt of an organic dibasic acid on ignition gives 0.325 g of pure silver. Find the molecular mass of the acid.

A. 59.15

B. 117.9

C. 119.6

D. 189.8

Answer: A

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79. In a Victor Meyer's determination of molecular mass, 0.1015 g of an organic substance displaced 26.16 mL of air at S.T.P. The molecular mass of the substance is

A. 22.4

B. 44.8

C. 76.4

D. 86.9

Answer: D



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80. 0.29 g of an organic compound on combustion gave 0.66 g of CO_2 and 0.27 g of H_2O . The percentage of carbon and hydrogen in the given compound respectively are

A. 10.3, 62.1

B. 44.6, 10.7

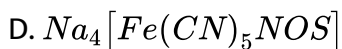
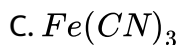
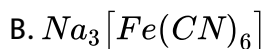
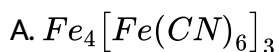
C. 62.1, 10.3

D. 10.7, 44.6

Answer: C

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81. The blue compound formed in the positive test for nitrogen with Lassaigne solution of an organic compound is



Answer: A

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82. The ammonia evolved from the treatment of 0.30 g of an organic compound for the estimation of nitrogen was passed in 100 mL of 0.1 M sulphuric acid. The excess of acid required 20 mL of 0.5 M sodium hydroxide solution for complete neutralisation. The organic compound is:

acetamide

benzamide

urea

thiourea

A. acetamide

B. benzamide

C. urea

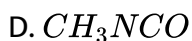
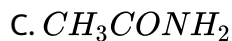
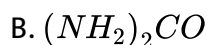
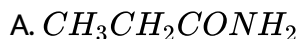
D. thiourea

Answer: C



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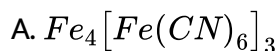
83. An organic compound having molecular mass 60 is found to contain C = 20%, H = 6.67% and N = 46.67% while rest is oxygen. On heating it gives NH_3 along with a solid residue. The solid residue gives violet colour with alkaline copper sulphate solution. The compound is?

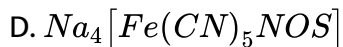
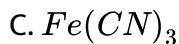
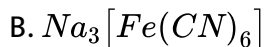


Answer: B

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84. The blue compound formed in the positive test for nitrogen with Lassaigne solution of an organic compound is





Answer: A

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85. 29.5 mg of an organic compound containing nitrogen was digested according to Kjeldahl's method and the evolved ammonia was absorbed in 20 mL of 0.1 M HCl solution. The excess of the acid required 15 mL of 0.1 M NaOH solution for complete neutralization. The percentage of nitrogen in the compounds is

A. 59.0

B. 47.4

C. 23.7

D. 29.5

Answer: C

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86. In Dumas' method for estimation of nitrogen, 0.3g of an organic compound gave 50mL of nitrogen collected at 300K temperature and 715mm pressure. Calculate the percentage composition of nitrogen in the compound. (Aqueous tension at 300K=15 mm)

- A. 16.45
- B. 17.45
- C. 14.45
- D. 15.45

Answer: A

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87. For testing halogens in an organic compound with $AgNO_3$ solution, sodium extract (Lassaigne's test) is acidified with dilute HNO_3 . What will happen if a student acidifies the extract with dilute H_2SO_4 in place of dilute HNO_3 ?

- A. helps in the precipitation of $AgCl$
- B. increases the solubility product of $AgCl$
- C. increases the concentration of NO_3^- ions
- D. decomposes Na_2S and $NaCN$, if formed

Answer: D

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88. In the Kjeldahl's method for estimation of nitrogen present in a soil sample, ammonia evolved from 0.75 g of sample neutralised 10 mL of 1 M H_2SO_4 . The percentage of nitrogen in the soil is

A. 37.33

B. 45.33

C. 35.33

D. 43.33

Answer: A



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89. For the estimation of nitrogen $1.4g$ of organic compound was digested by Kjeldahl method and the evolved ammonia was absorbed in $60mL$ of $\frac{M}{10}$ sulphuric acid. The unreacted acid required 20 ml of $\frac{M}{10}$ sodium hydroxide for complete neutralization. The percentage of nitrogen in the compound is :

A. 6 %

B. 10 %

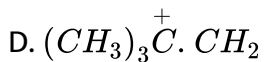
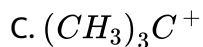
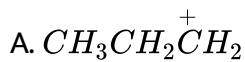
C. 3 %

D. 5 %

Answer: B

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90. Which of the following ions is most stable ?



Answer: C

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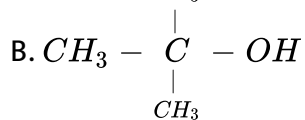
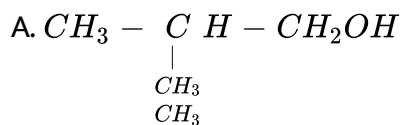
91. The number of electrons present in the valence shell of carbon bearing negative charge in a carbanion is

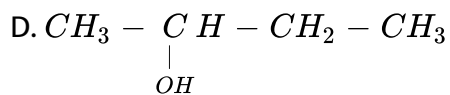
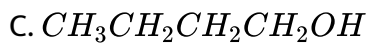
- A. 4
- B. 6
- C. 7
- D. 8

Answer: D

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92. The compound which gives the most stable carbonium ion on dehydration is





Answer: B

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93. In a free radical, the carbon atom carrying unpaired electron is

A. sp hybridised

B. sp^2 hybridised

C. sp^3 hybridised

D. dsp^2 hybridised

Answer: B

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94. Nitration of benzene is

- A. nucleophilic substitution
- B. nucleophilic addition
- C. electrophilic substitution
- D. free radical substitution.

Answer: C



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95. The reaction intermediates involved in the addition of HBr to propene in the presence of an organic peroxide are

- (a) free radicals
- (b) carbocations
- (c) carbanions
- (d) carbenes

A. free radicals

B. carbocations

C. carbanions

D. carbenes

Answer: A



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96. The shape of carbanion $[CH_3]^-$ is:

linear

bent

pyramidal

tetrahedral

A. linear

B. bent

C. pyramidal

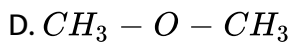
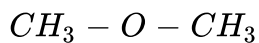
D. tetrahedral

Answer: C



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97. Which of the following is an electrophile ?



Answer: B



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98. Heterolytic fission of C—Cl bond produces

two free radicals

two carbonium ions

two carbanions

one cation and one anion.

A. two free radicals

B. two carbonium ions

C. two carbanions

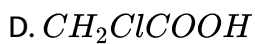
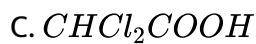
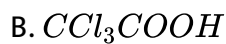
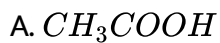
D. one cation and one anion.

Answer: D



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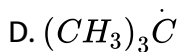
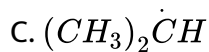
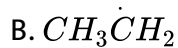
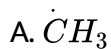
99. Which one of the following is the strongest acid ?



Answer: B

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100. The most stable free radical is



Answer: D

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101. The formation of cyanohydrin from a ketone is an example of
nucleophilic substitution
electrophilic substitution
electrophilic addition
nucleophilic addition.

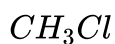
- A. nucleophilic substitution
- B. electrophilic substitution
- C. electrophilic addition
- D. nucleophilic addition.

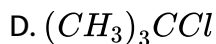
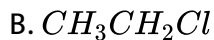
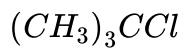
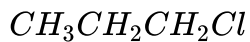
Answer: D



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102. Which of the following alkyl halides is hydrolysed by S_N1 mechanism ?





Answer: D



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103. Which of the following does contain three pairs of electrons ?

A. Carbocation

B. Carbanion

C. Free radical

D. None of these.

Answer: A

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104. Amongst the following, which are true for S_N2 reaction ? (i) The rate of reaction is independent of the concentration of the nucleophile. (ii) The nucleophile attacks the carbon atom on the side of the molecule opposite to the group being displaced. (iii) The reaction proceeds with simultaneous bond formation and bond rupture.

A. (i), (ii)

B. (i), (iii)

C. (i), (ii), (iii)

D. (ii), (iii)

Answer: D

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105. Nucleophiles are _____ while electrophiles are _____ .

- A. Lewis acids
- B. Lewis bases
- C. amphoteric
- D. none of these.

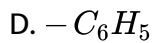
Answer: B



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106. The + I-effect is shown by

- A. CH_3
- B. $-OH$
- C. F



Answer: A



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107. Wilkinson's catalyst is

A. Ni

B. $[(C_6H_5)_3P]_3RhCl$

C. $LiAlH_4$

D. Fe_2O_3

Answer: B



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108. The hardness of water is estimated by

(a) conductivity method

(b) EDTA method

(c) titrimetric method

(d) distillation method

A. conductivity method

B. EDTA method

C. titrimetric method

D. distillation method

Answer: B



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109. Which of the following is an organometallic compound ?

A. Lithium methoxide

B. Lithium acetate

C. Lithium dimethylamide

D. Methyllithium.

Answer: D

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110. Which of the following is an organometallic compound ?

A. $Ti(C_2H_5)_4$

B. $Ti(OC_2H_5)$

C. $Ti(OCOCH_3)_4$

D. $Ti(OC_6H_5)_4$.

Answer: A

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111. In the compound, lithium tetrahydroaluminate, the ligand is

A. H^+

B. H

C. H^-

D. None of these

Answer: C



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112. Which of the following ligands does form a chelate ?

A. Acetate

B. Oxalate

C. Cyanide

D. Ammonia

Answer: B

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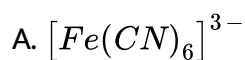
113. The geometry of $Ni(CO)_4$ and $Ni(PPh_3)Cl_2$ are

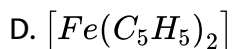
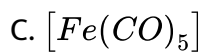
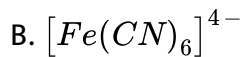
- A. both square planar
- B. tetrahedral and square planar respectively
- C. both tetrahedral
- D. square planar and tetrahedral respectively.

Answer: C

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114. Ferrocene is described by the formula

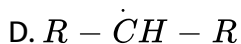
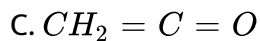
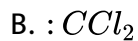
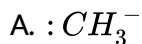




Answer: D

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115. Which of the following species is a carbene?



Answer: B

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116. In a triplet carbene, the central carbon atom

- A. is sp^2 hybridised
- B. contains a lone pair of electrons
- C. forms one σ and one π bonds with the groups attached
- D. contains two unpaired electrons.

Answer: D



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117. Which of the following species does act as an electrophile ?

- A. H_2O
- B. $CH_3 - O - CH_3$
- C. $\overset{\cdot}{C}H_3$
- D. CH_3NH_2

Answer: C

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118. The reaction, $RX + OH^- \rightarrow R - OH + X^-$, is

- A. an electrophilic substitution reaction
- B. a nucleophilic substitution reaction
- C. a free radical substitution reaction
- D. an elimination reaction.

Answer: B

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119. The reaction $CH_3Br + OH^- \rightarrow CH_3OH + Br^-$ follows

- A. S_N1 mechanism

B. S_N2 mechanism

C. either of the above two

D. none of the above two

Answer: B



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120. An S_N2 reaction occurs through the formation of a

A. carbocation

B. carbanion

C. free radical

D. transition state.

Answer: D



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121. The reaction, $CH_4 + Cl_2 \xrightarrow{h\nu} CH_3Cl + HCl$, occurs through

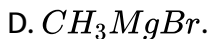
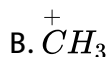
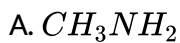
- A. electrophilic substitution
- B. nucleophilic substitution
- C. free radical substitution
- D. none of the above.

Answer: C



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122. Which of the following acts as a nucleophile?



Answer: A



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123. Which of the following has the highest nucleophilicity ?

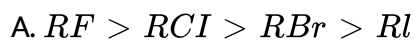
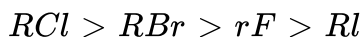
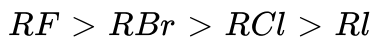
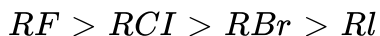


Answer: C



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124. The order of reactivities of the following alkyl halides for an S_N2 reaction is:

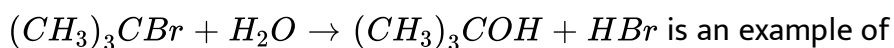


Answer: D



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125. Following reaction,



elimination reaction

free radical substitution

nucleophilic substitution

electrophilic substitution.

A. elimination reaction

B. free radical substitution

C. nucleophilic substitution

D. electrophilic substitution.

Answer: C



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126. Due to the presence of an unpaired electron, free radicals are

A. cations

B. anions

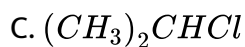
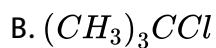
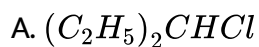
C. chemically inactive

D. chemically reactive.

Answer: D

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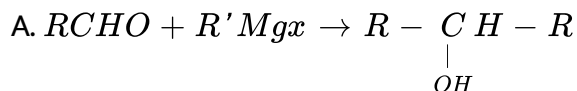
127. The organic chloro compound, which shows complete stereochemical inversion during a S_N2 reaction is



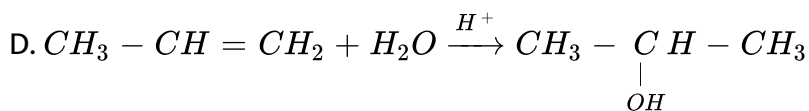
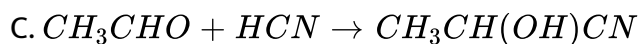
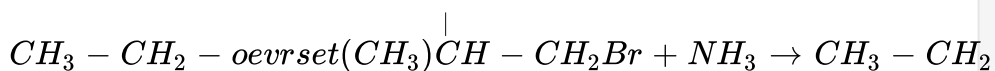
Answer: D

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128. Which one is a nucleophilic substitution reaction among the following ?



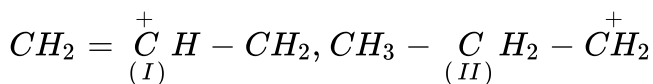
B.

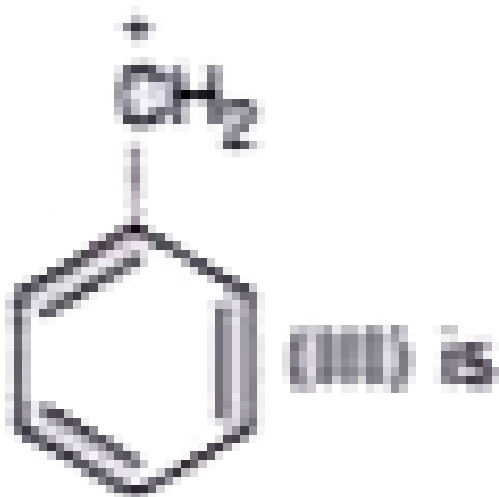


Answer: B

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129. The order of stability of the following carbocations





A. III gt II gt I

B. II gt III gt I

C. I gt II gt III

D. III gt I gt II

Answer: D

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130. The correct statement regarding electrophile is

- A. Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from a nucleophile.
- B. Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from another electrophile.
- C. Electrophiles are generally neutral species and can form a bond by accepting a pair of electrons from a nucleophile.
- D. Electrophile can be either neutral or positively charged species and can form a bond by accepting a pair of electrons from a nucleophile.

Answer: D



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131. The most suitable method of separation of 1:1 mixture of ortho and para-nitrophenols is :
sublimation

chromatography

crystallisation

steam distillation

A. sublimation

B. chromatography

C. crystallisation

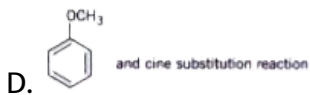
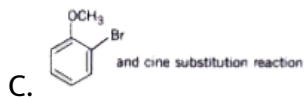
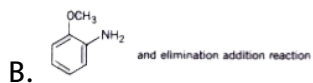
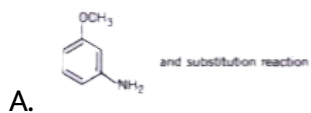
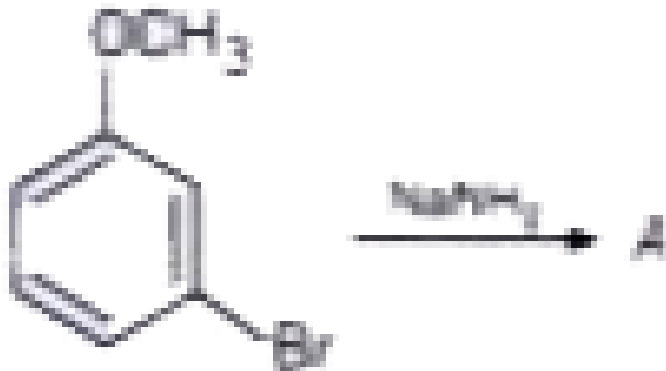
D. steam distillation

Answer: D



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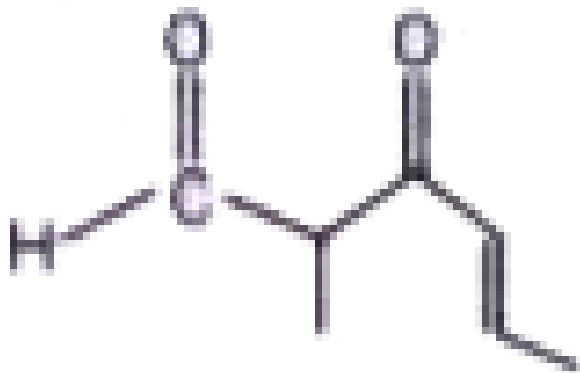
132. Identify A and predict the type of reaction



Answer: A

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133. The IUPAC name of the compound

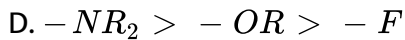
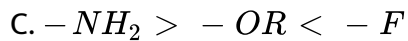
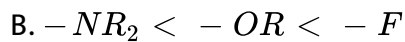
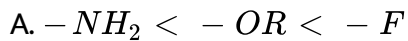


- A. 3-keto-2-methylhex-4-enal
- B. 5-formylhex-2-en-3-one
- C. 5-methyl-4-oxohex-2-en-5-al
- D. 3-keto-2-methylhex-5-enal

Answer: A

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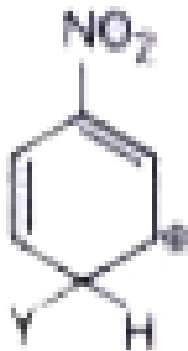
134. Which of the following is correct with respect to $-I$ -effect of the substituents? (R = alkyl)

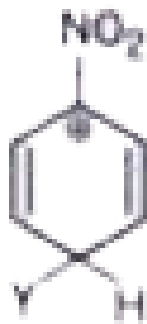


Answer: A

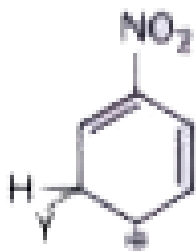
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135. Which of the following carbocations is expected to be most stable?





B.



C.

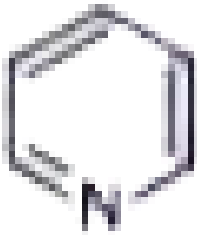


D.

Answer: C

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136. Which of the following compounds will be suitable for Kjeldahl's method for nitrogen estimation?



(a)



(b)



(c)



(d)



A.



Answer: B

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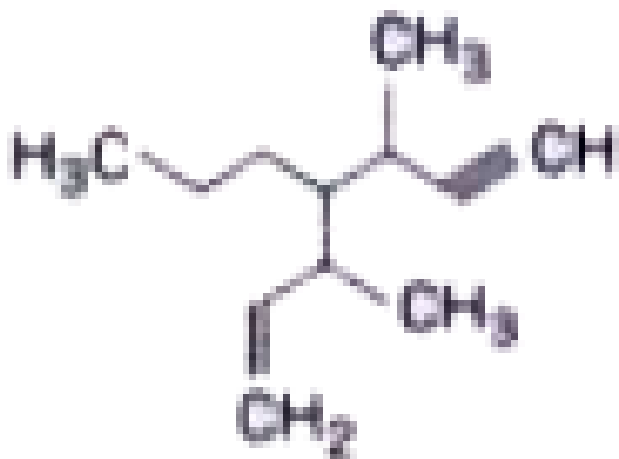
137. The number of sigma (σ) and pi (π) bonds in pent-2-en-4-yne is :

- A. 11 σ bonds and 2 π bonds
- B. 13 σ bonds and no π bonds
- C. 10 σ bonds and 3 π bonds
- D. 8 σ bonds and 5 π bonds.

Answer: C

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138. The IUPAC name for the following compound is :



- A. 3, 5-dimethyl-4-propylhept-1-en-6-yne
- B. 3-methyl-4-(3-methylprop-1-enyl)-1-heptyne
- C. 3-methyl-4-(1-methylprop-2-enyl)-1-heptene
- D. 3, 5-dimethyl-4-propylhept-6-en-1-yne.

Answer: A

139. Increasing order of reactivity of the following compounds for S_N1 substitution is :



A. (A) < (B) < (D) < (C)

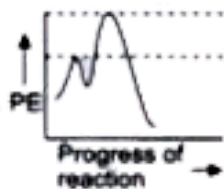
B. (B) < (C) < (D) < (A)

C. (B) < (C) < (A) < (D)

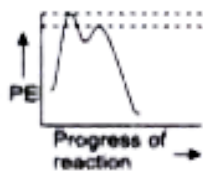
D. (B) < (A) < (D) < (C).

Answer: D

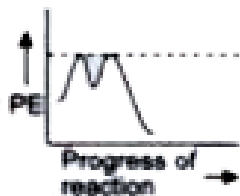
140. Which of the following is potential energy diagram for S_N1 reaction?



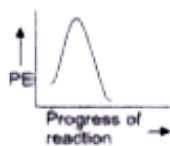
A.



B.



C.



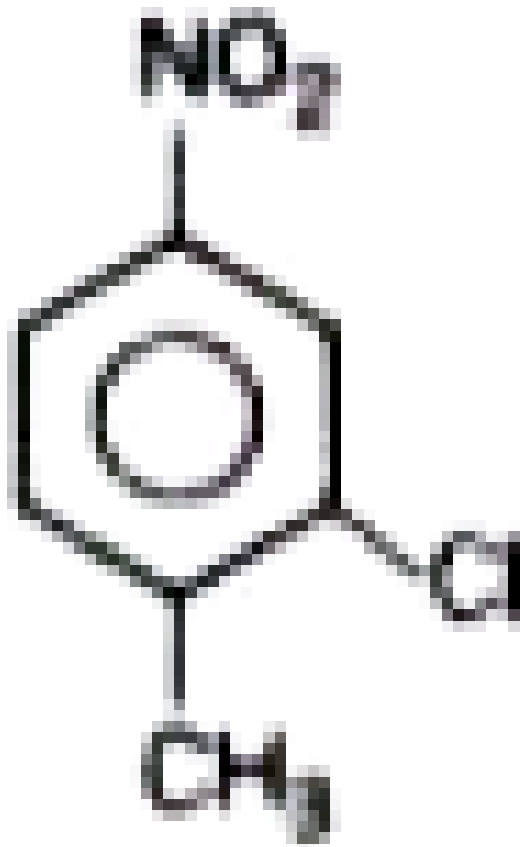
D.

Answer: B



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141. The correct IUPAC name of the following compound is :



A. 5-chloro-4-methyl-1-nitrobenzene

B. 2-chloro-1-methyl-4-nitrobenzene

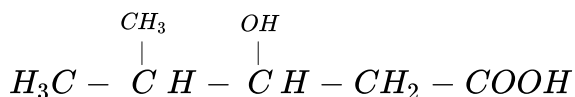
C. 2-methyl-5-nitro-1-chlorobenzene

D. 3-chloro-4-methyl-1-nitrobenzene.

Answer: B

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142. The *IUPAC* name of the following compound is:



- A. 4,4-dimethyl-3-hydroxybutanoic acid
- B. 2-methyl-3-hydroxypentan-5-oic acid
- C. 4-methyl-3-hydroxypentanoic acid
- D. 3-hydroxy-4-methylpentanoic acid.

Answer: D

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True Or False Type Questions

1. The property of catenation is shown by silicon also but it is much less pronounced as compared to that shown by carbon.

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2. Organic reactions are generally ionic in nature.

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3. Organic compounds exhibit isomerism due to the presence of rigid and directional covalent bonds.

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4. Open chain compounds are also known as alicyclic compounds.

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5. The behaviour of alicyclic compounds is similar to those of aliphatic compounds.

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6. The compound $CH_3 - CH_2 - CH_3$ contains two 1° and one 2° carbon atoms.

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7. Propane forms only one alkyl group.

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8. The IUPAC name of the compound $CH_3 - \underset{C_2H_5}{C} H - CH_3$ is 2-ethylpropane.

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9. Para disubstituted derivatives of benzene are 1, 4-derivatives.

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10. The principal functional group is indicated by adding a specific suffix to the word root.

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11. Presence of double bond in a compound is indicated by adding a prefix to the word root.

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12. $-NH_2$ group is placed higher as compared to $-OH$ group in the seniority table for functional groups.

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13. 1-bromobutane and 1-bromo-2-methylpropane are chain isomers.

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14. Propanal and propan-2-one are metamers.

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15. Propane shows chain isomerism.

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16. The two tautomeric forms of a substance are equally stable.

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17. 1,2-dibromoethene shows geometrical isomerism.

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18. Which of the following compounds will exhibit cis-trans (geometrical) isomerism?

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19. Explain why cis-isomer is less stable as compared to trans isomer

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20. The letter P is chiral in nature.

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21. The stereoisomers which are superimposable mirror images of each other are called enantiomers.

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22. A molecule having a plane of symmetry is a chiral molecule.

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23. The net optical rotation of a racemic mixture is zero due to external compensation. True/False

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24. An asymmetric carbon atom is a chiral centre.

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25. Enantiomers may possess different rates of reactions with other optically active compounds.

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26. Do Diastereoisomers have similar physical properties?

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27. CCl_4 gives a white precipitate when treated with $AgNO_3$.

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28. When a drop of water is added to anhydrous $CuSO_4$, it turns blue.

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29. In Lassaigne's test, if both N and S are present in the organic compound, they are converted to ___

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30. In chloroform layer test, chlorine water acts as an oxidising agent. True/False

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31. In Duma's method, nitrogen is estimated as NH_3 .

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32. Schiff's nitrometer used in Duma's method contains a KOH solution over mercury.

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33. Why does vanadium pentoxide acts as a catalyst?

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34. One gram equivalent of a weak acid is unable to completely neutralise one gram equivalent of a strong base.

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35. Phosphorus is estimated as $Mg_3(PO_4)_2$ in an organic compound.
Yes/No?

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36. Victor Meyer's method for determination of molecular mass is applicable only to volatile organic compounds.

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37. How is the molecular formula of a compound related to its empirical formula ?



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38. Chloroplatinate salts are very stable and do not decompose on heating.



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39. C_6H_5 -group causes - I-effect when present in a saturated chain of carbon atoms.



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40. 1° alkyl groups cause greater + I-effect as compared to 2° alkyl groups. True/False.

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41. Electromeric effect is a effect and involves transfer of electrons of a multiple bond.

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42. Mesomeric effect is a temporary effect. True or False.

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43. Mesomeric effect involves delocalisation of pi-electrons of all the double bonds present in a conjugated system.

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44. Hyperconjugation effect comes into existence when a C-H bond is present at Beta-position to a double bond.

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45. The central carbon in a free radical is sp^3 hybridised.

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46. Carbocations are planar species.

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47. The reactivity of carbanions follows the order $3^\circ > 2^\circ > 1^\circ$.

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48. What is the state of hybridisation of the central carbon in a carbocation ?

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49. Electrophiles are Lewis acids.

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50. Explain why does a S_N2 reaction involve an inversion in configuration.

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Fill In The Blank Type Questions

1. In the laboratory, urea was first prepared by heating

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2. Organic compounds are in nature and possess melting and boiling points.

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3. Unsaturated hydrocarbons are the compounds of andand contain one or more bonds.

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4. The neopentane contains 1° and 4° carbon atoms.

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5. The functional group present in nitriles is

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6. In a homologous series, two successive members differ by a group and a molecular mass of amu.

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7. The IUPAC name of tertiary butyl chloride is

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8. The IUPAC name of formic acid is

 [Watch Video Solution](#)

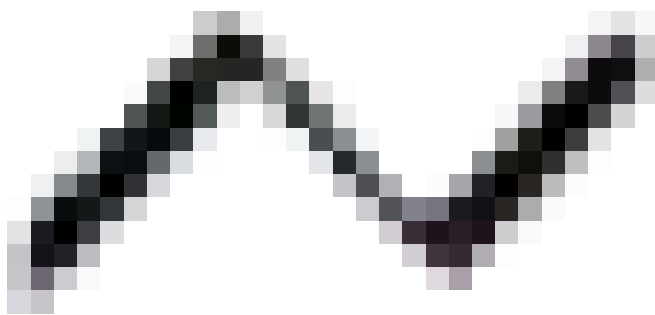
9. The functional group present in thioalcohols is.....

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10. The IUPAC name of $CH_3 - \underset{OH}{C}H - CH_2 - CH_3$ is

[▶ Watch Video Solution](#)

11. IUPAC name of the compound is



[▶ Watch Video Solution](#)

12. When two or more compounds having the same molecular formula differ in physical or chemical properties, the phenomenon is known as

..... and such compounds are called ...

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13. Chain isomerism is also referred to as isomerism.

 [Watch Video Solution](#)

14. Butan-1-ol and 2-methylpropan-1-ol differ in theirskeletons and show isomerism.

 [Watch Video Solution](#)

15. Pentane has chain isomers.

 [Watch Video Solution](#)

16. The ring-chain isomers possible with the molecular formula C_3H_6 are and

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17. In tautomerism, the two tautomeric forms continuously change into each other through the oscillation of

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18. Maleic acid and fumaric acid are isomers.

 [Watch Video Solution](#)

19. The main cause of geometrical isomerism is the ... carbon atoms about a bond.

 [Watch Video Solution](#)

20. The geometrical isomers have but not chemical properties.

 [Watch Video Solution](#)

21. Plane polarised light is obtained by passing the ordinary light through

.....

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22. Molecules whose mirror image is non-superimposable over them are known as chiral. Which of the following molecules is chiral in nature?

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23. When is a molecule said to be dissymmetric ? Give a brief account of the elements of symmetry.

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24. The process of separation of a racemic mixture into d- and l- components is called

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25. The net optical rotation of meso-tartaric acid is due to compensation.

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26. Prussian blue is

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27. When an organic compound contains a halogen along with N and S, halogen can be tested only after boiling the sodium extract with



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28. The yellow precipitate obtained in the detection of phosphorus is



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29. In the estimation of nitrogen by Kjeldahl's method, the compound is heated with in presence of



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30. In the estimation of sulphur by Carius method, sulphur is oxidised to which is precipitated as by addition of



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31. Victor Meyer's method makes use of the fact that gram mole of a substance in gaseous state occupies a volume of cc at S.T.P.

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32. Molecular mass of an acid = Equivalent mass x

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33. Inductive effect involves

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34. The + I-effect of alkyl groups is in the order > 2° >

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35. Electromeric effect is a effect and involves transfer of electrons of a multiple bond.

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36. Among $-OH$ and $>C=O$, the group causing + M-effect is group.

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37. Why is a 3 free radical more stable as compared to 1° and 2° free radicals?

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38. The central carbon in a carbocation is hybridised.

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39. What are carbocations ? Discuss their orbital structure and explain the relative order of the stability of various types of carbocations.

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40. In a singlet carbene, the lone pair of electrons is present in ahybridised orbital.

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41. Free radicals and carbenes act as philic reagents.

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42. Nucleophiles are Lewis and possess pair of electrons.

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43. What is molarity?

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44. What is the optical nature of the product obtained in an S_{N1} reaction if the substrate is optically active ?

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45. The Friedel-Crafts methylation of benzene involves

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46. Addition of bromine to ethylene is addition reaction.

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Assertion Reason Type Questions

1. Assertion: - 3° carbocations are more stable than 1° and 2° carbocations.

Reason :- The +I effect of alkyl groups decreases the magnitude of positive charge to the maximum possible extent in a 3° carbocation

- A. If both Assertion and Reason are CORRECT and Reason is the CORRECT explanation of the Assertion.
- B. If both Assertion and Reason are CORRECT but Reason is not the CORRECT explanation of the Assertion.
- C. If Assertion is CORRECT but Reason is INCORRECT.
- D. If Assertion is INCORRECT but Reason is CORRECT.

Answer: A



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2. Assertion: -The addition of HCl to unsymmetrical alkenes in the presence of organic peroxides takes place against Markownikoff's rule.

Reason :- 2° free radicals are more stable than 1° free radicals.

A. If both Assertion and Reason are CORRECT and Reason is the CORRECT explanation of the Assertion.

B. If both Assertion and Reason are CORRECT but Reason is not the CORRECT explanation of the Assertion.

C. If Assertion is CORRECT but Reason is INCORRECT.

D. If Assertion is INCORRECT but Reason is CORRECT.

Answer: D



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3. Assertion: -But-1-ene on reaction with HBr in the presence of a peroxide produces 1-bromobutane.

Reason :-It involves the formation of a primary radical.

- A. If both Assertion and Reason are CORRECT and Reason is the CORRECT explanation of the Assertion.
- B. If both Assertion and Reason are CORRECT but Reason is not the CORRECT explanation of the Assertion.
- C. If Assertion is CORRECT but Reason is INCORRECT.
- D. If Assertion is INCORRECT but Reason is CORRECT.

Answer: C

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4. Assertion : Addition of bromine to trans-but-2-ene yields meso-2,3-dibromobutane.

Reason : Bromine addition to an alkene is a nucleophilic addition

(a) If both Assertion and Reason are CORRECT and Reason is the CORRECT explanation of the Assertion.

(b) If both Assertion and Reason are CORRECT but Reason is not the CORRECT explanation of the Assertion.

(c) Assertion is CORRECT but Reason is INCORRECT.

(d) Assertion is CORRECT but Reason is INCORRECT.

A. If both Assertion and Reason are CORRECT and Reason is the CORRECT explanation of the Assertion.

B. If both Assertion and Reason are CORRECT but Reason is not the CORRECT explanation of the Assertion.

C. If Assertion is CORRECT but Reason is INCORRECT.

D. If Assertion is INCORRECT but Reason is CORRECT.

Answer: B



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5. Assertion: - $\overset{\cdot}{C}H_3$ acts as an electrophile.

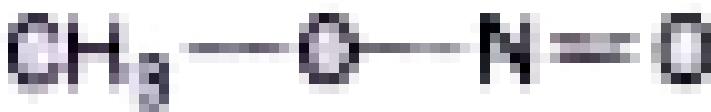
Reason :-The carbon atom in $\overset{\cdot}{C}H_3$ is in a state of sp^2 hybridisation.

- A. If both Assertion and Reason are CORRECT and Reason is the CORRECT explanation of the Assertion.
- B. If both Assertion and Reason are CORRECT but Reason is not the CORRECT explanation of the Assertion.
- C. If Assertion is CORRECT but Reason is INCORRECT.
- D. If Assertion is INCORRECT but Reason is CORRECT.

Answer: B



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6. Assertion: -

No and do not represent the resonance structures.

Reason :-The two structures involve a change in the position of atoms,

- A. If both Assertion and Reason are CORRECT and Reason is the CORRECT explanation of the Assertion.
- B. If both Assertion and Reason are CORRECT but Reason is not the CORRECT explanation of the Assertion.
- C. If Assertion is CORRECT but Reason is INCORRECT.
- D. If Assertion is INCORRECT but Reason is CORRECT.

Answer: A



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7. Assertion: - In a fractionating column, the processes of evaporation and condensation occur automatically several times.

Reason :-A fractionating column is provided with obstructions to the passage of vapours upwards and to the liquid downwards.

- A. If both Assertion and Reason are CORRECT and Reason is the CORRECT explanation of the Assertion.
- B. If both Assertion and Reason are CORRECT but Reason is not the CORRECT explanation of the Assertion.
- C. If Assertion is CORRECT but Reason is INCORRECT.
- D. If Assertion is INCORRECT but Reason is CORRECT.

Answer: B



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8. Assertion: - The mixture of steam with an organic liquid boils at a temperature much lower than the boiling points of organic liquid and water.

Reason :- The mixture of steam and an organic liquid is completely immiscible. For such a system, the total vapour pressure is equal to the sum of the individual vapour pressure of water and the liquid.

A. If both Assertion and Reason are CORRECT and Reason is the CORRECT explanation of the Assertion.

B. If both Assertion and Reason are CORRECT but Reason is not the CORRECT explanation of the Assertion.

C. If Assertion is CORRECT but Reason is INCORRECT.

D. If Assertion is INCORRECT but Reason is CORRECT.

Answer: A



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9. Assertion: - Higher the R_f value of a substance, greater is the time taken by it for elution.

Reason :- The time taken by a substance for elution is greater when it is adsorbed more strongly on the adsorbent.

A. If both Assertion and Reason are CORRECT and Reason is the CORRECT explanation of the Assertion.

B. If both Assertion and Reason are CORRECT but Reason is not the CORRECT explanation of the Assertion.

C. If Assertion is CORRECT but Reason is INCORRECT.

D. If Assertion is INCORRECT but Reason is CORRECT.

Answer: D



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10. Explain why :

A blood red colouration is obtained on addition of $FeCl_3$ to Lassaigne's solution when the compound contains both N and S.

- A. If both Assertion and Reason are CORRECT and Reason is the CORRECT explanation of the Assertion.
- B. If both Assertion and Reason are CORRECT but Reason is not the CORRECT explanation of the Assertion.
- C. If Assertion is CORRECT but Reason is INCORRECT.
- D. If Assertion is INCORRECT but Reason is CORRECT.

Answer: C



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11. Assertion: - In mass spectrometry, the molecular ion peak gives the molecular mass of the compound.

Reason :-The molecular mass of the molecular ion is the same as that of the compound taken.

- A. If both Assertion and Reason are CORRECT and Reason is the CORRECT explanation of the Assertion.
- B. If both Assertion and Reason are CORRECT but Reason is not the CORRECT explanation of the Assertion.
- C. If Assertion is CORRECT but Reason is INCORRECT.
- D. If Assertion is INCORRECT but Reason is CORRECT.

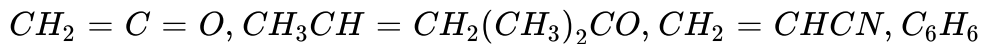
Answer: A



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Ncert Text Book Exercises With Hints And Solutions

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



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2. Indicate the σ and π bonds in the following molecules:

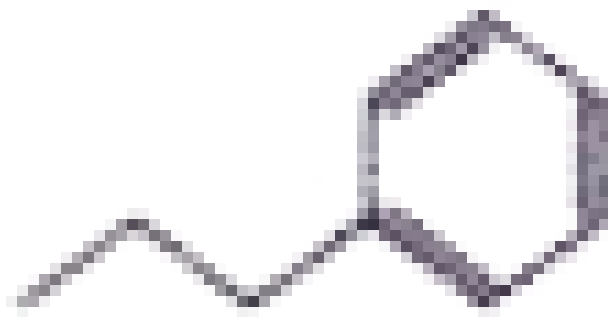


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3. Write bond line formulas for : 2, 3-dimethyl butanal, Heptan-4-one.

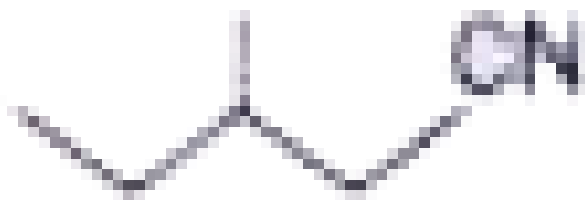
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4. Give the I.U.P.A.C. names of the following compounds:



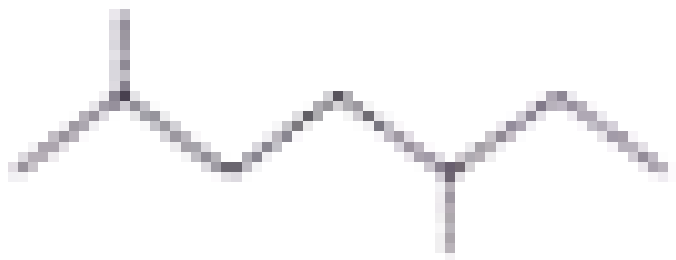
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5. Give the I.U.P.A.C. names of the following compounds:



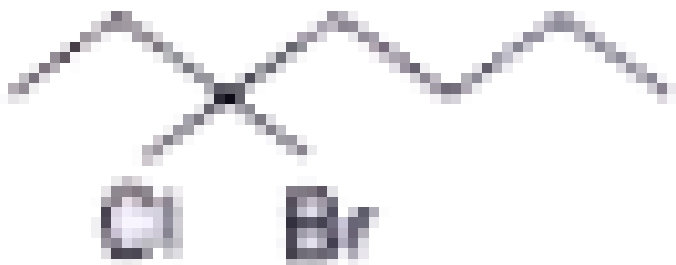
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6. Give the I.U.P.A.C. names of the following compounds:



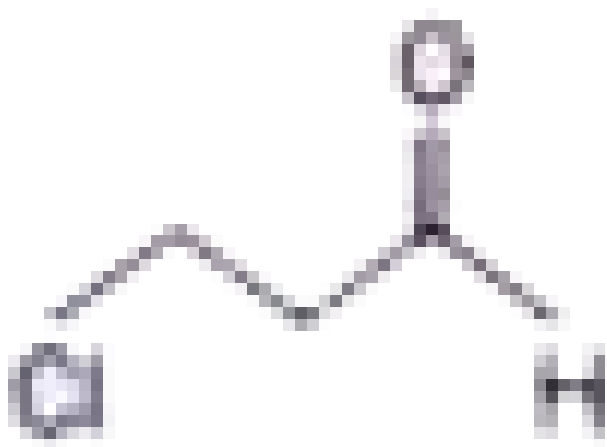
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7. Give the I.U.P.A.C. names of the following compounds:



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8. Give the I.U.P.A.C. names of the following compounds:



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9. Give the I.U.P.A.C. names of the following compounds:



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10. Which of the following represents the correct I.U.P.A.C. name for the compounds concerned?

2,2-dimethylpentane or 2-dimethylpentane

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11. Which of the following represents the correct I.U.P.A.C. name for the compounds concerned?

2,2-dimethylpentane or 2-dimethylpentane

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12. Which of the following represents the correct I.U.P.A.C. name for the compounds concerned?

2-chloro-4-methylpentane or 4-chloro-2-methylpentane

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13. Which of the following represents the correct I.U.P.A.C. name for the compounds concerned?

But-3-yn-1-ol or But-4-ol-1-yne.

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14. Draw formulas for the first five members of each homologous series beginning with the following compounds :



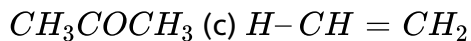
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15. Draw formulas for the first five members of each homologous series beginning with the following compounds :



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16. Draw formulas for the first five members of each homologous series beginning with the following compounds. (a) $H - COOH$ (b)



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17. Give condensed and bond line structural formulas and identify the functional group(s) present, if any, for :

(a) 2,2,4-Trimethylpentane

(b) 2-Hydroxy-1,2,3-propanetricarboxylic acid

(c) Hexanedial

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18. Give condensed and bond line structural formulas and identify the functional group(s) present, if any, for :

(a) 2,2,4-Trimethylpentane

(b) 2-Hydroxy-1,2,3-propanetricarboxylic acid

(c) Hexanedial

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19. Give condensed and bond line structural formulas and identify the functional group(s) present, if any, for :

(a) 2,2,4-Trimethylpentane

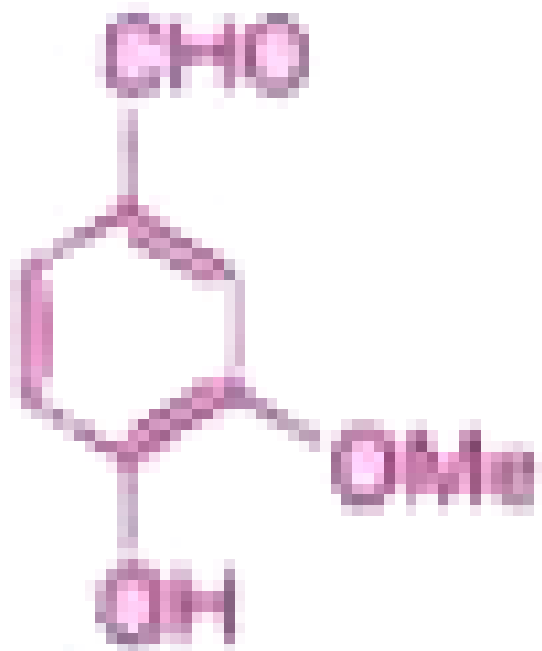
(b) 2-Hydroxy-1,2,3-propanetricarboxylic acid

(c) Hexanedial



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20. Identify the functional groups in the following compounds:



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21. Identify the functional groups in the following compounds:



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22. Identify the functional groups in the following compounds:



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23. Which of the two: $O_2NCH_2CH_2O^-$ or $CH_3CH_2O^-$ is expected to be more stable and why?

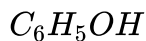
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24. Explain why alkyl groups act as electron donors when attached to a π system



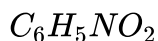
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25. Draw the resonance structures for the following compounds. Show the electron shift using curved-arrow notation.



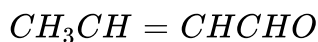
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26. Draw the resonance structures for the following compounds. Show the electron shift using curved-arrow notation.



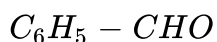
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27. Draw the resonance structures for the following compounds. Show the electron shift using curved-arrow notation.



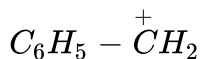
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28. Draw the resonance structures for the following compounds. Show the electron shift using curved-arrow notation.



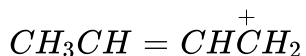
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29. Draw the resonance structures for the following compounds. Show the electron shift using curved-arrow notation.



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30. Draw the resonance structures for the following compounds. Show the electron shift using curved-arrow notation.

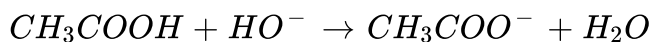


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31. What are electrophiles and nucleophiles ? Explain with examples.

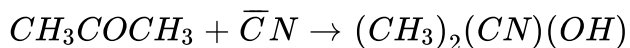
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32. Identify the reagents shown in bold in the following equations as nucleophiles or electrophiles :



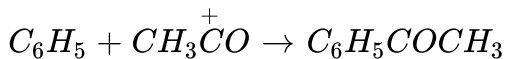
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33. Identify the reagents shown in bold in the following equations as nucleophiles or electrophiles :



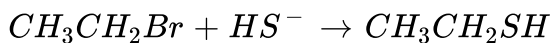
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34. Identify the reagents shown in bold in the following equations as nucleophiles or electrophiles :



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35. Classify the following reactions in one of the reaction type studied in this unit.



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36. Classify the following reactions in one of the reaction type studied in this unit.



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37. Identify the following reactions as either oxidation or reduction : $\text{Cl} + \text{e} \rightarrow \text{Cl}^-$

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38. What is Electrophiles?

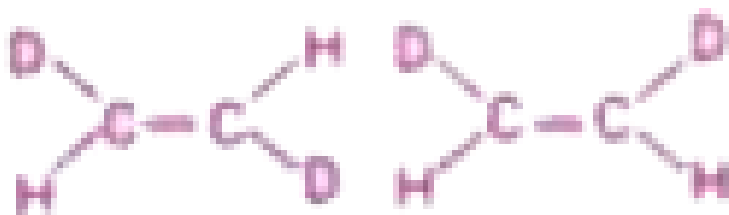
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39. What is the relationship between the members of following pairs of structures? Are they structural or geometrical isomers or resonance contributors?



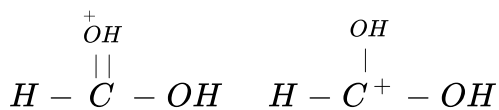
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40. What is the relationship between the members of following pairs of structures? Are they structural or geometrical isomers or resonance contributors?



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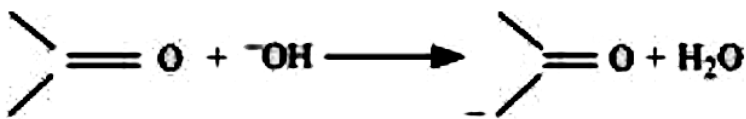
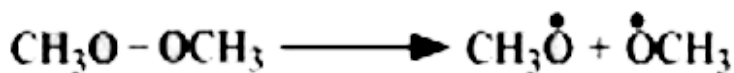
41. What is the relationship between the members of following pairs of structures? Are they structural or geometrical isomers or resonance contributors?



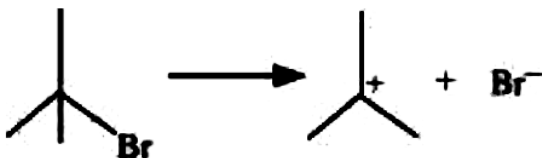
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42. For the following bond cleavages, use curved-arrows to show the electron flow and classify each as homolysis or heterolysis. Identify reactive intermediate produced as free radical, carbocation and carbanion.

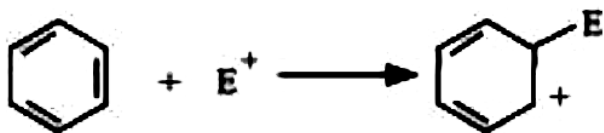
(a)



(c)



(d)



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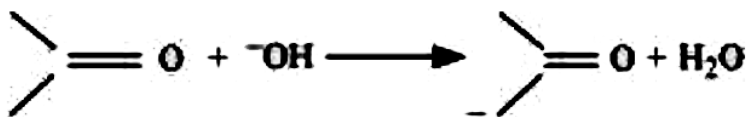
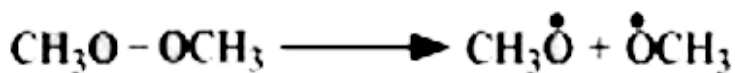
43. For the following bond cleavages, use curved-arrows to show the electron flow and classify each as homolysis or heterolysis. Identify reactive intermediate produced as free radical, carbocation and carbanion.



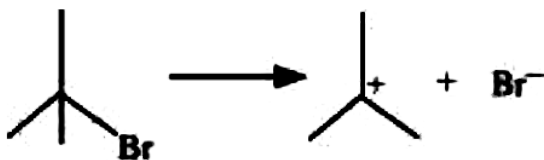
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44. For the following bond cleavages, use curved-arrows to show the electron flow and classify each as homolysis or heterolysis. Identify reactive intermediate produced as free radical, carbocation and carbanion.

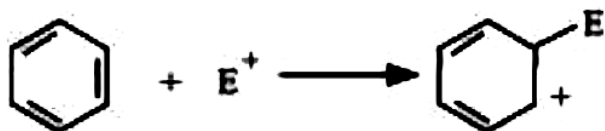
(a)



(c)



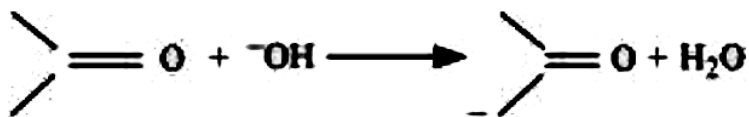
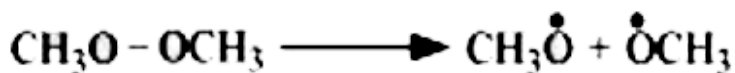
(d)



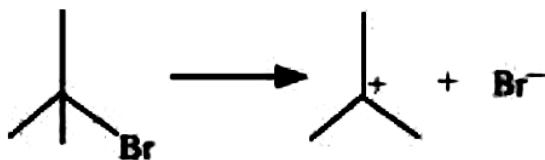
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45. For the following bond cleavages, use curved-arrows to show the electron flow and classify each as homolysis or heterolysis. Identify reactive intermediate produced as free radical, carbocation and carbanion.

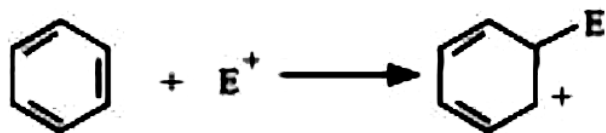
(a)



(c)

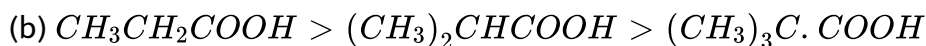


(d)



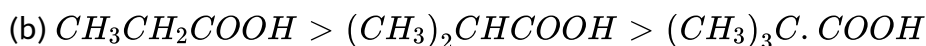
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46. Explain the terms Inductive and Electromeric effects. Which electron displacement effect explains the following correct orders of acidity of the carboxylic acids?



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47. Explain the terms Inductive and Electromeric effects. Which electron displacement effect explains the following correct orders of acidity of the carboxylic acids?



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48. Give a brief description of the principles of the following techniques taking an example in each case.

(a) Crystallisation (b) Distillation (c) Chromatography

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49. Give a brief description of the principles of the following techniques taking an example in each case.

(a) Crystallisation (b) Distillation (c) Chromatography

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50. Give a brief description of the principles of the following techniques taking an example in each case.

(a) Crystallisation (b) Distillation (c) Chromatography

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51. Describe the method, which can be used to separate two compounds with different solubilities in a solvent S.

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52. What is the difference between distillation, distillation under reduced pressure and steam distillation ?

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53. Discuss the chemistry of Lassaigne's test.

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54. Differentiate between the principle of estimation of nitrogen in an organic compound by (i) Dumas method and (ii) Kjeldahl's method.

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55. Discuss the principle of estimation of halogens, sulphur and phosphorus present in an organic compound.

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56. Explain the principle of paper chromatography.

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

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58. Explain the reason for the fusion of an organic compound with metallic sodium for testing nitrogen, sulphur and halogens.

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59. Name a suitable technique of separation of the components from a mixture of calcium sulphate and camphor.

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60. Explain, why an organic liquid vaporises at a temperature below its boiling point in its steam distillation ?



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61. Will CCl_4 give white precipitate of AgCl on heating it with silver nitrate? Give reason for your answer.



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62. Why is a solution of potassium hydroxide used to absorb carbon dioxide evolved during the estimation of carbon present in an organic compound?



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63. Why is it necessary to use acetic acid and not sulphuric acid for acidification of sodium extract for testing sulphur by lead acetate test?



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64. An organic compound contains 69% carbon and 4.8% hydrogen, the remainder being oxygen. Calculate the masses of carbon dioxide and water produced when 0.20 g of this substance is subjected to complete combustion.

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65. A sample of 0.50 g of an organic compound was treated according to Kjeldahl's method. The ammonia evolved was absorbed in 50 mL of 0.5 M H_2SO_4 . The residual acid required 60 mL of 0.5 M solution of NaOH for neutralisation. What would be the percentage composition of nitrogen in the compound?

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66. 0.3780 g of an organic chloro compound gave 0.5740 g of silver chloride in Carius estimation. Calculate the percentage of chlorine present in the compound.

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67. In the estimation of sulphur by Carius method, 0.468 g of an organic sulphur compound afforded 0.668 g of barium sulphate. Find out the percentage of sulphur in the given compound.

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68. In the organic compound $CH_2 = CH - CH_2 - CH_2 - C \equiv CH$, the pair of hybridised orbitals involved in the formation of: $C_2 - C_3$ bond is:

(a) $sp - sp_2$ (b) $sp - sp_3$ (c) $sp_2 - sp_3$ (d) $sp_3 - sp_3$

A. $sp - sp^2$

B. $sp - sp^3$

C. $sp^2 - sp^3$

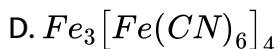
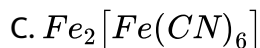
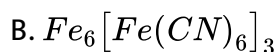
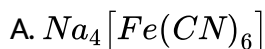
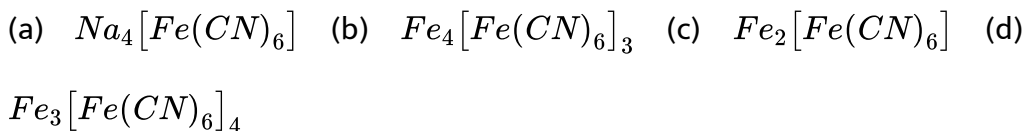
D. $sp^3 - sp^3$

Answer:



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69. In the Lassaigne's test for nitrogen in an organic compound, the Prussian blue colour is obtained due to the formation of:

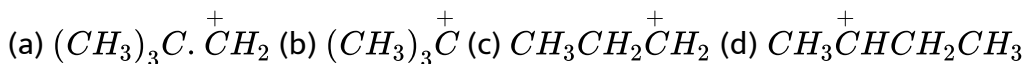


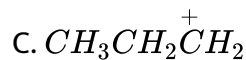
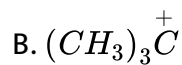
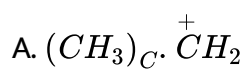
Answer:



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70. Which of the following carbocation is most stable ?





Answer:



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71. The best and latest technique for isolation, purification and separation of organic compounds is

A. crystallisation

B. distillation

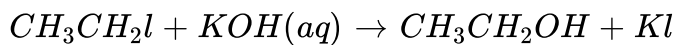
C. sublimation

D. chromatography

Answer:

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72. The reaction :



is classified as

- A. electrophilic substitution
- B. nucleophilic substitution
- C. elimination
- D. addition

Answer:

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