



CHEMISTRY

JEE (MAIN AND ADVANCED) CHEMISTRY

GENERAL ORGANIC CHEMISTRY

Problem

1. Write the hybrid state of carbon in the following compounds and shapes of each of the molecules

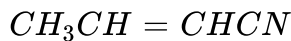
(a) $H_2C = O$ (b) CH_3F (c) $H - C \equiv N$



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2. What is the type of hybridisation of each carbon in the following compounds?

(a) CH_3Cl (b) $(CH_3)_2CO$ (c) CH_3CN (d) $HCONH_2$ (e)



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3. How many sigma and Pi bonds are present in each of the following molecules?

(a) $CH_3 - CH = CH_2$ (b) $CH_3 - C \equiv C - CH_3$ (c)

$HC \equiv C - CH = CH - CH_3$ (d) $CH_2 = C = CHCH_3$



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4. Give hybridisation state of each carbon in the following molecules (a)

$CH_2 = C = CH_2$ and (b) $CH_2 = CH - CH = CH_1$



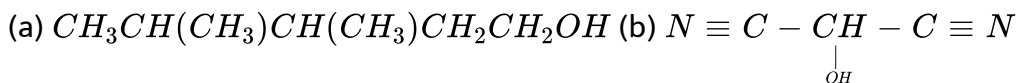
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5. How many sigma and pi bonds are presents in each of the following molecules?



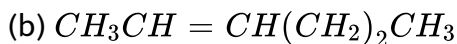
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6. For the following compounds, write their bondline formula.



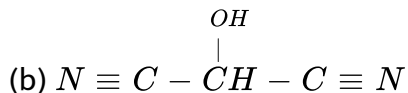
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7. Expand each of the following condensed formulas into their completes structural formulas:



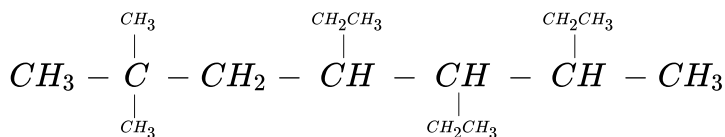
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8. For each of the following compounds, write a condensed formula and also their bond-line formula.



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9. Write the IUPAC name of the following compound.



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10. $(\text{CH}_3)_2\text{C} = \text{CH} - \overset{\text{CH}_3}{\underset{|}{\text{CH}}} - \text{CH} = \text{C}(\text{CH}_3)_2$ What is the systematic name of the above mentioned structure?



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11. Write the IUPAC name of $CH_3 - CH_2 - \underset{\substack{| \\ CH_2OH}}{CH} - CH_2 - \underset{\substack{| \\ CH_2CH_3}}{CH} - CH_3$

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12. Write the structural formula of the compound Hex-1, 3-dien-5-yne

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13. Write the systematic name of $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - CH_2 - \overset{\overset{O}{||}}{C} - CH_3$

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14. Write the IUPAC name of $CH_3 - \underset{\substack{| \\ OH}}{CH} - \underset{\substack{| \\ OH}}{CH} - \underset{\substack{| \\ OH}}{CH_2}$

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15. Write the IUPAC name of $CH_3 - CH = CH - \underset{\substack{| \\ CH_2 - CH_2}}{CH} - CH = CH_2$

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16. Write the IUPAC name of $CH_3 - \underset{\substack{| \\ CHO}}{CH} - CH_2 - \underset{\substack{| \\ CH_3}}{CH} - COOH$

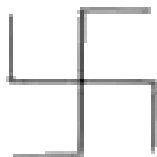
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17. Write the IUPAC name of the compound

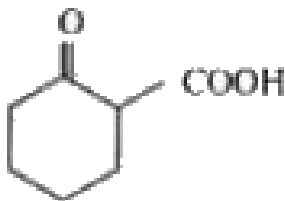


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18. Write the IUPAC names of the following



b)



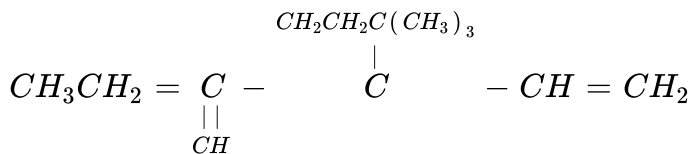
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19. Write the systematic name of



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20. Write the IUPAC name of the following compound.



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21. Draw bond line formulas of all the cyclic compounds having molecular formula C_5H_{10} and give their IUPAC names



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22. Give complete structural formulas of the following compounds

(i) 3-Amino butanal and (ii) 5-Oxohex-2-enamide



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23. Write the position isomers of (a) $\text{C}_3\text{H}_6\text{Cl}_2$ (b) $\text{C}_3\text{H}_5\text{Cl}$





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24. How many structural isomers exist with the formula $C_4H_{10}O$?



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25. Write the aromatic structures of all isomers with the formula C_7H_8O .



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26. How many geometrical isomers are possible for 2, 4-hexadiene?



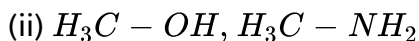
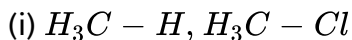
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27. With the molecular formula $C_2FClBrI$, how many geometrical isomers are possible?



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28. Which bond is more polar in the following pairs of molecules:



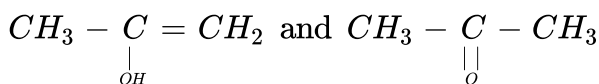
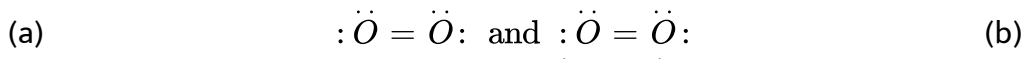
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29. In which $C - C$ bond of $CH_3CH_2CH_2Cl$, the inductive effect is expected to be the least?



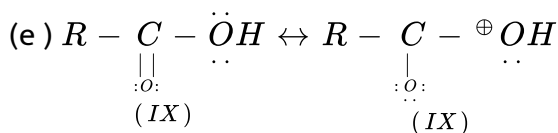
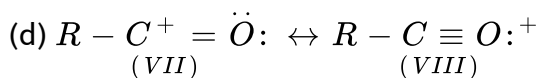
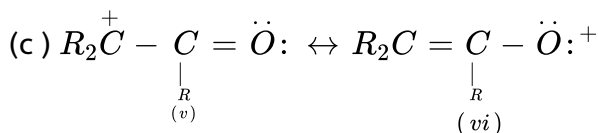
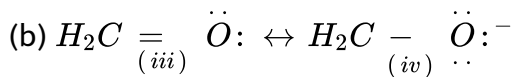
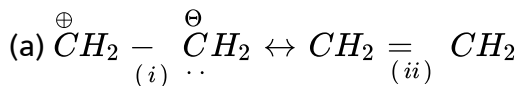
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30. Explain why each of the following structure is not a resonance form?



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31. Explain how the hybrid structure is related to the structures of each of the following pairs of contributing resonance structures?



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32. Why the bond length of two C,O bonds in carboxylate ions are equal?



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33. Write the resonance structures of crotonal-dehyle and indicate the stability order.



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34. Explain mesomeric and inductive effects present in vinyl chloride.



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35. In the which of the following compounds mesomeric effect is possible? Vinyl chloride , b) Allyl chloride and c) 3- Butenal



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36. What is the stability order of various alkyl free radicals ? Why



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37. Why toluene is more reactive than benzene towards electrophilic substitution reactions?



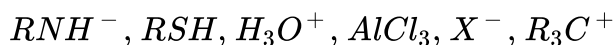
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38. What type of species are formed during homolysis of a covalent bond?



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39. Categorise the following species as nucleophile or electrophile :



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40. Identify electrophilic centre in the following: $RCHO$, RCN and CH_3X



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41. Mention about the purification of (a) aniline and (b) naphthalene



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42. How is ethyl alcohol purified from methylated spirit



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43. Hydrazine does not give Lassaigne's test. Wy?



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44. 0.2g of an organic compound on analysis give 0.147g of carbondioxide, 0.12 g of water and 74.6 c,c of nitrogen at S.T.P. Calculate the weight percentages of constituents.



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45. 0.3g of an organic compound on combustion liberated 0.18g of water vapour and 0.44 g of carbonioxide. Calculate the percentage composition of the compound



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46. How does an aminothioether respond to sodium fusion extract test?



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47. Why diazonium salts do not show positive Lassaigne's test nitrogen ?



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48. In Kjeldahl's estimation of nitrogen, the ammonia evolved from 0.5g of an organic compound neutralised 10ml of $1M H_2SO_4$. Calculate the percentage of nitrogen in the compound



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49. 0.25g of an organic compound gave 30cm^3 of moist dinitrogen at 288K and 745mm pressure. Calculate the percentage of nitrogen.
(Aqueous tension at 288K = 12.7mm)



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50. In Carius method, 0.1890 g of an organic compound gave 0.2870 of silver chloride. Calculate the percentage of chlorine in the compound



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51. One gram of a bromoalkane on heating with excess silver nitrate in Carius tube method gave 0.94g of yellow precipitate. What is the percent weight of halogen?



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52. In sulphur estimation, 0.157 g of an organic compound gave 0.4813g of barium sulphate. What is the percentage of sulphur in the compound ?



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53. On heating 0.2g of an organic compound with a mixture of barium chloride and nitric acid, 0.466 g of barium sulphate was obtained. Calculate the percentage of sulphur



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54. Give hybridisation state of each carbon in the following molecules

CH_3CHO and (b) $CH_2 = C = CH_2$



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55. How many sigma and pi bonds are present in each of the following molecules ?

(a) $CH_3 - CH = CH_2$ and (b) $HC \equiv CCH = CHCH_3$



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56. For the following compounds, write their bond - line formula.

(a) $CH_3CH(CH_3)CH_2CH_2OH$ and (b) $N \equiv C - \underset{\substack{| \\ OH}}{CH} - C \equiv N$



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57. How is ethyl alcohol purified from methylated spirit



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58. Mention about the purification of (a) aniline and (b) naphthalene



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59. Hydrazine does not give Lassaigne's test. Why?



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60. 0.2g of an organic compound on analysis give 0.147g of carbon dioxide, 0.12 g of water and 74.6 c.c of nitrogen at S.T.P. Calculate the weight percentages of constituents.



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61. How does an aminothioether respond to sodium fusion extract test?



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62. Why do diazonium salts not show positive Lassaigne's test for nitrogen?



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63. In Kjeldhal's estimation of nitrogen, the ammonia obtained from 0.5 g of an organic substance was passed into 100cm^3 of $\frac{M}{10}\text{H}_2\text{SO}_4$. The excess of acid required 154cm^3 of $\frac{M}{10}\text{NaOH}$ for neutralisation. Calculate the percentage of nitrogen in the compound.



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64. In Kjeldahl's estimation of nitrogen, the ammonia evolved from 0.5 g of an organic compound neutralised 10 ml of $1\text{MH}_2\text{SO}_4$. Calculate the percentage of nitrogen in the compound



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65. 0.25 g of an organic compound gave 30cm^3 of moist dinitrogen at 288 K and 745 mm pressure. Calculate the percentage of nitrogen. (Aqueous tension at 288 K = 12.7 mm)



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66. On heating 0.2g of an organic compound with a mixture of barium chloride and nitric acid, 0.466 g of barium sulphate was obtained. Calculate the percentage of sulphur

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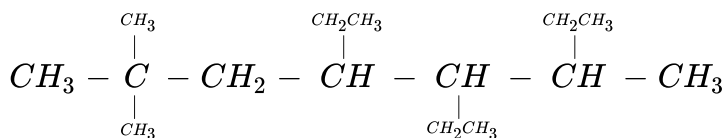
67. One gram of a bromoalkane on heating with excess silver nitrate in Carius tube method gave 0.94g of yellow precipitate. What is the percent weight of halogen?

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68. $(CH_3)_2 = CH - CH(CH_3)CH = C(CH_3)_2$ What is the systematic name of the above mentioned structure?

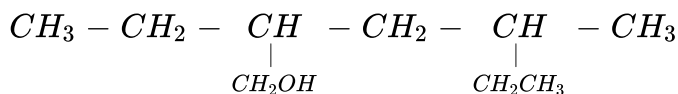
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69. Write the IUPAC name of the following compound.



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70. Write the IUPAC name of



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71. Write the IUPAC name of $\text{CH}_3 - \underset{\text{OH}}{\text{CH}} - \underset{\text{OH}}{\text{CH}} - \underset{\text{OH}}{\text{CH}_2}$



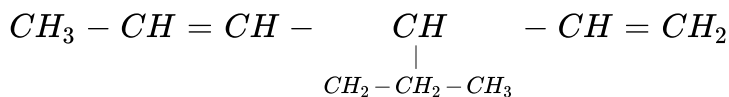
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72. Write the structural formula of the compound Hex-1, 3-dien-5-yne



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73. Write the IUPAC name of

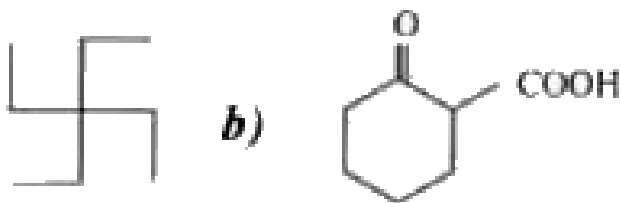


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74. Write the IUPAC name of $\text{CH}_3 - \underset{\text{CHO}}{\underset{|}{\text{CH}}} - \text{CH}_2 - \underset{\text{CH}_3}{\underset{|}{\text{CH}}} - \text{COOH}$

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75. Write the IUPAC names of the following



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76. Write the systematic name of



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77. Write the IUPAC name of the compound



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78. Draw bond line formulas of all the cyclic compounds having molecular formula C_5H_{10} and give their IUPAC names



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79. Give complete structural formulas of the following compounds

(i) 3-Amino butanal and (ii) 5-Oxohex-2-enamide



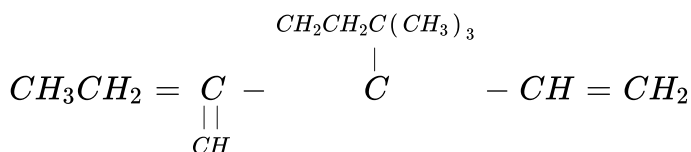
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80. Write the IUPAC name of para cresol.



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81. Write the IUPAC name of the following compound.





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82. How many structural isomers exist with the formula $C_4H_{10}O$?



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83. Write the position isomers of (a) $C_3H_6Cl_2$ (b) C_3H_5Cl



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84. Write all five possible structures of benzene derivatives with the formula C_7H_8O .



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85. How many geometrical isomers are possible for 2,4 heptadiene ?



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86. Write the E and Z notations for 1 - Bromo - 1 - chloro - 2 - iodopropene.



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87. With the molecular formula $C_2FClBrI$, how many geometrical isomers are possible?



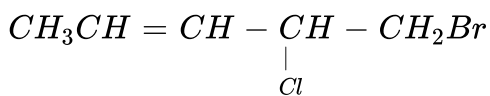
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88. The observed rotation of 10ml of a solution containing 2g of a compound when placed in 25cm long polarimeter tube is $+13.4^\circ$. What is the specific rotation of the compound?



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89. How many stereo isomers are possible for

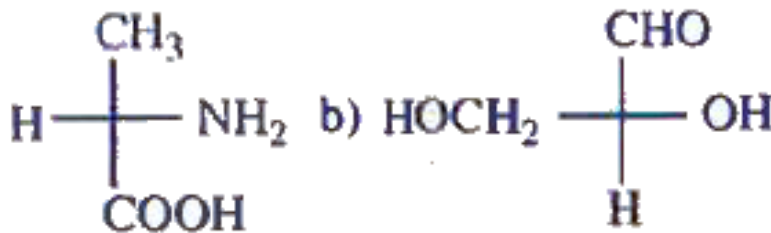


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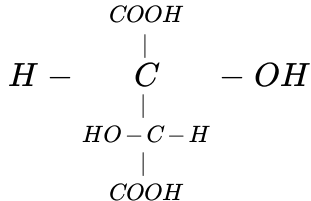
90. Assign R or S configuration on the compound: $H_2N - \overset{\overset{COOH}{|}}{\underset{\underset{CH_3}{|}}{C}} - H$

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91. Write the relative configurations of following compounds :

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92. Using the symbols R and S, specify the configuration of the following tararic acid.



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93. Find the absolute configuration of D-glyceraldehyde.



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Subjective Exercise 1

1. Explain the structures of CH_4 and C_2H_6 .



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2. Discuss the structure and hybridisation in ethylene.



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3. Explain sp hybridisation taking acetylene as example.

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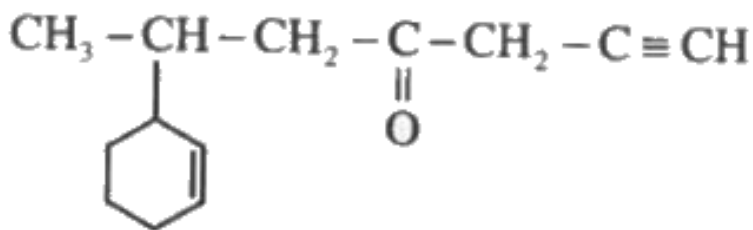
4. The chemical formula of methane is.....

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5. What are the main natural sources of organic compounds?

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6. Indicate hybrid state of each carbon atom in the following molecule





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7. Give the order of bond lengths of various hybrid carbon atoms and hydrogen atom.



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8. Comment on the bond-line structural representation of hydrocarbons



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9. Write the Lewis structures of methyl nitrite and ethyl alcohol,



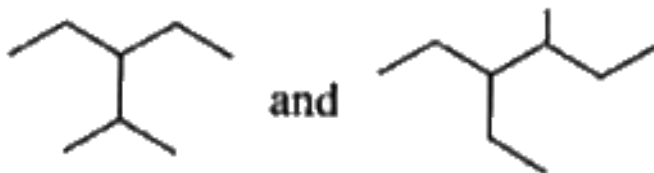
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10. Write the bond line formula of cyclopentanol and 2-ethyl -4-methylpentan -1-ol



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11. Write the IUPAC names of the following compounds



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Subjective Exercise 2

1. Explain the classification of hydrocarbons.

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2. What are alicyclic compounds? Give two examples

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3. What are the characteristics of homologous series?



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4. What is a functional group? Give three examples



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5. Give the structural formula of the following functional groups: (a) Carboxylic acid, (b) Amide, (c) Acid anhydride, (d) Isocyanide and (e) Ester



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6. All heterocyclic compounds need not be aromatic. Explain



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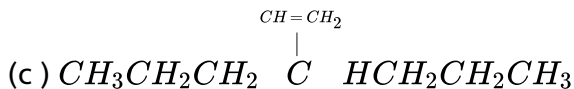
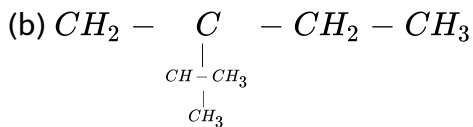
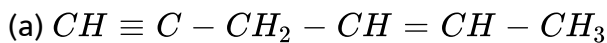
Subjective Exercise 3

1. Mention different rules for naming hydrocarbons



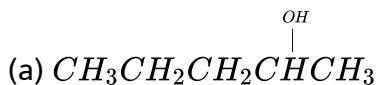
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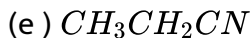
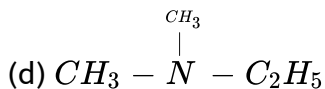
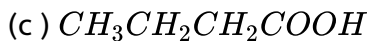
2. Write the IUPAC names of the following hydrocarbons:



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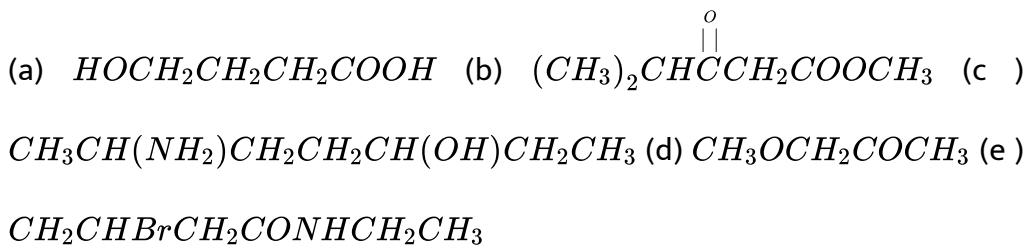
3. Write the IUPAC names of the following monofunctional compounds





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4. Write the IUPAC names of the given poly functional compounds



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5. Write the structural formula of the following,

(a) 2-Butenamide

B) Ethylethanote

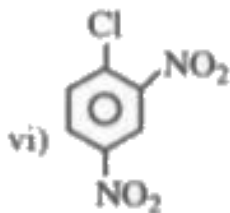
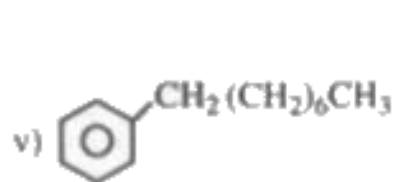
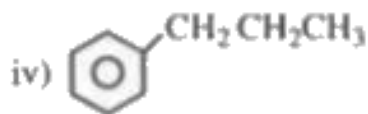
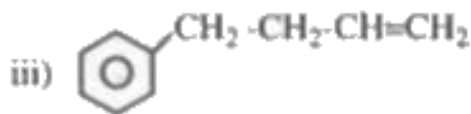
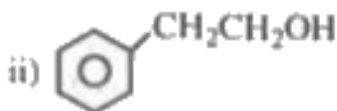
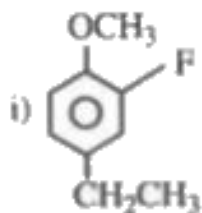
(c) 2-Methyl-3-hexyne

(d) Propanoic anhydric

(e) Pentan - 2,4 - dione

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6. Write the IUPAC names of the following:



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7. Write the structural formula of the following:

(a) 2, 3-dimethyl hexanal

(b) 2-methyl-1-butene

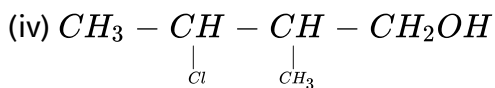
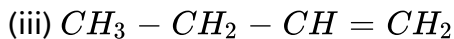
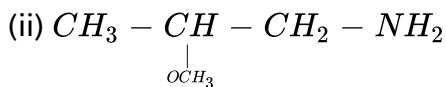
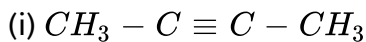
(c) 2-aminopropanoic acid

(d) 3-bromo-4-methyl heptane



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8. Give the IUPAC names of the compounds:



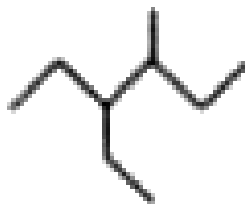
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9. Write the IUPAC names of

a)



b)



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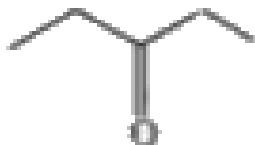
10. Write the preferential order in naming polyfunctional compounds



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11. Write the systematic names of the following

(a)

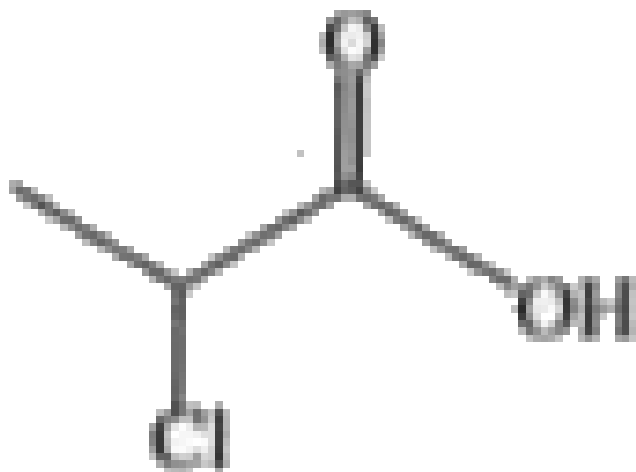


(b)



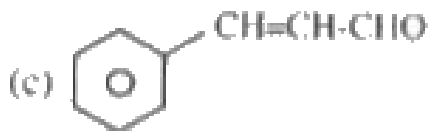
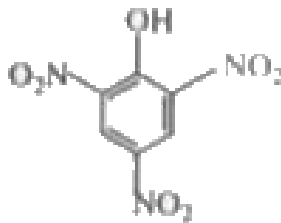
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12. Write the IUPAC name of



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13. Write the IUPAC names of the following substituted benzene derivatives:



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14. Write the IUPAC names of three cresols



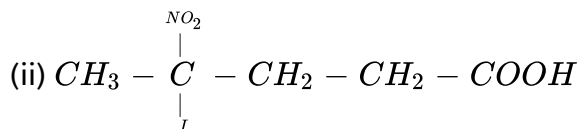
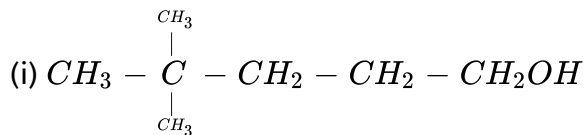
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15. Write the structures of 3-chloro-4-methyl hexane and 2-methoxy-3, 3-dibromo-1- pentanol.



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16. Write the IUPAC name of the following



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17. Write the bond line formula of cyclopentanol and 2-ethyl -4-methylpentan -1-ol



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Subjective Exercise 4

1. Explain the difference between structural isomers and stereo isomers.



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2. What is the difference between conformation and configuration in open chain molecules?



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3. How many isomeric carbonyl compounds are possible with the molecular formula, $C_5H_{10}O$? Draw their structures



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4. What is geometrical isomerism? Explain the geometrical isomers of 2-butene



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5. Mention the number of isomeric ethers having molecule formula, $C_5H_{12}O$. Write their names.



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6. Explain functional group isomerism and position isomerism with one example each



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7. What type of functional group isomers are possible from a molecular formula $C_4H_{10}O$? Given the name of the isomers



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8. What is position isomerism? Give an example



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9. What is metamerism? Give an example



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10. Give IUPA names of the possible functional isomers of formula C_3H_6O .



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11. Give the structural formulae and names of the isomers with the molecular formula, C_5H_{12}



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Subjective Exercise 5

1. Explain inductive effect



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2. Write a brief note on mesomeric effect



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3. Explain resonanace effect



[Watch Video Solution](#)

4. Write a brief note on electromeric effect



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5. Discuss hyperconjugation. Explain the order of stability of various substituted alkenes



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6. Write the differences between inductive effect and mesomeric effect



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7. Write the important features of resonating structures.



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Subjective Exercise 6

1. Discuss the fission of a covalent bond in carbon compounds



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2. What do you understand by organic reaction mechanism?



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3. Explain the types of organic reagents.



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4. Explain how many types of organic reactions are possible.



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5. What are electrophiles ? Explain with two examples



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6. What are nucleophiles ? Give two examples



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Subjective Exercise 7

1. Explain (a) column chromatography, (b) thin layer chromatography and (c) partition chromatography



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2. Discuss briefly distillation under reduced pressure



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3. Write the brief note on chromatography.



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4. Write a note on (a) Distillation and (b) Fractional distillation



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5. Explain crystallization and sublimation phenomena which are used in the purification of organic compounds.



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6. Describe solvent extraction method to purify a compound.



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7. How are organic solids purified?



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8. What is retardation factor?



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Subjective Exercise 8

1. Explain the estimation of nitrogen of an organic compound by

(a) Dumas method and (b) Kjeldahl's method





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2. How are carbon and hydrogen of an organic compound estimated?



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3. Explain the estimation of phosphorus and sulphur present in the organic compound



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4. Mention the colours of the precipitates obtained in Lassaigne's test when the organic compound contains different halogens



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5. How are halogens of an organic compound estimated?



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 [Watch Video Solution](#)

6. How are carbon and hydrogen of an organic compound estimated?

 [Watch Video Solution](#)

7. Explain the estimation of phosphorus and sulphur present in the organic compound

 [Watch Video Solution](#)

8. How oxygen present in an organic compound is estimated?

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9. Discuss the principle involved in Dumas method for the estimation of nitrogen

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10. How is nitrogen estimated by Kjeldahl's method



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11. 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 0.27g and 0.66g respectively. Calculate the percentage of carbon and hydrogen in it



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12. 0.22g of an organic compound on combustion in an atmosphere of carbon -dioxide gave 34 cm^3 of moist nitrogen at 17°C and 733.4mm pressure. If the aqueous tension at 17°C is 13.4 mm, calculate the percentage of nitrogen in the compound



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13. 0.303 g of an organic compound was analysed for nitrogen by Kjeldahl's method. The ammonia evolved was absorbed in 50 ml. of 0.1N H_2SO_4 . The excess acid required 25ml of 0.1N NaOH for neutralisation. Calculate the percentage of nitrogen present in the compound



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14. 0.246 g of an organic substance when heated with excess of fuming nitric acid and silver nitrate gave 0.2584g of silver bromide residue. Calculate the weight percentage of bromine in the organic compound



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



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16. The parent chain must include carbon-carbon multiple bonds present in the compound



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17. If two equally long chains are possible, the chain with maximum number of side chains is selected as parent chain



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18. The numbering of carbon atoms is done in such a way that the substituted carbon atoms have the lowest possible numbers



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19. The functional group bearing carbon should be given the lowest number or lowest sum rule is to be followed



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20. In case of unsaturated hydrocarbons, the carbon atom involved in the multiple bond should be given the lowest possible number



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21. If a number of groups are attached to the parent chain, the name is given to the compound following the alphabetical order



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22. The order of decreasing priority for functional groups is carboxylic acid > nitrile > aldehyde > ketone > alcohol > amine > double

bond > triple bond



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23. The chain terminating groups like -COOH - CHO, -CN, etc. should always get the number '1' for the carbon atom



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24. When a benzene ring is attached to an alkane with a functional group, it is considered as substituent instead of a parent



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25. Compounds having the same molecular formula, same structure with different configuration are called stereoisomers and the phenomenon is called stereoisomerism. The phenomenon is broadly classified with three types called (a) geometrical isomerism (b) optical isomerism and (c)

conformational isomerism.

Which of the following compounds exhibit both geometrical as well as optical isomerism



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26. Compounds having the same molecular formula, same structure with different configuration are called stereoisomers and the phenomenon is called stereoisomerism. The phenomenon is broadly classified with three types called (a) geometrical isomerism (b) optical isomerism and (c) conformational isomerism.

Which of the following compounds exhibit both geometrical as well as optical isomerism



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27. Structural isomerism is due to the difference in the linkage of atoms or groups without any reference to space



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28. Structural isomerism is divided into chain, position, function group metamerism and tautomerism



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29. Stereoisomerism is due to the difference in arrangement of atoms or groups in space



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30. Stereo isomers have same molecular formula but differ in the spatial arrangement of atoms or groups



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31. Chain isomerism arises due to difference in the arrangement of carbon atoms constituting the chain



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32. Chain isomers differ in the nature of the carbon chain (skeleton)



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33. Butane has 2 chain isomers: pentane has 3, hexane has 5 and heptane has 9 chain isomers.



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34. Position isomerism is due to the difference in the position of a functional group, multiple bond or substituent in the same carbon chain



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35. Compounds having same molecule formula but difference functional groups are called functional isomers



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36. Alcohol's ethers, aldehydes-ketones, carboxylic acids-esters, etc, are examples of pairs of functional isomers



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37. Metamerism is due to the presence of different alkyl groups attached to the same bivalent functional group



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38. Ketone secondary amines, ethers etc show metamerism



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39. Tautomerism is a special type of functional isomerism where the isomers exist in equilibrium with each other



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40. Configurational isomerism is further divided into geometrical isomerism and optical isomerism



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41. Geometrical isomerism arises due to restricted rotation about carbon-carbon or carbon-nitrogen double bond



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42. In cis isomers, same or similar groups are present on the same side of double bond



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43. In trans isomer, similar groups are present on the opposite side of the double bond



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44. Unsymmetrical alkenes and their derivatives, cycloalkane dicarboxylic acids , oximes, azobenzene, azoxybenzene, etc., exhibit geometrical isomerism



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45. Generally geometrical isomers possess similar chemical properties but differ in their physical properties



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46. Cis isomer is more polar than trans isomer, possesses higher boiling point, lower melting point, greater solubility higher density, higher refractive index and high heat of combustion.



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47. Cis isomer has lesser stability than the corresponding trans isomer



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48. The light ray which vibrates in a single plane is called as plane polarised light



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49. The substances which have the ability of rotating plane polarised light are called as optically active



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50. If the rotation is in clockwise direction, it is called dextro rotatory (d-) (or) (+) and in the anticlockwise, laevo rotatory (*l* -) (or) (-)



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51. A carbon atom which is bonded to four different atoms or groups is called an asymmetric carbon atom



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52. The electronic displacements in covalent bonds may occur either due to the presence of some atom or group in the molecule or under the influence of attacking reagent



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53. Inductive effect is the permanent displacement of electrons along a carbon chain when some atom or group of atoms with different electronegativity than carbon is attached to carbon chain



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54. The atom or group which has more power to attract (withdraw) electrons in comparison to hydrogen is said to have -I effect



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55. The order of -I effect is $NO_2 > CN > SO_3H > CHO > CO > COOH > CoCl > COOR > CONH_2 > F > Cl > Br > I > OR > C_6H_5$



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56. The atom or group which has less power to attract the electrons than hydrogen is said to have +I effect



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57. The order of +I effect is: $(CH_3)C > (CH_3)_2CH > CH_3CH_2 > CH_3$



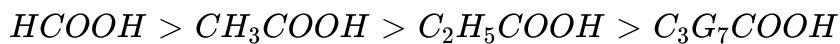
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58. Inductive effect is a permanent effect and it tends to be insignificant beyond the third carbon atom



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59. Acidic nature order of various carboxylic acids and substituted carboxylic acids is



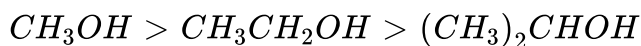
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60. Phenol is more acidic than water and methanol is less acidic than water



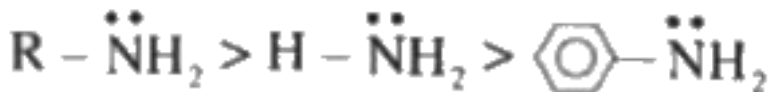
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61. Acidic nature order of some alcohol is



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62. Relative strength of bases also can be explained by inductive effect



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63. Due to steric effect tertiary amines may not be more basic than secondary amines



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64. Electromeric effect is the complete transfer of the shared pair of pi electrons of a multiple bond to one of the atoms in presence of the attacking reagent



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65. Electromeric effect is a temporary effect and comes into play instantaneously at the demand of the attacking reagent



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66. When the transfer of electrons takes place towards the attacking reagent, it is +E effect. Eg. Addition of acids to alkenes



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67. When the transfer of electrons takes place away from the attacking reagent, it is -E effect eg. Addition of cyanide ion to carbonyl compounds



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68. When both inductive and electromeric effects simultaneously operate, usually electromeric effect predominates



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69. Mesomeric or resonance effect is a permanent effect involving the transfer of electrons relayed through pi electrons of multiple bonds or a lone pair of electrons and multiple bonds in a chain of carbon atoms in a molecule



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70. Electromeric effect always facilitates the reaction and never inhibits



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71. Groups with +M effect increase the electron density of the rest of the molecule

eg

Cl , $-Br$, $-I$, $-NH_2$, NHR , NR_2 , $-OH$, $-OR$, $-OCOR$, $-NHCOR$

etc



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72. Groups with $-M$ effect decrease the electron density of the rest of the molecule

eg-

$-COOH$, $-COOR$, $-CHO$, $-COR$, $-CO-$, $-CN$, $-NO_2$, $-S$

etc



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73. Resonance effect is called conjugative effect if it is transmitted through whole of the conjugated system



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74. The energy of actual structure of the molecule is lower than that of any of the resonance structures.



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75. The difference between the real energy of the resonance hybrid structure and the most stable resonance structure is called resonance energy



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76. Resonance explains the stability of aromatic compounds, some unusual bond lengths in some molecules, behaviour of *o* – and *p* directing and m-directing groups



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77. When alkyl groups are attached to an unsaturated system or a benzene nucleus, the sigma electrons present in $\begin{array}{c} | \\ -C- \\ | \end{array} H$ bond of the alkyl group also involve in conjugation known as hyperconjugation



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78. Hyperconjugation is also called $\sigma - \pi$ conjugation or no bond resonance



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79. Greater the number of methyl groups attached to the double bonded carbon atoms, greater is the hyper conjugation and greater is its stability



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80. Stability of alkenes, carbocations, alkyl free radicals, orienting effect of alkyl groups in aromatic ring, unexpected bond lengths in some molecules, etc. can be explained by hyperconjugation



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81. Homolytic fission of a covalent bond leads to the formation of neutral species which contain an unpaired electron called free radicals



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82. Homolytic fission is favoured by conditions such as non-polar nature of the bond, high temperature, U.V radiations, presence of peroxides etc



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83. Heterolytic fission of a covalent bond leads to the formation of charged species



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84. The Hetrolytic fission will be favoured by polar nature of the bond, polar solvents, presence of ions due to acid and base catalyst

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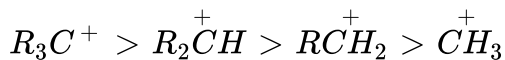
85. Carbocation is a group of atoms that contains a carbon atom bearing positive charge and has only six electrons on its valence shell

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86. The positively charged carbon atom in the carbocation is in sp^2 hybridisation. It is trigonal planar in shape

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87. Order of stability of carbocations is:

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88. The stability order can be explained by hyper conjugation and also by +I effect of alkyl groups



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89. Carbanion is a group of atoms that contains a carbon atom bearing negative charge



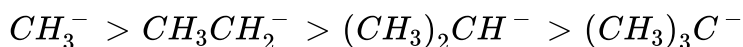
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90. The negatively charged carbon atom in the carbanion is in sp^3 hybridisation. Its shape is pyramidal or tetrahedral with one lone pair



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91. The stability order of carbanions is:



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92. If an unpaired electron is present on a carbon atom in a group of atoms which is formed due to homolysis of a covalent bond, it is called alkyl free radical

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93. Alkyl free radicals are planar and the central carbon atom is in sp^2 hybridisation

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94. The unhybridised 2p orbitals of the central carbon atom of alkyl free radical contains the unpaired electron

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95. The stability order of alkyl free radicals is:



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96. The stability order of alkyl free radicals can be explained by hyperconjugation



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97. Carbenes (CH_2) are neutral species in which carbon atom has six electrons in the outer shell, out of which two constitute a lone pair and two are shared



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98. Carbon atom in carbene is in sp^2 hybridisation



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99. Basing on the nature of the attacking site in the substrate, attacking reagents are classified as nucleophiles and electrophiles



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100. Nucleophiles donate a free electron pair to the electron deficient centre of the organic substrate



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101. Nucleophiles are either negatively charged or neutral



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102.

Cl^- , Br^- , I^- , NH_2^- , RNH^- , R_2N^- , OR^- , $RCOO^-$, R_3C^- , CH_3COO^-

etc. are charged nucleophiles



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103. $\ddot{N}H_3$, $R\ddot{N}H_2$, $R_2\ddot{N}H$, $R_3\ddot{N}$, $H_2\ddot{O}:$, $R\ddot{O}R$, $H_2\ddot{S}:$, $R\ddot{S}H$, $R\ddot{S}R$,

etc., are neutral nucleophiles



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104. Electrophiles are electron deficient and attack the substrate where the electron density is more



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105. Electrophiles are either positively charged or neutral



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106. H^+ , Cl^+ , Br^+ , I^+ , NO_2^+ , R_3C^+ , NH_4^+ , NO^+ , $C_6H_5N_2^+$ etc., are charged electrophiles



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107. SO_3 , BF_3 , $AlCl_3$, $FeCl_3$, $ZnCl_2$, $BeCl_2$ etc., are neutral electrophiles



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108. Nucleophiles act as Lewis bases and electrophiles act as Lewis acids



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109. Ambiphiles are those species which behave like electrophiles and nucleophiles. Eg $H - \ddot{O} - H$, $R - \ddot{O} - H$ etc



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110. In substitution reactions, an atom or a group attached to a carbon atom in a substrate molecule is replaced by another atom or group



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111. Substitution reactions are further classified as free radical, electrophilic or nucleophilic substitution reactions



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112. Alkanes undergo free radical substitution, aromatic compounds undergo electrophilic substitution and alkyl halides undergo nucleophilic substitution reactions



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113. If the attaching reagent adds on to the substrate molecule without elimination, it is called addition reaction



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114. In addition reactions, a triple bond is converted to double bond and a double bond to single bonds



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115. Addition reactions are also of three types: Electrophilic, nucleophilic or free radical addition reactions



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116. Unsaturated hydrocarbons undergo electrophilic addition and carbonyl compounds undergo nucleophilic addition



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117. In elimination reactions, generally atoms or groups from adjacent carbon atoms in the substrate molecule are removed and a multiple bond is formed



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118. In elimination reactions, two sigma bonds are lost and a new pi bond is formed



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119. In the preparation of alkenes, dehydration of alcohols, dehydrohalogenation of alkyl halides, dehalogenation of vicinal dihalides are called β -elimination reactions



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120. In a molecular rearrangement reaction, the product formed is different from that of the expected. Then new compound is actually the structural isomer of the original one



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Objective Exercise 1

1. Urea was prepared first time in the laboratory by heating

- A. Ammonium cyanate
- B. Ammonium cyanide
- C. Ammonium isocyanate
- D. Ammonium isocyanide

Answer: A



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2. Heterocyclic compounds are In nature

- A. Aliphatic
- B. Aromatic
- C. Physical
- D. Inorganic

Answer: C



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3. The alicyclic compound is

- A. Cyclohexane
- B. Hexene-2
- C. Pyrrole
- D. Hexane

Answer: A



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LIST - 1

Compound

A) Benzene

B) Acetylene

C) Graphite

D) Diamond

LIST - 2

C-C bond length

1) 1.42\AA

2) 1.54\AA

3) 3.35\AA

4) 1.20\AA

5) 1.39\AA

4.

The correct match is

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
4	5	1	2

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
2	3	4	5

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
5	4	1	2

D.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
1	4	2	3

Answer: C



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List-A
(Molecule)



List-B
(Pure and hybrid orbitals)

1) 12, 18

2) 6, 4

3) 6, 6

4) 6, 8

5.

The correct match is

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
4	2	3	1

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
2	3	4	1

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	4	2	1

D.

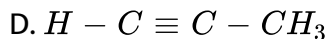
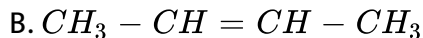
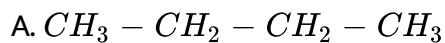
<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
4	3	2	1

Answer: D



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6. Among the following compounds which does not have more than one type of hybridisation for carbon atoms?



Answer: A



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7. Number of sigma bonds in ethane formed by the overlap of sp^3 and s orbital is

A. 5

B. 6

C. 7

D. 4

Answer: B



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8. Ratio of π to σ bonds in benzene is

A. 1 : 4

B. 1 : 2

C. 3 : 1

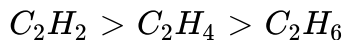
D. 1 : 6

Answer: A



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9. (A) : Carbon-carbon bond energy values are in the order



(R) : Bond energy increases with increase in the bond order

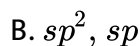
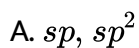
- A. A and R are true, R explains A
- B. A and R are true, R does not explain A
- C. A is true, but R is false
- D. A is false, but R is true

Answer: A



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10. The hybridisation of 1st and 2nd carbon atoms in propadiene respectively



C. sp^2 , sp^2

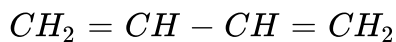
D. sp , sp

Answer: B



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11. The type of hybridisation of carbon atoms numbered 2 and 3 in



A. sp^2 , sp^3

B. sp^2 , sp^2

C. sp , sp^2

D. sp , sp

Answer: B



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12. The ($C - H$) bond length order in hydrocarbons in which the hybridisation of carbon is sp^3 or sp^2 or sp

A. $sp - s > sp^2 - s > sp^3 - s$

B. $sp - s = sp^2 - s = sp^3 - s$

C. $sp^3 - s > sp^2 - s > sp - s$

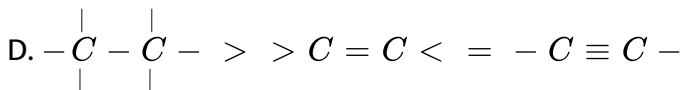
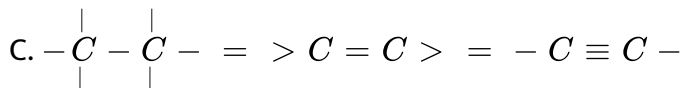
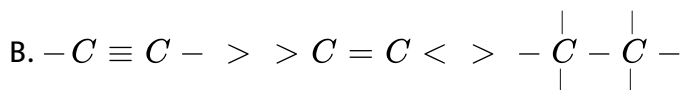
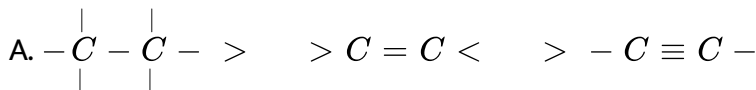
D. $sp^3 - s > sp - s > sp^2 - s$

Answer: C



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13. Bond length order among is



Answer: A



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14. Energy of $C, C\pi$ bond in k.cal is

A. 96

B. 60

C. 76

D. 74

Answer: B



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15. The number of teritary carbon atoms in tertiary butyl alcohol is

A. 3

B. 2

C. 1

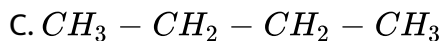
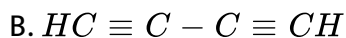
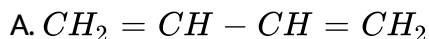
D. 4

Answer: C



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16. Which of the following compounds have the same type of hybridised carbon atoms?



D. All

Answer: D



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17. All carbon-carbon bond length is same in molecule

A. Butene-1

B. Benzene

C. Butene-2

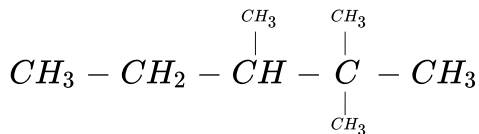
D. Propyne-1

Answer: B



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18. Number of primary, secondary, tertiary and neo carbons in the following compound respectively are



A. 4,2,1,1

B. 5,1,1,1

C. 3,2,2,1

D. 5,0,2,1

Answer: B



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19. The number of tertiary carbons and quaternary hydrogens in neopentane respectively are

A. 1 and 1

B. 1 and 0

C. 1 and 2

D. 0 and 0

Answer: D



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LIST - 1

- A) Neopentane
- B) Isobutane
- C) Cyclohexane
- D) Isopentane

LIST - 2

- 1) 1° and 3° -Carbons
- 2) All 2° -Carbons
- 3) 1° and 4° - Carbons
- 4) Only 1° -Carbons
- 5) 1° , 2° and 3° - Carbons

20.

The correct match is

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
1	5	3	2

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
5	3	4	1

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	1	2	5

D.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	1	5	3

Answer: C



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21. The number of C-C sigma bonds present in 1-butyne is

A. 2

B. 3

C. 4

D. 5

Answer: B



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22. The organic substance which contains both the sp and sp^3 hybridised carbon atoms is

A. n-Butane

B. Isobutane

C. 2-Butyne

D. 1, 3-Butadiene

Answer: C



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23. 18 C-H and 7 C-C sigma bonds are in

- A. Cyclohexane
- B. 3, 3-dimethylpentane
- C. 2, 3, 3-trimethylpentane
- D. n-heptane

Answer: C



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24. Total number of valence electrons in the molecule CH_3CHO is

- A. 18

B. 16

C. 20

D. 22

Answer: A



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25. The shape of acetylene molecule is

A. linear

B. planar

C. pyramidal

D. tetrahedral

Answer: A



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LIST - 1
(Compound)
A) Methanal
B) Ethane
C) Acetylene
D) Propadiene

LIST - 2
(Hybridisation of carbon)
1) sp
2) Both sp^2 and sp^3
3) sp^3
4) sp^2
5) Both sp and sp^2

26.

The correct match is

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
2	1	3	4

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
4	3	1	5

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
1	3	5	4

D.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
4	2	1	5

Answer: B



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27. The carbon atoms in the compound $(CN)_4C_2$ are

A. sp hybridized

B. sp^2 hybridized

C. sp and sp^2 hybridized

D. sp , sp^2 and sp^3 hybridized

Answer: C



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28. The compound 1, 2-butadiene has Hybridised carbon atoms

A. sp

B. sp^2 hybridized

C. sp , sp^2

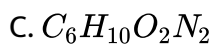
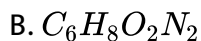
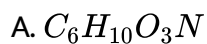
D. sp , sp^2 , sp^3

Answer: D



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29. Which of the following belongs to the homologous series of $C_5H_8O_2N$?



Answer: D



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30. IUPAC name of $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2OH$

A. sec-butyl alcohol

B. per-butyl alcohol

C. 2-methylpropanal

D. 2-methyl propanol-1

Answer: D



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31. The systematic name of $(CH_3)_2CH - COOH$

A. 2-Propanoic acid

B. Isobutanoic acid

C. 2- Methylpropanoic acid

D. 2-Methylbutanoic acid

Answer: C



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32. The IUPAC name of $CH_3 - \overset{\overset{OH}{|}}{\underset{\underset{CH_2CH_3}{|}}{C}} - CH_2 - \overset{\overset{OH}{|}}{CH} - CH_3$

- A. 1, 1-dimethyl-1, 3-butandiol
- B. 2-ethyl -2,4 -pentandiol
- C. 4-methyl-2,4-hexanediol
- D. 1, 2, 3-trimethyl -1, 3-propanediol

Answer: C



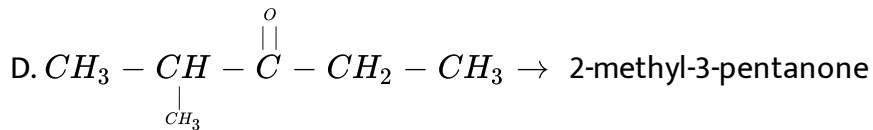
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33. Which of the following compounds has correct IUPAC name?

A. $CH_3 - CH_2 - CH_2 - COO - CH_2CH_3 \rightarrow$ butanal

B. $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CHO \rightarrow$ 3-methyl-3-butanol

C. $CH_3 - \underset{\underset{OH}{|}}{CH} - \underset{\underset{CH_3}{|}}{CH} - CH_3 \rightarrow$ 2-methyl-3-butanol



Answer: D



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34. IUPAC name of the $CH_2 = CH -$ group is

A. vinyl

B. Ethyl

C. Ethenyl

D. Ethynyl

Answer: C



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35. IUPAC names of $CH_2 = CH - CH_2 -$ and $CH_3 - CH = CH -$ groups respectively are

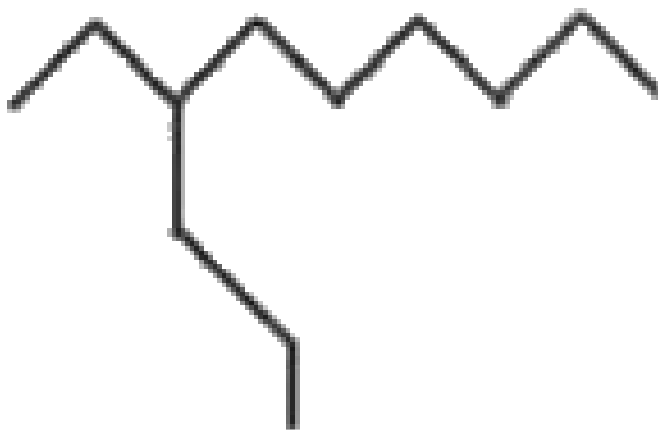
- A. 2-propenyl and 1-propenyl
- B. 1-propenyl and 2-propenyl
- C. Allyl and vinyl
- D. Vinyl and allyl

Answer: A



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36. The IUPAC name of



- A. 4-ethyl decane
- B. 3-propyl nonane
- C. 3-hexyl hexane
- D. 4-hexyl hexane

Answer: A



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LIST - 1
(Radical)

A) Vinyl

B) Allyl

C) Propenyl

D) Phenyl

LIST - 2
(Formula)

1) C_6H_5-

2) $CH_2 = CH-$

3) $CH_3-CH_2-CH_2-$

4) $CH_3-CH = CH-$

5) $CH_2 = CH - CH_2-$

37.

The correct match is

A.

A	B	C	D
2	5	4	1

B.

A	B	C	D
5	2	3	1

C.

A	B	C	D
2	4	5	1

D.

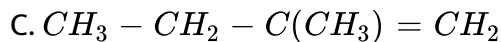
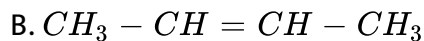
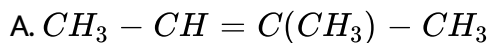
A	B	C	D
1	2	3	4

Answer: A



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38. The structural formula of 2-methyl-2-butene is

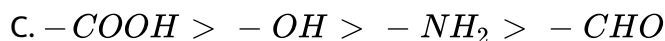


Answer: A

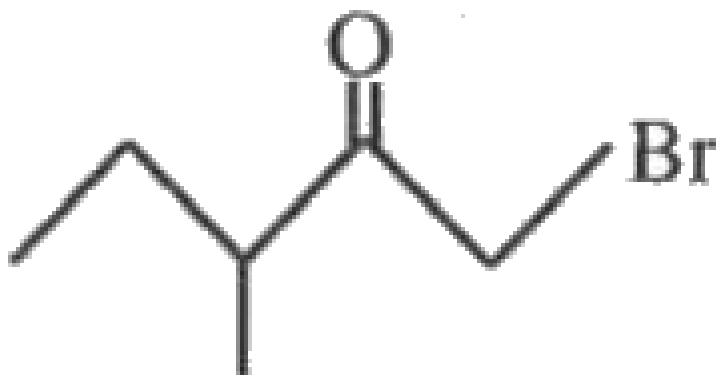


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39. A carbon compound has many functional groups, then order of preference while naming it according to IUPAC nomenclature is



Answer: D



40.

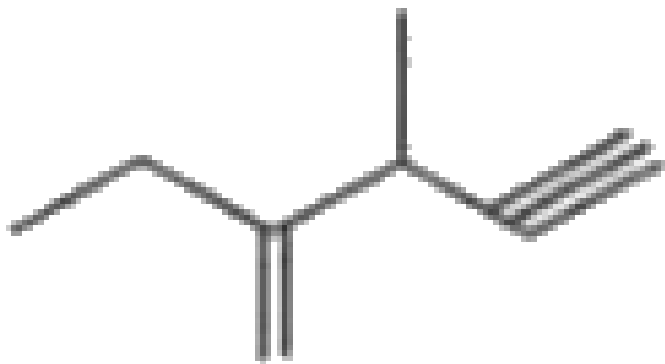
IUPAC

name

- A. 1-Bromo-3-methyl pentanone-2
- B. 5- Bromo-3-methyl pentanone-4
- C. 4-Bromo-3-ethyl butanone-3
- D. 1- Bromo-3-ethyl butanone-2

Answer: A

41. The IUPAC name of



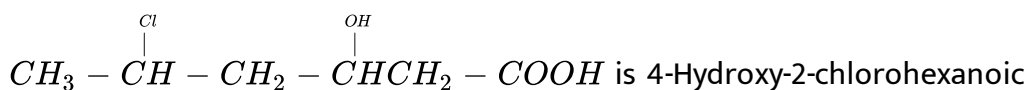
- A. 2-ethyl-3-methyl-1-pentene-4-yne
- B. 2-ethyl-3-methyl-4-pentene-1-ene
- C. 4-ethyl-3-methyl-1-pentene-4-ene
- D. 4-ethyl-3-methyl-4-pentene-1-yne

Answer: A



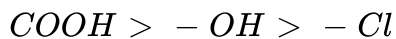
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42. (A): The IUPAC name of the compound



acid

(R): The order of preference of functional groups according to IUPAC is



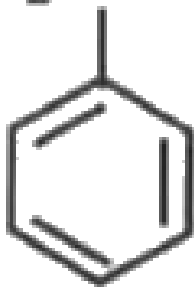
- A. A and R are true, R explains A
- B. A and R are true, R does not explain A
- C. A is true, but R is false
- D. A is false, but R is true

Answer: A



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43. IUPAC name of



A. 3-phenyl-1-butanol

B. 3-phenyl-4-butanol

C. 2- Benzyl-1-butanol

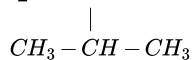
D. 2- phenyl-1-butanol

Answer: D



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44. IUPAC name of $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH} - \text{CH}_3$ is



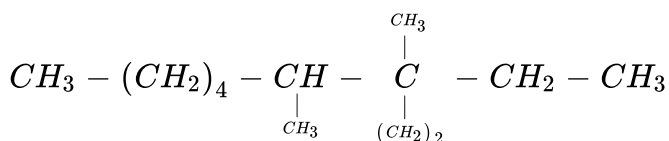
- A. 2, 3-Dimethyl hexane
- B. 2- methyl -3- propylbutane
- C. 2- isopropylpentane
- D. Noname

Answer: A



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45. Which of the following is correct IUPAC name for the following compound?



- A. 6, 7-dimethyl-7-n propylonane
- B. 4- ethyl-4, 5- dimethyldecane
- C. 3, 4-dimethyl-3-n propylonane
- D. 6, 7- dimethyl-7-ethyldecane

Answer: B



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46. IUPAC name of $CH_3CH_2CH_2COCH_3$ is

A. 2-pentanone

B. Pentan-2-one

C. pentanone-2

D. all the above

Answer: D



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47. IUPAC name of $HOOC - CH_2 - CHO$ is

A. Formyl ethanoic acid

- B. 2-Carboxyethanal
- C. Prop-3 -al-1-oic acid
- D. Prop-1-al-3-oic acid

Answer: A



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48. Which of the following statements is wrong

- A. IUPAC name of alkenes end with suffix-ene
- B. IUPAC name of alkenes end with suffix-yne
- C. The substituent bearing carbon gets the possible lowest number in comparison to functional group bearing carbon
- D. IUPAC name of an aldehyde is alkanal

Answer: C



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49. In IUPAC nomenclature, the order followed for naming the compounds is:

- A. Prefix (es) + root word + primary suffix + secondary suffix
- B. Root word + prefix (es) + primary suffix + secondary suffix
- C. Primary suffix + Prefix (es) + root word + secondary suffix
- D. Primary suffix + root word + prefix (es) + secondary suffix

Answer: A



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50. IUPAC name of $CH_3 - CHCl - CH_2 - CHO$ is

- A. 2-chloro-4-butanol
- B. 3-chlorobutanol
- C. 2-chloro-4-butanal

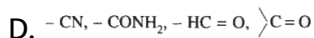
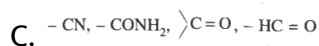
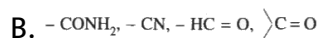
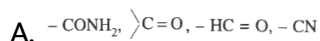
D. 3-chlorobutanal

Answer: D



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51. Identify the correct decreasing order of priority of the functional groups from the following

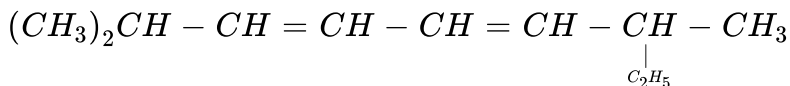


Answer: B



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52. The IUPAC name of



- A. 2, 7-dimethyl-3, 5-nonadiene
- B. 2, 7-dimethyl-2-ethylheptadiene
- C. 2-methyl-7-ethyl-3, 5-octadiene
- D. 1, 1-dimethyl-6-ethyl 1-2, 4-heptadiene

Answer: A



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53. Steam distillation method is useful for the purification of

- A. Are insoluble in water
- B. Are volatile in steam
- C. Have non-steam volatile impurities

D. All of the above

Answer: D



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54. Impure Aniline is purified by

A. Simple distillation

B. Steam distillation

C. Vacuum distillation

D. Extraction with a solvent

Answer: B



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55. Chromatography is a technique based on

- A. Solubilities of solute
- B. Adsorption of solute
- C. Chemical adsorption followed by dispersion
- D. Differential adsorption of different constituents of a mixture

Answer: D



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56. Naphthalene is a volatile solid. It is purified by

- A. Fractional crystallization
- B. Fractional distillation
- C. Solvent extraction
- D. Sublimation

Answer: D



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57. An organic substance from its aqueous solution can be separated by

- A. Extraction with solvent
- B. Steam distillation
- C. Fractional distillation
- D. Vacuum distillation

Answer: A



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58. A mixture of camphor and NaCl can be separated by

- A. Sublimation
- B. Evaporation
- C. Filtration

D. Decantation

Answer: A



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59. A very common adsorbent used in column chromatography is

A. Powdered charcoal

B. Alumina

C. Chalk

D. Sodium carbonate

Answer: B



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60. In column chromatography the moving phase consists

- A. A substance which is to be separated
- B. Mixture of eluent and adsorbent
- C. Eluent
- D. Adsorbent

Answer: C



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61. In steam distillation, the vapour pressure of the volatile organic compound is

- A. Equal to atmospheric pressure
- B. Less than the atmospheric pressure
- C. More than the atmospheric pressure
- D. Just double the atmospheric pressure

Answer: B

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62. Simple distillation of liquids involves simultaneously

- A. vaporisation and condensation
- B. heating and sublimation
- C. vaporisation and sublimation
- D. boiling and filtration

Answer: A

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63. Mobile phase and stationary phase respectively in paper chromatography

- A. liquid-liquid
- B. liquid-gas

C. solid-liquid

D. solid-gas

Answer: A



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64. A bottle contains two immiscible liquids. They may be separated by

A. Vacuum distillation

B. Fractionating column

C. Separating funnel

D. Steam distillation

Answer: C



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65. Vacuum distillation is used to purify liquids which

- A. Are highly volatile
- B. Are explosive in nature
- C. Soluble in water
- D. Decompose below their boiling points

Answer: D



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66. A mixture of benzene and toluene can be separated by

- A. Crystallisation
- B. Solubility
- C. Distillation
- D. Fractional distillation

Answer: D



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67. A miscible mixture of C_6H_6 + $CHCl_3$ can be separated by

- A. Sublimation
- B. Distillation
- C. Filtration
- D. Crystallisation

Answer: B



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68. (A): Nitrogen in hydrazine hydroxylamine cannot be detected by 'Lassaigne's test'

(R): In the Lassaigne's extraction preparation with N_2H_4 and NH_2OH ,

NaCN cannot be formed due to absence of carbon in these compounds

- A. A and R are true, R explains A
- B. A and R are true, R does not explain A
- C. A is true, but R is false
- D. A is false, but R is true

Answer: A



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69. When Lassaigne's extract (Na_2S) is acidified with acetic acid and then lead acetate solution is added to it, the colour of the precipitate is

- A. Blue
- B. Black
- C. Red

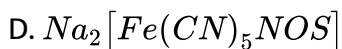
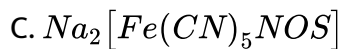
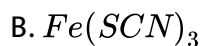
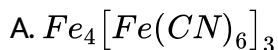
D. White

Answer: B



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70. 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

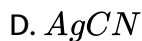
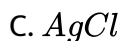
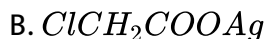
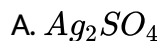


Answer: C



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71. $ClCH_2COOH$ is heated with fuming HNO_3 in the presence of $AgNO_3$ in carius tube. After filtration and washing a white precipitate is obtained. The precipitate is of

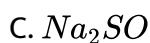


Answer: C



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72. In Lassaigne's test, thiourea is converted into



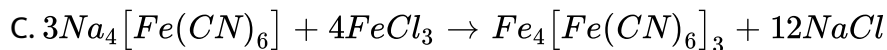
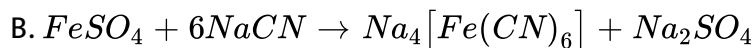
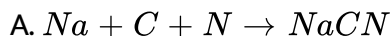
D. NaCNS

Answer: D



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73. Which of the following reactions takes place in Lassaigne's test for the detection of nitrogen present in an organic compound?



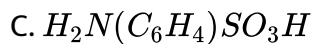
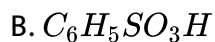
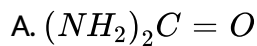
D. All of these

Answer: D



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74. Which of the following compounds may give blood red colouration while performing Lassaigne's test for nitrogen



Answer: C



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LIST - 1**Color****A) Prussian blue****B) Violet****C) Blood red****D) Colour less****LIST - 2****Product****1) $[\text{Fe}(\text{CN})_5\text{NOS}]^{4-}$** **2) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$** **3) $[\text{Fe}(\text{SCN})]^{2+}$** **4) AgCl** **5) $\text{Na}_4[\text{Fe}(\text{CN})_6]$** **75.**

The correct match is

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
4	1	3	2

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	1	2	4

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
1	2	3	4

D.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
2	1	3	4

Answer: D**Watch Video Solution**

76. In Lassaigne's test, the organic compound is fused with sodium metal as to

- A. Increase the ionization of compound
- B. Increase the volume of compound
- C. Increase the reactivity of compound
- D. Convert the covalent compounds into electrovalent compounds

Answer: D



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77. In detection of CO_2 , lime water turns milky due to formation of

- A. CaO
- B. $CaCl_2$
- C. $CaCO_3$
- D. $Ca(HCO_3)_2$

Answer: C



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78. In Lassaigne's test for nitrogen the blue colour is due to the formation of

- A. Sodium cyanide
- B. Sodium ferrocyanide
- C. Ferric Ferrocyanide
- D. Potassium ferrocyanide

Answer: C



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79. Lassaigne's test gives a violet colouration with sodium nitroprusside, it indicates

A. N

B. S

C. O

D. Cl

Answer: B



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80. Carbon and Hydrogen are estimated by

A. Liebig's method

B. Dumas method

C. Carius method

D. Kjeldahl's method

Answer: A



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81. 0.4 g of an organic compound gave 0.188g of silver bromide by a halogen estimation method. The percentage of bromine in the compound is (at . Wts of Ag= 108, Br = 80)

A. 20

B. 40

C. 46

D. 60

Answer: B



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82. Match the reagents used for the detection of elements in organic compounds

Reagent	Element
A) Lead acetate	1) P
B) Silver nitrate	2) N
C) Ammonium molybdate	3) S
D) $\text{FeSO}_4 + \text{FeCl}_3$	4) Cl

Correct match is

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	1	2	4

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	4	1	2

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	4	2	1

D.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
4	3	2	1

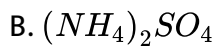
Answer: B



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83. In Kjeldahl's method, nitrogen present in the organic compound is first converted into

A. NH_3



Answer: B



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84. 0.302 g of organic compound gave 0.268g of silver bromide. The % of bromine in the sample is

A. 20

B. 50

C. 37.75

D. 75

Answer: C



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85. The molecular formula of an organic compound is C_4H_9N . The volume of N_2 that will be given by 0.2g of the above compound at STP is... (ml)

A. 31.5

B. 50

C. 63

D. 93

Answer: A



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86. If 0.75 g of an organic compound in Kjeldahl's method neutralized 30 ml of 0.25N- H_2SO_4 , the percentage of nitrogen in the compound is

A. 28

B. 50

C. 80

D. 14

Answer: D



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87. 0.32g of an organic compound containing sulphur produces 0.233g of $BaSO_4$. Percentage of sulphur in the compound is

A. 20

B. 50

C. 10

D. 80

Answer: C



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88. In organic quantitative analysis, CuO acts as

- A. Reducing agent
- B. Oxidising agent
- C. Hydrolysing agent
- D. Precipitating agent

Answer: B



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89. In the Duma's method for the estimation of nitrogen in an organic compound, nitrogen is determined in the form of

- A. N_2
- B. NO
- C. NH_3

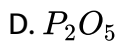
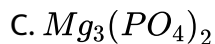
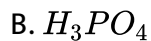
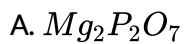
D. H

Answer: A



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90. In organic compounds, phosphorus is estimated as:



Answer: A



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91. 0.28g of an organic compound in Dumas method liberated 22.4 ml of nitrogen at STP. The percentage of nitrogen in the compound is

- A. 20
- B. 10
- C. 80
- D. 50

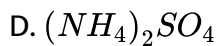
Answer: A



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92. In the Duma's method for the estimation of nitrogen in an organic compound, nitrogen is determined in the form of

- A. NH_3
- B. N_2
- C. NaCN



Answer: B



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93. The number of chain isomers for C_5H_{12} is

A. 1

B. 2

C. 3

D. 4

Answer: C



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94. Number of possible position isomers for dichlorobenzene is

A. 2

B. 3

C. 4

D. 5

Answer: B



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95. 2-Methyl butane and dimethyl propane are

A. Chain isomers

B. Position isomers

C. Metamers

D. Functional isomers

Answer: A



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96. Functional isomer of carboxylic acid is

- A. Amide
- B. Acid chloride
- C. Fatty acid
- D. Alkylalkanoate

Answer: D



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97. The isomerism exhibited due to the difference in the size of the alkyl groups attached to the same functional group is

- A. Tautomerism
- B. Stereo isomerism
- C. Metamerism

D. Optical isomers

Answer: C



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98. Diethylether and n-propyl methylether are

A. Metamers

B. Tautomers

C. Functional isomers

D. Optical isomers

Answer: A



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99. The number of possible isomeric structures for the formula C_4H_{10} is

A. 10

B. 1

C. 2

D. 6

Answer: C



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100. Which of the following classes of organic compounds show metamerism?

A. Ethers

B. Secondary amines

C. Ketones

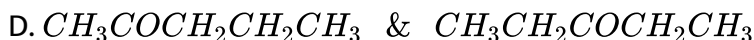
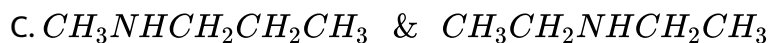
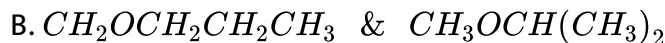
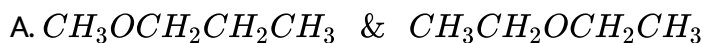
D. Any of the three

Answer: D



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101. Among the following the pair that is not a pair of metamers is

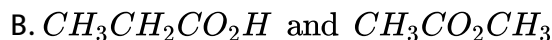
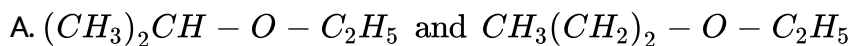


Answer: B



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102. One among the following pairs of compounds are not isomers?



D. $CH_3CH_2NO_2$ and NH_2CH_2COOH

Answer: C



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103. Ethylacetate and methyl propionate are

A. Functional isomers

B. Tautomers

C. Metamers

D. Position isomers

Answer: C



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104. Dimethylether is the isomer of

- A. Diethyl ether
- B. Methyl alcohol
- C. Methoxymethane
- D. Ethyl alcohol

Answer: D



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105. Isomers with the same molecular and same structural formula are called

- A. Geometrical isomers
- B. Optical isomers
- C. Tautomers
- D. Stereoisomers

Answer: D

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106. The isomerism exhibited by n-propyl alcohol and isopropyl alcohol is

- A. Metamerism
- B. Position
- C. Functional
- D. Tautomerism

Answer: B

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107. The total number of acyclic isomers for C_3H_4 is

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

D. 4

Answer: B



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108. n-Butanol and 2-methyl propanol are a pair of which isomers?

A. Position

B. Functional

C. Metamers

D. Chain

Answer: D



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109. Which are isomers?

- A. Ethanol and ethoxyethane
- B. Methanol and Methoxymethane
- C. Propionic acid and ethyl acetate
- D. Propanal and acetone

Answer: D



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110. $CH_3CH_2CH_2OH$ is a functional isomer of

- A. $C_2H_5OCH_3$
- B. $CH_2OC_3H_7$
- C. $CH_3CH_2CH_2OCH_2CH_3$
- D. $CH_3CHOHCH_3$

Answer: A



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111. The alkane that yields two isomeric monobromo derivatives is

A. Neopentane

B. Ethane

C. Methane

D. Propane

Answer: D



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112. The number of isomers of C_6H_{14} is (MLNR)

A. 4

B. 5

C. 6

D. 7

Answer: B



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113. The compound which is not isomeric with diethyl ether is

A. n-Propyl methyl ether

B. 1-Butanol

C. 2-Methyl-2-propanol

D. Butanone

Answer: D



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114. Aldehyde can be isomertic functionally with

A. alcohols

B. ethers

C. esters

D. Ketones

Answer: D



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115. Hydrocarbon that may show geometrical isomerism

A. alkane

B. alkene

C. alkyne

D. arene

Answer: B



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116. The least number of carbon atoms in alkane forming chain isomers is

A. 3

B. 1

C. 2

D. 4

Answer: D



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117. Write the structures and names of all possible isomers of trimethyl benzenes.

A. 2

B. 3

C. 4

D. 6

Answer: B



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118. (A) : The number of isomeric amines possible for the formula C_3H_9N is four

(R) : Primary, secondary and tertiary amines are functional isomers

A. A and R are true, R explains A

B. A and R are true, R does not explain A

C. A is true, but R is false

D. A is false, but R is true

Answer: B



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119. Ketone secondary amines, ethers etc show metamerism

- A. A and R are true, R explains A
- B. A and R are true, R does not explain A
- C. A is true, but R is false
- D. A is false, but R is true

Answer: A



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120. n-Butane and isobutane are a pair of

- A. Chain isomers
- B. Position isomers
- C. Metamers
- D. Functional isomers

Answer: A



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121. Cycloalkanes are isomeric with

A. Alkadienes

B. Alkynes

C. Aromatic compounds

D. Olefins

Answer: D



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122. Number of monochloro benzenes is

A. 1

B. 3

C. 5

D. 6

Answer: A



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123. Isomerism exhibited by methyl formate and acetic acid is

A. Geometrical

B. Stereo

C. Tautomerism

D. Functional

Answer: D



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124. CH_3COCH_3 and $CH_2 = COH - CH_3$ represent

- A. Metamers
- B. Position isomers
- C. Keto-enol tautomers
- D. Functional isomers

Answer: C



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125. Which of the following statements is not correct?

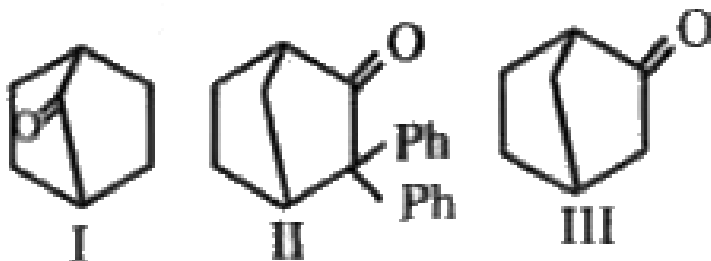
- A. 2-Methylpentane and 3-methyl pentane are a pair of position isomers
- B. Methoxymethane and ethyl alcohol are a pair of functional isomers
- C. 1, 2-Dibromobenzene and 1, 4-dibromobenzene are a pair of position isomers

D. 2-chloro-2-butene and 2-chloror-1 butene are a pair of functional isomers

Answer: A

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126. Which among the given molecules are exhibit tautomerism?



- A. III only
- B. Both I and III
- C. Both I and II
- D. Both II and III

Answer: A



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127. (A) : Cycloalkanes can exhibit geometrical isomerism.

(R): In cycloalkanes, free rotation is not possible about the ring

- A. A and R are true, R explains A
- B. A and R are true, R does not explain A
- C. A is true, but R is false
- D. A is false, but R is true

Answer: D



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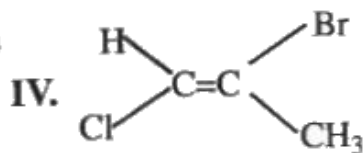
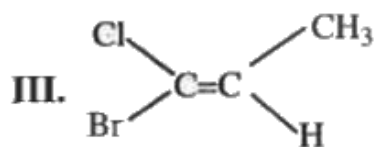
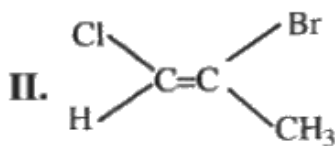
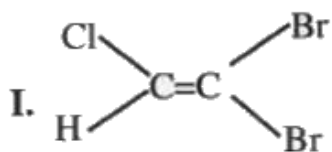
128. Two geometrical isomers are given by the following compound

- A. Ethylidene bromide
- B. Acetylene tetrachloride
- C. Acetylene tetrabromide
- D. Acetylene dibromide

Answer: D

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129. Which is a pair of geometrical isomers?



- A. I and II
- B. I and III

C. II and IV

D. III and IV

Answer: C



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130. Geometrical isomers result due to the

A. Free rotation about C-C

B. Restricted rotation about C=C

C. Restricted rotation about $C \equiv C$

D. Free rotation about C=C

Answer: B



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131. The restricted rotation about carbon-carbon double bond in 2-butene is due to

- A. Overlap of one s and sp^2 hybridized orbitals
- B. Overlap of two sp^2 hybridized orbitals
- C. Overlap of one p and one sp^2 hybridized orbitals
- D. Sidewise overlap of two p-orbitals

Answer: D



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132. Which of the following has no hindered rotation about carbon-carbon bond?

- A. Ethane
- B. Ethylene
- C. Acetylene

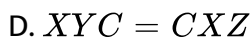
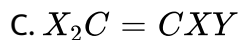
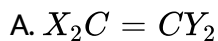
D. Tetrachloroethene

Answer: A



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133. Which of the following structures permits cis-trans isomerism?

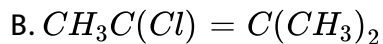
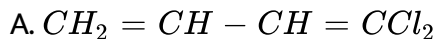


Answer: D



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134. Which among the following is likely to show geometrical isomerism?



Answer: D



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135. The common characteristic of cis 2-butene and trans-2-butene is

A. Solubility

B. Melting point and boiling point

C. Heat of hydrogenation

D. Product of hydrogenation

Answer: D



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136. In order that a compound may show geometrical isomerism

A Compound must have a chiral carbon

(B) Each of the two doubly bonded carbon atoms must have different atoms or groups

(C) Compound must have a plane of symmetry

A. only A

B. only B

C. only C

D. None

Answer: B



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137. Write the structural formulas and IUPAC names for all possible isomers having the number of double or triple bond as indicated:

C_4H_8 (one double bond)

A. 2

B. 3

C. 4

D. 5

Answer: C



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138. Number of possible geometrical isomers for 1, 3-pentadiene is

A. 8

B. 4

C. 3

D. 2

Answer: D



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139. Maleic acid and fumaric acids are

- A. Structural isomers
- B. Geometrical isomers
- C. Optical isomers
- D. Conformational isomers

Answer: B



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140. Geometrical isomerism is shown by

- A. $\text{CH}_2 = \text{C}(\text{Br})\text{I}$
- B. $\text{CH}_3\text{CH} = \text{C}(\text{Br})\text{I}$
- C. $(\text{CH}_3)_2\text{C} = \text{C}(\text{Br})\text{I}$

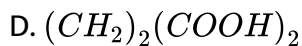
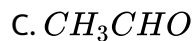
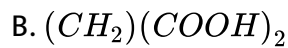
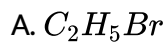


Answer: B



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141. Which of the following compounds exhibits geometrical isomerism?



Answer: B



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142. Which of the following shows geometrical isomerism?

- A. but -2-ene
- B. propene
- C. 2-methylbut-2-ene
- D. o-xylene

Answer: A



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143. Which of the following will show geometrical isomerism?

- A. 1-butene
- B. 1,2-dibromo-2-butene
- C. propene
- D. isopropylene

Answer: B



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144. Out of the following compounds, which one would have a zero dipole moment?

- A. 1, 1-Dichloro ethylene
- B. Cis-1,2-dichloroethylene
- C. Trans -1, 2-dichloroethylene
- D. None of these

Answer: C



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145. Which of the following has zero dipole moment?

- A. cis-2-butene
- B. trans-2-butene
- C. 1-butene

D. 2-methyl-1-propene

Answer: B



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146. (A): Inductive effect is possible in chlorobutane but absent in Butane
(R): Inductive effect is possible in the organic compounds having at least one polar covalent bond

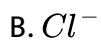
- A. A and R are true, R explains A
- B. A and R are true, R does not explain A
- C. A is true, but R is false
- D. A is false, but R is true

Answer: A



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147. Which of the following is a free radical?



Answer: C



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148. Heterolysis of a C-C covalent bond gives

A. Carbanion

B. Carbonium ion

C. Free radical

D. Both 1 and 2

Answer: D



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149. Which of the following contains three pairs of electrons?

- A. Carbanion
- B. Free radical
- C. Carbocation
- D. None

Answer: C



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150. What are electrophiles ? Explain with two examples

- A. Electron loving species

B. Electron hating species

C. Nucleus loving species

D. Nucleus hating species

Answer: A



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151. Heterolysis of C-Cl bond produces

A. Two carbanions

B. Two carbonium ions

C. Two free radical S

D. One cation and one anion

Answer: D



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152. (A): Alkenes, carbonyl compounds can exhibit electromeric effect but not alkanes, saturated alcohols

(R): Electromeric effect is possible organic compounds having at least one multiple bond

- A. A and R are true, R explains A
- B. A and R are true, R does not explain A
- C. A is true, but R is false
- D. A is false, but R is true

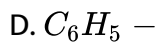
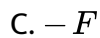
Answer: B



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153. The $+I$ (Inductive effect) is show by

- A. $CH_3 -$
- B. $HO -$

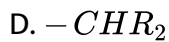
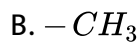


Answer: A



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154. The $-I$ effect is shown by ?

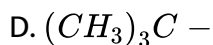
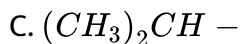
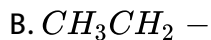


Answer: A



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155. Which of the following groups has highest inductive effect?



Answer: D



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156. Shifting of electrons of a multiple bond under the influence of reagent is called

A. I-effect

B. M-effect

C. E-effect

D. T-effect

Answer: C



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157. An alkene is most likely to react with

- A. A free radical
- B. An alkali
- C. A nucleophile
- D. An electrophile

Answer: D



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158. Resonating structures of a molecule should have

- A. Identical arrangement of atoms

- B. Nearly the same energy content
- C. The same number of paired electrons
- D. All

Answer: D



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159. The cleavage of covalent bond $A - B \rightarrow A^\cdot + B^\cdot$ is known as

- A. Heterolytic fission
- B. Homolytic fission
- C. Carbanion formation
- D. Carbocation formation

Answer: B



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160. The reaction of HBr with ethene is an example of reaction

- A. Polymerisation
- B. Substitution
- C. Addition
- D. Condensation

Answer: C



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161. Which of the following substituents has +M (Mesomeric) effect?

- A. $-CH$
- B. $-CHO$
- C. $-NH_2$
- D. $-NO_2$

Answer: C



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162. The C-C bond dissociation energy is

A. 103 K cal s mole^{-1}

B. 83 K cal s mole^{-1}

C. 8.3 K cal s mole^{-1}

D. 83 K cal s mole^{-1}

Answer: B



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163. Which of the following shows electromeric effect?

A. Alkanes

B. Alkyl amines

C. Alkyl halides

D. Aldehydes

Answer: D



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164. Which of the following ions does not show resonance?

A. NO_3^-

B. CH_3COO^-

C. Cl^-

D. CO_3^{2-}

Answer: C



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165. The formation of cyanohydrin from a ketone is an example of

- A. Nucleophilic addition
- B. Electrophilic substitution
- C. Nucleophilic substitution
- D. Electrophilic addition

Answer: A



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166. The bond length is affected by

- A. Hybridisation
- B. Delocalisation
- C. Electronegativity
- D. All of the above

Answer: D



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167. Mesomeric effect is a permanent effect in which π electrons are transferred from a

- A. Multiple bond to an atom
- B. Multiple bond to a single covalent bond
- C. Both 1 and 2
- D. None

Answer: C



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168. In carbocation the carbon bearing the positive charge is

A. sp^2 hybridised

B. sp^3 hybridised

C. dsp^3 hybridised

D. None

Answer: A



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169. Shape of methyl carbanion is

A. Planar

B. Pyramidal

C. Tetrahedral

D. Linear

Answer: B



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170. Shape of the methyl carbonium ion is

- A. Planar
- B. Linear
- C. Octahedral
- D. Tetrahedral

Answer: A



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171. Which of the following types of reactions majorly occur when a reactant has a double bond?

- A. Addition
- B. Substitution
- C. Elimination

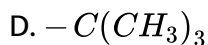
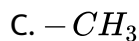
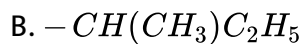
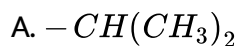
D. Photolysis

Answer: A



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172. Which of the following alkyl groups is more powerful electron donating group when they are attached to unsaturated carbon

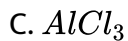


Answer: D



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173. An example of electrophile is

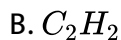
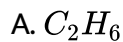


Answer: C



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174. AN example of nucleophile is

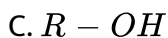


Answer: B



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175. Which one of the following is not an electrophile?



Answer: D



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176. $C_2H_5Br + NaOH \rightarrow C_2H_5OH + NaBr$, the above reaction is

A. Free radical substitution

B. Nucleophilic substitution

C. Electrophilic substitution

D. Condensation

Answer: B



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177. The hybridization of central carbon atom in trimethyl free radical is

A. sp

B. sp^2

C. sp^3

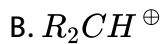
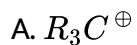
D. may be sp^2 or sp

Answer: B



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178. A carbocation in which dispersal of charge does not take place



Answer: D



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179. In which of the following, ortho/para substitution by an electrophile is very facile?

A. Nitrobenzene

B. Phenol

C. Benzoic acid

D. Acetophenone

Answer: B



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180. Which of the following effects can explain the stability of tertiary butyl carbonium ion?

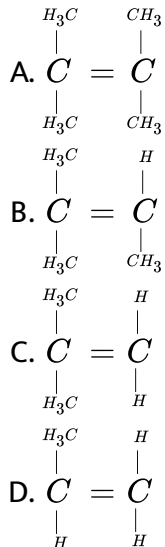
- A. Electromeric
- B. Inductive
- C. Hyper conjugation
- D. Both 2 and 3

Answer: D



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181. The most stable methylated alkene is

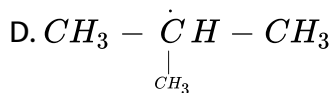
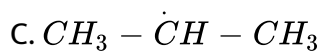
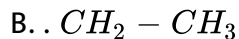
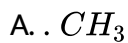


Answer: A



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182. Which is least stable?



Answer: A



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183. Which of the following statements about resonance is not correct?

- A. The different resonance structures of a molecule have fixed arrangement of atomic nuclei
- B. The different resonance structures of a molecule should have same number of unpaired electrons
- C. The hybrid structure has equal contribution from all the resonating structures
- D. None of the individual resonating structures explain the various characteristics of the molecule

Answer: C



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184. Free radical reactions

- A. Occur in gas phases
- B. Are often autocatalytic
- C. Are initiated by light, oxygen or peroxides
- D. All are correct

Answer: D



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185. Which of the following is a more stable carbocation?

- A. Sec-pentyl carbocation
- B. Isopentyl carbocation
- C. Tert. Pentyl carbocation
- D. Neopentyl carbocation

Answer: C



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186. Which of the following occurs reaction intermediate?

- A. Free radicals
- B. Carbocations
- C. Carbanion
- D. All

Answer: D



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187. $-CHO$ group is

- A. $+Me$ and $+IE$ groups

B. $-ME$ and $-IE$ group

C. $+ME$ and $-IE$ group

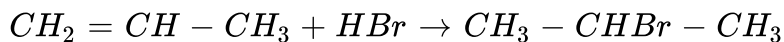
D. $-ME$ and $+IE$ group

Answer: B



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188. The reaction is



A. Nucleophilic addition

B. Electrophilic substitution

C. Electrophilic addition

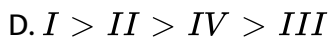
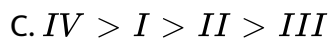
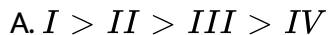
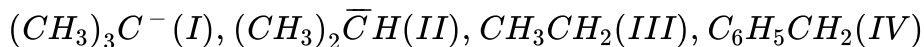
D. Free radical addition

Answer: C



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189. The order of decreasing stability of the carbanions



Answer: B



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190. Which of the following has the highest nucleophilicity?



D. NH_2^-

Answer: C



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191. Electrophilic reagents are

- A. Electron pair donors
- B. Lewis acids
- C. Odd electron molecules
- D. None of the above

Answer: B



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192. Homolytic fission of C - C bond in ethane gives an intermediate in which carbon is

A. sp^3 - hybridized

B. sp^2 - hybridized

C. sp - hybridized

D. sp^3d hybridized

Answer: B



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193. The most stable free radical among the following is

A. $C_6H_5 - CH_2 - \dot{C}H_2$

B. $C_6H_5\dot{C}HCH_3$

C. $CH_3 - \dot{C}H_2$

D. $CH_3 - \dot{C}H - CH_3$

Answer: B



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194. The kind of delocalization involving sigma bond orbitals is called

- A. Inductive effect
- B. Hyper conjugation effect
- C. Electrometric effect
- D. Mesomeric effect

Answer: B



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195. (A): $CH_3 = \overset{\oplus}{C} - \overset{\cdot\cdot}{\underset{\cdot\cdot}{O}}$ is more stable than $CH_3 - C \equiv \overset{\oplus}{O}:$

(R): Resonance structure in which all the atoms obey octet rule is more

stable than resonance structure in which all atoms are not obeying octet rule

- A. A and R are true, R explains A
- B. A and R are true, R does not explain A
- C. A is true, but R is false
- D. A is false, but R is true

Answer: D



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196. The species having trigonal planar shape is

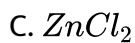
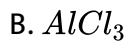
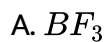
- A. CH_3^+
- B. $:CH_3^-$
- C. BF_4^-
- D. SiH_4

Answer: A



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197. Which of the following is not an electrophile?



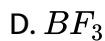
Answer: D



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198. Which of the following is not a nucleophile ?



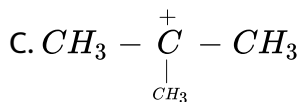
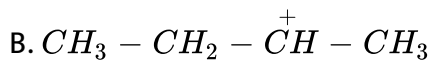
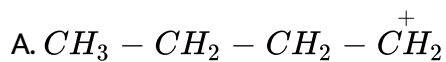


Answer: D



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199. Which of the following is the most stable ion ?

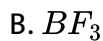
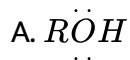


Answer: D



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200. Which of the following is an electrophilic reagent?



Answer: C



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201. The paramagnetic species is

A. Carbonium ion

B. Carbanion

C. Free radical

D. None

Answer: B



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202. Which of the following free radical is the most stable?

A. Tertiary

B. Secondary

C. Primary suffix + Prefix (es) + root word + secondary suffix

D. Methyl

Answer: A



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203. The two bonds N=O and N–O in $H_3 CNO_2$ are of same bond length due to

- A. Inductive effect
- B. Hyperconjugation
- C. Electromeric effect
- D. Resonance effect

Answer: A



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204. The pair of electron in the given carbanion, $\text{CH}_3\text{C} \equiv \text{C}^-$, is present in which of the following orbitals?

- A. 2p
- B. sp^3 hybridised
- C. sp^2
- D. sp

Answer: D

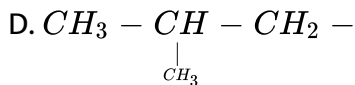
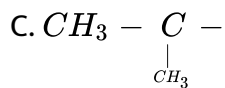
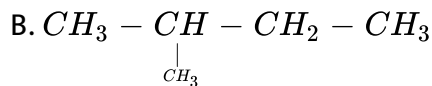
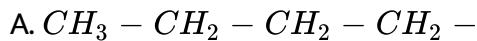
Objective Exercise 2

1. The compound containing sp , sp^2 and sp^3 hybridised carbon atoms in 1 : 2 : 3 ratio is

- A. 2-Methyl-2,3- pentadiene
- B. 1, 2-Hexadien-4-yne
- C. 1, 5-Hexadien-3-yne
- D. all the above

Answer: A

2. Secondary butyl group is



Answer: B



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3. The correct IUPAC name of $CH_3 - CH_2 - CH(CH_3) - CH(C_2H_5)_2$ is

A. 4-Ethyl -3- methylhexane

B. 3-Ethyl -4-methylhexane

C. 4-Methyl -3-ethylhexane

D. 2, 4-Diethylpentane

Answer: B



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4. The correct IUPAC name of $H - \overset{\overset{O}{||}}{C} - CHO$ is

A. Formyl methanal

B. 1, 2-Ethanedione

C. 2-Oxoethanal

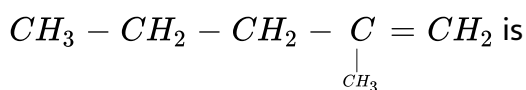
D. Ethanedial

Answer: D



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5. The IUPAC name of the following compound



A. 2-Methylpentene-1

B. 4- Methylpentene-1

C. 1-Hexene

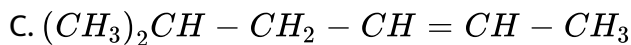
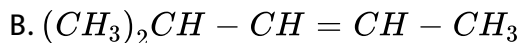
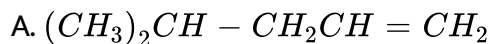
D. 3-Methyl pentene

Answer: A



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6. The structure of 4-methylpentene-2 is



Answer: B



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7. The IUPAC name of $(CH_3)_2CH - COOH$ is

- A. 2-Propanoic acid
- B. Isobutanoic acid
- C. 2-Methylpropanoic acid
- D. 2-Methylbutanoic acid

Answer: C



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8. The IUPAC name of the formula $CH_3 - \overset{CH_3}{\underset{|}{C}} = \overset{H}{\underset{|}{C}} - COOH$ is

- A. 2-Methyl-2-butenic acid
- B. 3-Methyl-3-butenic acid
- C. 3-Methyl-2-butenic acid

D. 2-Methyl-3-butenic acid

Answer: C



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9. IUPAC name of $CH_2 = CH - CH = CH_2$ is

A. 1, 2-Butadiene

B. 1, 3-Butadiene

C. 1, 4-Butadiene

D. Butadiene

Answer: B



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10. IUPAC name of $CH_2 = CH - CH(CH_3)_2$ is

A. 1, 1-Dimethyl -2-propane

B. 3-Methyl-1-butene

C. 2-vinyl propane

D. 1-Isopropyl ethylene

Answer: B



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11. IUPAC name of $(CH_3)_3CCH_3$ is

A. 1, 1, 1-Trimethylethane

B. 2, 2, 2-Trimethylpropane

C. 2, 2, 2-Trimethylethane

D. Dimethylpropane

Answer: D



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12. IUPAC name of $CH_3 - CHCl - CH_2 - CHO$ is

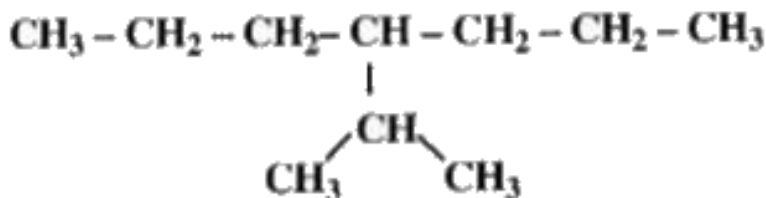
- A. 2-chloro-4-butanol
- B. 3-chloro butane
- C. 2-chloro-4-butanal
- D. 3-chlorobutanal

Answer: D



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13. The systematic name of the organic compound having the structure is



- A. 4-Isopropyl hexane

B. 2-methyl-3-propyl hexane

C. Isodecane

D. 4-(Methylethyl) heptane

Answer: D



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14. IUPAC name of $CH \equiv C - CH = CH_2$ is

A. But-1-yne-3-ene

B. But -1-en-3-yne

C. But-1-yne-2-ene

D. None of the above

Answer: B



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15. $CH_3 - CH_2 - \underset{\substack{| \\ CH_3}}{CH} - (CH_2)_3 - CH_3$ The IUPAC name

- A. 3-methyl hexane
- B. 4-methyl hexane
- C. 5-methyl heptane
- D. 3-methyl heptane

Answer: D



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16. IUPAC name of $(CH_3)_2CH - CHBr_2$ is

- A. 1, 1-dibromo -2-methyl propane
- B. 2-methyl -3-Bromo propane
- C. iso propyl Bromide
- D. 3⁰ butyl bromide

Answer: A



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17. $CH_3 - \underset{\substack{| \\ C_2H_5}}{CH} - CH_2 - \underset{\substack{| \\ C_2H_5}}{CH} - CH_3$ IUPAC name is

- A. 2, 4-diethyl pentane
- B. 3, 5-dimethyl heptane
- C. 3- methyl 5-ethyl hexane
- D. 5-ethyl -3-methyl hexane

Answer: B



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18. IUPAC name of n-amyl alcohol is

- A. butanol-1

B. pentanol-2

C. pentanol-3

D. pentanol-1

Answer: D



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19. IUPAC name of $CH_3 - \underset{\underset{CH_3}{|}}{C}(OH) - CH_3$

A. sec-butyl alcohol

B. pri-butyl alcohol

C. 2-methylpropanal

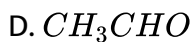
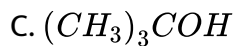
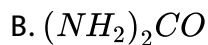
D. 2-methylpropanol-2

Answer: D



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20. The compound in which C uses only sp^3 hybrid orbitals for bond formation is



Answer: C



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21. The maximum number of linear atoms in propyne molecule is

A. 3

B. 4

C. 2

D. 6

Answer: B



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22. IUPAC name of allyl chloride

- A. 1-chloro-1-propene
- B. 1-chloro-2-propene
- C. 3-chloro-2-propene
- D. 3-chloro-1-propene

Answer: D



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23. Among the following which one represents the correct name of the compound?

A. methylpenatane

B. 2-propene

C. 1-pentanone

D. none

Answer: D



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24. The IUPAC name of $\begin{array}{c} CH \\ | \\ CHO \end{array} = \begin{array}{c} CH \\ | \\ NH_2 \end{array}$

A. 1-Amino prop -2-enal

B. 3- Amino prop -2-enal

C. 1- Amino 2-formyl ethene

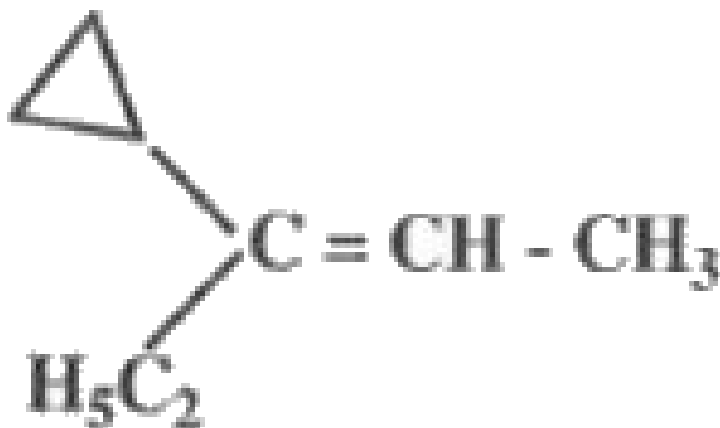
D. 3-Amino -1-oxoprop -2-ene

Answer: B



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25. The IUPAC name of



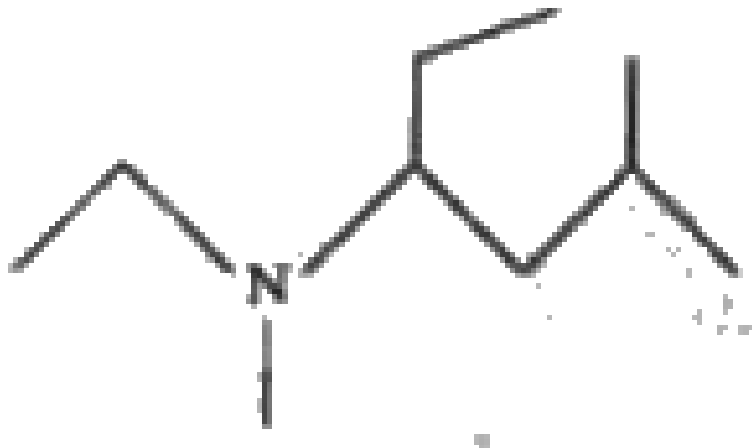
- A. 3-Cyclopropyl -3-ethyl-2-propene
- B. 1-Cyclopropyl -1-ethyl propene
- C. 3- Cyclopropyl -2-pentene
- D. (1- ethyl-1-propenyl) cyclopropane

Answer: C



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26. The IUPAC name of



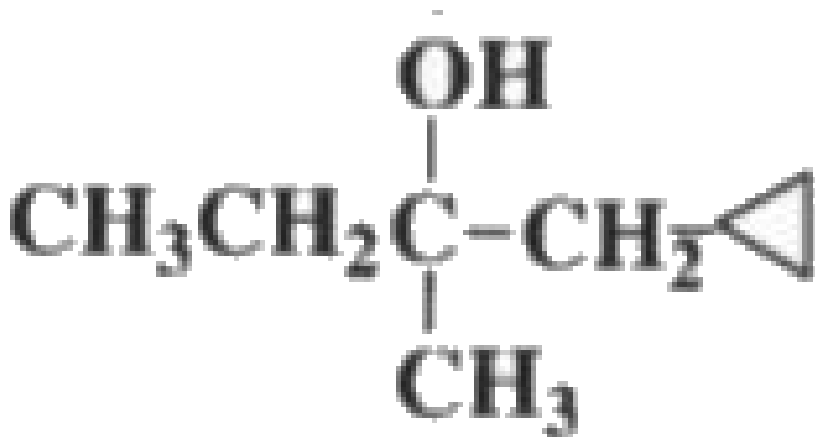
- A. N-ethyl -N, N -di methyl 4-hexanamine
- B. N, N-di ethyl -N-dimethyl -4-butanamine
- C. N-ethyl -N-methyl-5-methyl-3-hexanamine
- D. 3-(ethylmethyl amino) -5-methylhexane

Answer: C



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27. IUPAC name of the compound



- A. tert-pentanol cyclo propane
- B. 2-cyclobutyl butan-2-ol
- C. 1-cyclopropyl-2-methylbutan -2-ol
- D. 2-cyclobutyl -2-methyl-butan-2-ol

Answer: C



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28. The IUPAC name of the given structure



- A. 6-Bromo-5-chlorocyclohexene-3-yne
- B. 5-Bromo-6-chloro-1-cyclohexene-3-yne
- C. 6-Bromo-5-chloro-3-cyclohexene-1-yne
- D. 4-Bromo-3-chloro-1-cyclohexene-5-yne

Answer: B



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29. The total number of bonds in tetracyano methane

- A. 8
- B. 16
- C. 9
- D. 18

Answer: B



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30. The compound which has one isopropyl group is

- A. 2, 2, 3, 3-tetramethyl pentane
- B. 2, 2- dimethyl pentane
- C. 2, 2, 3- trimethyl pentane

D. 2-methyl pentane

Answer: D



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31. False statements regarding isopentane is

A. It has 3 – CH_3 group



B. It has one group



C. It has one group

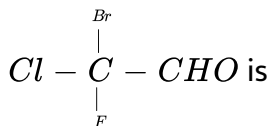
D. It has a carbon atom which is not bonded to hydrogen

Answer: D



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32. The IUPAC name of the compound is



A. 2-Bromo-2-chloro-2-fluoroethanal

B. 1-Bromo-1-chloro-2-fluoroethanal

C. 2-Fluoro-2-chloro-2-bromoethanal

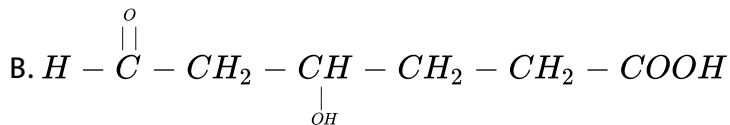
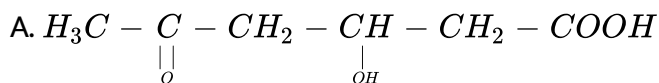
D. 2-Fluoro-2-chloro-2-bromoethanal

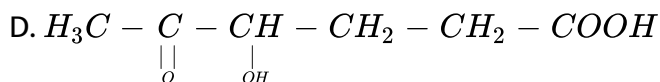
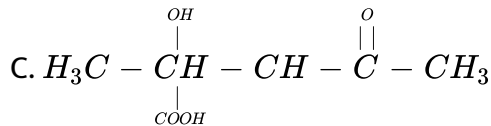
Answer: A



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33. The structure for 3-hydroxy -5-oxohexanoic acid is

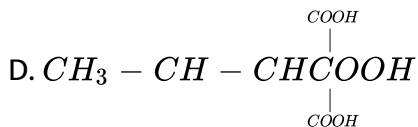
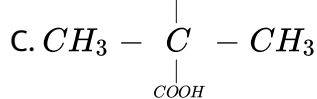
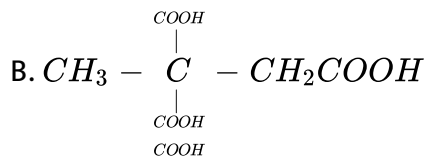




Answer: A

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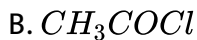
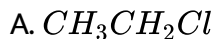
34. The structure for propane -1, 2, 3- tricarboxylic acid is



Answer: A

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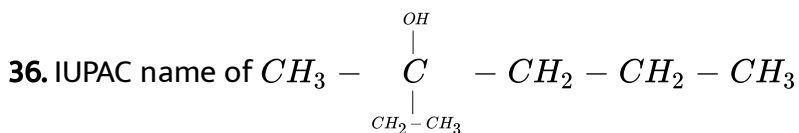
35. Ethanoyl chloride is the IUPAC name of



Answer: B



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A. 3-methyl-3-hexanol

B. 2-ethyl-2-pentanol

C. 2-ethyl-2-hydroxy pentane

D. 2-hydroxy-2-ethyl pentane

Answer: A



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37. The IUPAC name of isobutanol is

- A. 2-methyl propanol
- B. 2-methyl-2-propanol
- C. 2-butanol
- D. 2-methyl-1-propanol

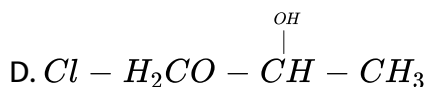
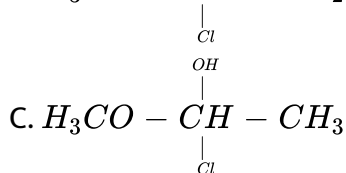
Answer: D



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38. The structure of 2-(chloromethoxy) ethanol

- A. $ClCH_2OCH_2CH_2OH$



Answer: A



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LIST - 1

A) Benzene

B) Pyridine

C) Cycloalkane

D) Alkane

LIST - 2

1) Heterocyclic

2) Alicyclic

3) Aliphatic

4) Aromatic

5) unsaturated aliphatic

39.

The correct match is

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
4	1	2	3

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
1	4	2	3

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
2	4	1	3

D.

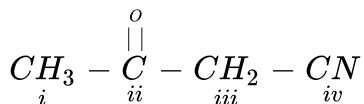
<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	4	1	2

Answer: A



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40. The hybridisation of each carbon in the following compound is



A. $sp^3 sp^2 sp^3 sp$

B. $sp^3 sp^3 sp^2 sp$

C. $sp^3 sp sp^3 sp^2$

D. $sp^3 sp^2 sp sp^3$

Answer: A



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41. The latest technique used for purification of organic compounds is

- A. Chromatography
- B. Vacuum distillation
- C. Fractional distillation
- D. Crystallisation

Answer: A



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42. The best method to separate the mixture of ortho and para nitrophenol (1:1) is

- A. Steam distillation
- B. Crystallisation
- C. Vapourisation
- D. Colour spectrum

Answer: A



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43. Anthracene is purified by

- A. Filtration
- B. Crystallisation
- C. Distillation
- D. Sublimation

Answer: D



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44. On adding $FeCl_3$ solution to acidified Lassaigne's solution, a blood red colour is produced, it indicates the presence of

A. S

B. N, N-di ethyl -N-dimethyl -4-butanamine

C. N & S

D. S & Cl

Answer: C



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LIST - 1

Color

A) blood red

B) prussian blue

C) violet

D) colourless

LIST - 2

Element(s)

1) Cl

2) S

3) N and S

4) N

5) P

45.

The correct match is

- A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
1	4	2	3
- B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
2	4	3	1
- C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	4	2	1
- D.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
4	3	2	1

Answer: C



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46. Sodium nitroprusside when added to an alkaline solution of sulphide ions produces

- A. red colour
- B. blue colour
- C. purple colour
- D. Brown colour

Answer: C

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47. 0.12g of an organic compound gave 0.22 $Mg_2P_2O_7$ by the usual analysis. The percentage of phosphorus in the compound is

- A. 15.23
- B. 38.75
- C. 51.2
- D. 60.92

Answer: C

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48. In Duma's method, the gas which is collected in Nitrometer is

- A. N_2
- B. NO

C. NH_3

D. H_2

Answer: A



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49. The ammonia evolved by 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 solution hydroxide solution for complete neutralization. The organic compound is

A. Acetamide

B. Benzamide

C. Urea

D. Thiourea

Answer: C



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50. In Dumas method , 0.3 g of an organic compound gave 45 ml of nitrogen at STP. The percentage of nitrogen is

- A. 16.9
- B. 18.7
- C. 23.2
- D. 29.6

Answer: B

51. How many structural isomers exist with the formula $C_4H_{10}O$?

- A. 7
- B. 6

C. 5

D. 3

Answer: D



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52. The number of benzene isomers for C_8H_{10} ?

A. 1

B. 2

C. 3

D. 4

Answer: D



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53. The number of structurally isomeric primary amines for $C_4H_{11}N$

A. 2

B. 8

C. 6

D. 5

Answer: B



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54. Number of structural isomers which can be obtained theoretically on monochlorination of 2-methylbutane is

A. 1

B. 2

C. 3

D. 4

Answer: D



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55. How many structural cyclic isomers of C_5H_{10} are possible?

A. 4

B. 3

C. 6

D. 5

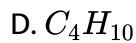
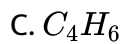
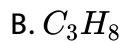
Answer: A



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56. Chain isomerism may be exhibited by

A. C_3H_6



Answer: D



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57. Number of possible structural isomers for C_3H_6O

A. 4

B. 3

C. 6

D. 5

Answer: C



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58. Type of isomerism not possible with the molecular formula $C_4H_{10}O$ is

- A. Chain isomerism
- B. Optical isomerism
- C. Functional group isomerism
- D. Geometrical isomerism

Answer: D



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59. How many isomers could be obtained by replacing one hydrogen of propene with chlorine?

- A. 2
- B. 4
- C. 3
- D. 5

Answer: B



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60. Different conformations of the same molecule are called

A. Isomers

B. epimers

C. Enantiomers

D. Rotamers

Answer: C



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61. Match the following

List – I

- A) Acetaldehyde,
Vinylalcohol**
- B) Elipsed and
staggered**
- C) (+)2-Butanol,
(–) 2-Butanol**
- D) Methyl-n-
propylamine**

List – II

- I) Enantiomers**
- II) tautomers ethane**
- III) Chain isomers**
- IV) Conformational
isomers**
- V) Metamers**

- A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
<i>II</i>	<i>IV</i>	<i>III</i>	<i>V</i>
- B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
<i>II</i>	<i>IV</i>	<i>I</i>	<i>V</i>
- C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
<i>V</i>	<i>I</i>	<i>IV</i>	<i>II</i>
- D.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
<i>V</i>	<i>I</i>	<i>III</i>	<i>II</i>

Answer: B



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62. In which of the following properties, the two enantiomers of lactic acid differ from each other?

- A. Sign of specific rotation
- B. Density
- C. Melting point
- D. Refractive index

Answer: C



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63. Which of the following is a pair of functional isomers?

- A. CH_3COCH_3 , CH_3CHO
- B. $C_2H_5CO_2H$, $CH_3CO_2CH_3$
- C. $C_2H_5CO_2H$, $CH_3CO_2C_2H_5$
- D. CH_3CO_2H , CH_3CHO

Answer: B



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64. Which will have enantiomers

- A. n-butyl chloride
- B. ter- butyl chloride
- C. sec- butyl chloride
- D. iso- butyl chloride

Answer: B



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65. The number of primary alcohol isomers with the formula $C_4H_{10}O$ is

- A. 1

B. 2

C. 3

D. 4

Answer: B



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66. The total number of structural and stereo isomers for the compound of the formula $C_4H_{10}O$ is

A. 7

B. 8

C. 4

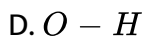
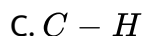
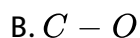
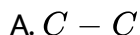
D. 3

Answer: B



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67. In C_2H_5OH , the bond that undergoes heterolytic cleavage most readily is



Answer: D



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68. Pick up the incorrect statement

A. Mesomeric effect occurs in conjugated compounds

B. Inductive effect is transmitted over only quite a short length

C. Due to mesomeric effect, electron pair is transferred completely

D. Inductive effect is a polarisability effect

Answer: D



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69. Reactivity of H-atoms attached to different atoms in alkanes has the order

A. $3^0 > 1^0 > 2^0$

B. $1^0 > 2^0 > 3^0$

C. $3^0 > 2^0 > 1^0$

D. None

Answer: C



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70. Two structures of anilinium are given. Choose the correct statement



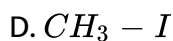
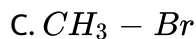
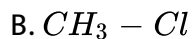
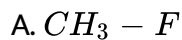
- A. II is not an acceptable canonical structure because it is non-aromatic
- B. II is not an acceptable canonical structure because carbonium ions are less stable than NH_4^+ ion
- C. II is not an acceptable canonical structure because the nitrogen has 10 valency electrons
- D. II is an acceptable canonical structure

Answer: A



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71. Which of the following has highest bond dissociation energy

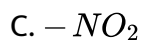


Answer: C



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72. The group which exhibits -M effect is



D. All

Answer: D



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73. Which of the following statements about inductive effect is correct?

- A. It is operate in saturated compounds
- B. It involves electrons in σ bond
- C. The electron pair is only slightly displaced during the I-effect
- D. All are correct

Answer: D



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74. Mark the true statement concerning mesomeric effect?

- A. It occurs in conjugated compounds
- B. It involves electrons in π bonds
- C. Here electron pair is transferred completely

D. All are true

Answer: D



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75. Which one of the following does not exhibit hyperconjugation?

A. Ethanal

B. Allylene

C. Isobutylene

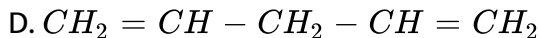
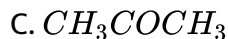
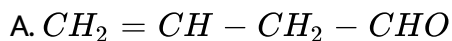
D. Trifluoro acetaldehyde

Answer: D



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76. In which of the following resonance will be possible?

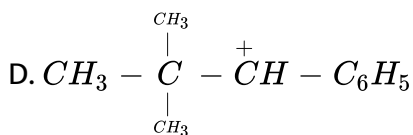
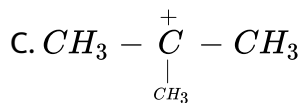
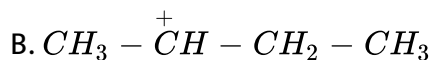
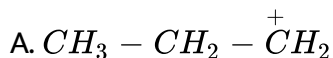


Answer: B



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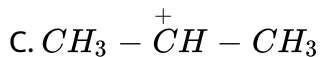
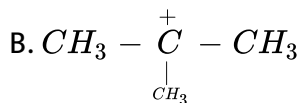
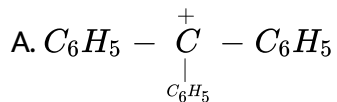
77. Which of the following is least stable?



Answer: A

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78. Pick out the most stable carbonium ion



Answer: A

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79. Which of the following statements is false about resonance

A. It increases stability of a molecule

B. It leads to similar type of bonds

C. It increases reactivity of the molecule

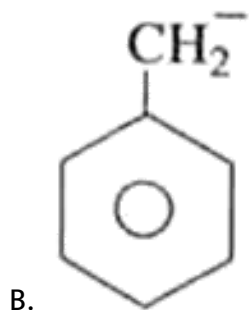
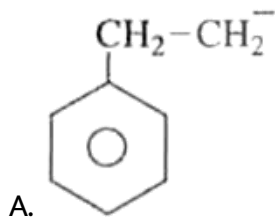
D. It decreases reactivity of the molecule

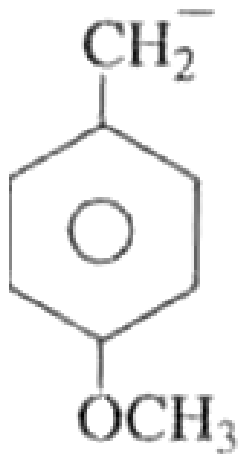
Answer: C



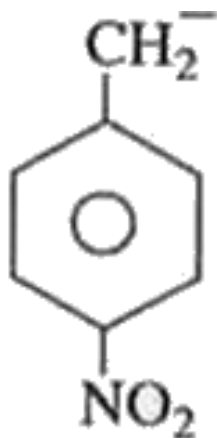
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80. The most stable carbanion among the following is





C.



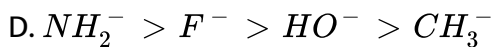
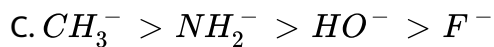
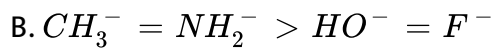
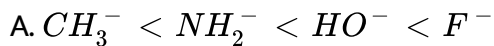
D.

Answer: D



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81. Nucleophilicity order is correctly represented by



Answer: C



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82. Resonance is not shown by

A. Cyclohexane

B. Benzene

C. Xylene

D. Mecetylene

Answer: A



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Practice Exercise

1. The compound $CH_3 - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{CH_3}{|}}{CH} - CH_3$ contains

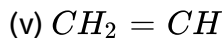
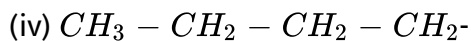
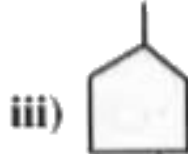
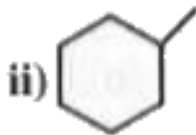
- A. 2-Methylpentane
- B. 2, 3-Dimethylbutane
- C. 3-Methyl pentane
- D. 2, 2-Dimethylpentane

Answer: D



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2. Most often ordinary functional groups are attached with the following original chemical structure



Which of these are coplanar systems:

A. (i) and (v)

B. (ii) and (iii)

C. (ii), (iii) and (iv)

D. (iv)

Answer: A



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3. The kind of valency that exists to CaH_2 and C_2H_2 are

A. Electrovalency in CaH_2 and covalency in C_2H_2

B. Electrovalency in both

C. Covalency in CaH_2 and electrovalency in C_2H_2

D. Covalency in both

Answer: A



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4. The compound which has one isopropyl group is

A. 2, 2, 3, 3-tetramethyl pentane

B. 2, 2-Dimethylpentane

C. 2, 2, 3-Trimethylpentane

D. 2-Methylpentane

Answer: D



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5. Which alkane would have only 1° - and 3° - and

- A. 4-pentane
- B. 2-Methylbutane
- C. 2, 2-Dimethylpropane
- D. 2, 3-Dimethylbutane

Answer: D



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6. The shortest C-C bond distance is found in

- A. Diamond
- B. Ethane
- C. Benzene
- D. Acetylene

Answer: D



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LIST - 1

A) Cyclobutane

B) Pyrrole

C) Nitrobenzene

D) Hexane

LIST - 2

1) Carbocyclic, aromatic

2) Aliphatic

3) Alicyclic

4) Heterocyclic

**5) Unsaturated,
aliphatic**

7.

The correct match is

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
2	3	1	4

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	4	2	1

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	4	1	2

D.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
2	3	4	1

Answer: C



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8. The compound having only one type of hybrid orbitals in all carbon atoms is

- A. Ethane dial
- B. 2, 4-pentadine
- C. Propene
- D. Butyne

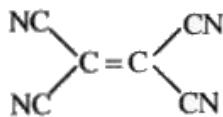
Answer: A



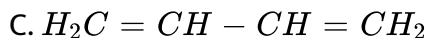
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9. The compound having some number of σ are π bonds is

- A. $H_2C = CH - CN$



B.

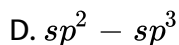
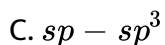
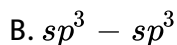
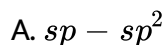


Answer: B



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10. In the compound $\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{CH}_2 - \text{C} \equiv \text{CH}$, the $\text{C}_2 - \text{CH}_3$ bond is of the type



Answer: D



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11. Number of 1° , 2° , 3° hydrogen atoms in iso-pentane are

A. 9, 2, 1

B. 6, 2, 0

C. 6, 3, 1

D. 6, 1, 1

Answer: A



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12. Compound containing sp and sp^2 hybridised carbon atoms is

A. Vinyl acetylene

B. Benzene

C. Cyclohexene

D. None of these

Answer: A



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13. Distillation is used to separate liquids which differ in their b, pt by

A. $5^{\circ}C$

B. $10^{\circ}C$

C. $> 40^{\circ}C$

D. $20^{\circ}C$

Answer: C



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14. Which one of the following is not used for the purification of solid impurities?

- A. Distillation
- B. Sublimation
- C. Crystallisation
- D. None of these

Answer: A



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15. A mixture contains four solid organic compounds A,B,C,D. On heating, only C changes from solid to vapour state. C can be separated from the rest in the mixture by

- A. Distillation
- B. Sublimation

C. Fractional distillation

D. Crystallisation

Answer: B



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16. In paper chromatography

A. Moving phase is liquid and stationary phase is solid

B. Moving phase is liquid and stationary phase is liquid

C. Moving phase is solid and stationary phase is solid

D. Moving phase is solid and stationary phase is liquid

Answer: B



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17. Which of the following is the scientific method to test the presence of water in a liquid?

- A. Smell
- B. Taste
- C. Use of litmus paper
- D. Use of anhydrous copper sulphate

Answer: D



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18. 0.2g of an organic compound on complete combustion produces 0.18g of water, then the percentage of hydrogen in it is

- A. 5
- B. 10
- C. 15

D. 20

Answer: B



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19. Which of the following organic compounds contain about 52% carbon?

A. Ethanal

B. Dimethyl ether

C. Acetic acid

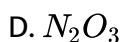
D. Phenol

Answer: B



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20. In Kjeldahl's method, the nitrogen presence is estimated as



Answer: B



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21. 29.5mg of an organic compound containing nitrogen was digested according to Kjeldahl's method and the evolved ammonia was absorbed in 20mL of 0.1M HCl solution. The excess of the acid required 15mL of 0.1M NaOH solution for complete neutralization. The percentage of nitrogen in the compound is

A. 23.7

B. 29.5

C. 59.0

D. 47.4

Answer: A



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22. Fractional crystallization is carried out to separate

A. Organic solids mixed with inorganic solids

B. Organic solids highly soluble in water

C. Organic solids having small difference in their solubilities in a suitable solvent

D. Organic solids having great difference in their solubilities in a suitable solvent

Answer: C



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23. Distillation under reduced pressure method is used to purify the liquids in which the liquids

- A. have high boiling points
- B. have low boiling points
- C. do not decompose at their boiling points
- D. highly volatile

Answer: A



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24. A liquid which decomposes at or below its boiling point can be purified by

- A. Steam distillation

- B. simple distillation
- C. Fractional distillation
- D. distillation under reduced pressure

Answer: D



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25. Which of the following can not be used as adsorbent in adsorption chromatography?

- A. Silica gel
- B. Alumina
- C. Cellulose
- D. Aluminum chloride

Answer: D



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26. Which of the following statements is not correct regarding purification of liquids by steam distillation?

- A. impurities must be non-volatile
- B. The liquid must be completely immiscible with water
- C. The liquid must possess high boiling point
- D. The liquid must not be steam volatile

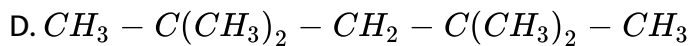
Answer: D



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27. Which of the following represents 2, 2, 3-trimethyl hexane?

- A. $CH_3 - C(CH_3)_2 - CH_2 - CH_2 - CH(CH_3)_2$
- B. $CH_3 - CH(CH_3) - CH_2 - CH(CH_3) - CH_2 - CH_3$
- C. $CH_3 - C(CH_3)_2 - CH(CH_3) - CH_2 - CH_2 - CH_3$



Answer: C



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28. The IUPAC name of $(C_2H_5)_4C$ is

- A. tetra ethyl methane
- B. 2, 2-Dimethylpentane
- C. 3, 3-diethylpentane
- D. neopentane

Answer: C



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29. Write IUPAC name of chloral

A. 4, 4, 2-Trimethylpentane

B. 2, 2-Dimethylpentane

C. 2, 2-Dimethylbutane

D. 2, 2, 4-Trimethylpentane

Answer: D



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30. The IUPAC name of the compound $C_2H_5 - \underset{\begin{smallmatrix} || \\ CH_2 \end{smallmatrix}}{C} - CH_2OH$ is

A. 2-Ethylprop -2-en-1 -ol

B. 2-Hydroxymethyl butan-1-ol

C. 2-Methylenebutan-1-ol

D. 2-Ethyl-3-hydroxy prop -1-ene

Answer: A



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31. The IUPAC name of the compound is



- A. 4-Ethylpentanol-2
- B. 4-Methylhexanol-2
- C. 2-Ethylpentanol-2
- D. 3-Methylhexanol-2

Answer: B



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

- A. 4-Methyl-2-pentyne
- B. 4, 4-Dimethyl-2-butyne

C. Isoprpylmethyl acetylene

D. 2-Methyl-4-pentyne

Answer: A



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33. The IUPAC name of $CH_3 - \overset{\overset{CH_3}{||}}{CH} - \overset{\overset{O}{|}}{C} - CH_2 - CH_2OH$ is

A. 1-Hydroxy -4-methyl-3-pentanone

B. 2-Methyl -5-hydroxy-3-pentanone

C. 4-Methyl -3- oxo-1-pentanol

D. Hexanol-1-one-3

Answer: A



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34. The correct IUPAC name of the compound $Cl_3C - CH_2CHO$

A. 3, 3, 3-Trichloro propanal

B. 1, 1, 1-Trichloro propanal

C. 2, 2, 2-Trichloro propanal

D. Chloral

Answer: A



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35. IUPAC name of $CH_2 = C = CH_2$ is

A. propadiene

B. 1, 1-propadiene

C. 2, 2-propadiene

D. 1, 3-propadiene

Answer: A



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36. IUPAC name of $CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - CH = CH_2$ is

A. 3, 3, 3-Trimethyl -1-propene

B. 1, 1, 1-Trimethyl-3-propene

C. 3, 3-Dimethyl -1-butene

D. 1, 1-Dimethyl -3-butene

Answer: C



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37. The IUPAC name of $CH_3 - CH_2 - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{O}{||}}{C} - CH_3$

- A. Isohexanone
- B. 3-methyl-2-pentanone
- C. either (1) or 2
- D. 3-Methyl-4-pentanone

Answer: B



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38. The structural formula of 3-ethyl-2-methyl hexane is

- A. $CH_3 - CH(CH_3) - CH(C_2H_5) - CH_2 - CH_2 - CH_3$
- B. $CH_3 - CH_2 - CH(C_2H_5) - CH(CH_3) - CH_2 - CH_3$
- C. either (1) or 2
- D. None of these

Answer: A



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39. The IUPAC name of $(CH_3)_3C - CH = CH_2$ is

- A. 2, 2-dimethylbut-3-ene
- B. 2, 2-dimethylpent-4-ene
- C. 3, 3-dimethylbut-1-ene
- D. 3, 3-dimethylpent-1-ene

Answer: C



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40. The compound $CH_3 - \underset{\substack{| \\ CH_2 - CH_3}}{C} = CH - CH_3$ is

- A. 2-ethyl-2-butene
- B. 3-methyl-3-pentene
- C. 3-methyl-2-pentene

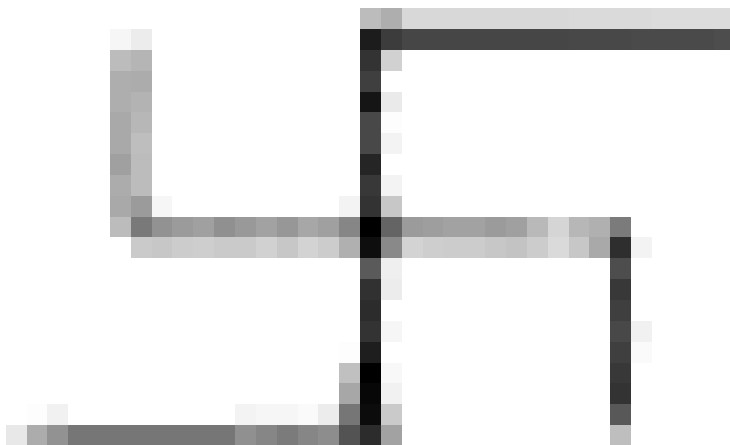
D. 3-ethyl-2-butene

Answer: C



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41. The IUPAC name of the given structure



is

A. 3, 3-Dimethylpentane

B. 3, 3-Diethylpentane

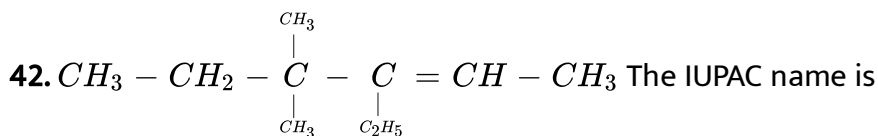
C. 3-Ethyl-3-methylpentane

D. 3-Ethyl-3-ethylpentane

Answer: B



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A. 3-ethyl-4, 4-dimethyl-2-hexene

B. 4-ethyl -3, 3-dimethyl-2-hexene

C. 4-ethyl -3, 3-dimethyl -4-hexene

D. 3, 3-dimethyl -4-ethyl -4-hexene

Answer: A



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43. $CH_3 - \underset{\begin{smallmatrix} || \\ CH_2 \end{smallmatrix}}{C} - CH_2 - \underset{\begin{smallmatrix} || \\ CH_2 \end{smallmatrix}}{C} - CH_3$ IUPAC name of the above compound is

- A. 2, 4-pentadiene
- B. 2, 4-dimethyl-1, 4-pentadiene
- C. 2, 4-butadine
- D. None of the above

Answer: B



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44. IUPAC name of $CH_3 - O - \underset{\begin{smallmatrix} | \\ CH_3 \end{smallmatrix}}{CH} - CH_3$

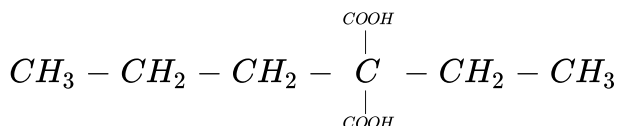
- A. methyl propyl ether
- B. methyl isopropyl ether
- C. 2-methoxy propane
- D. all the above

Answer: C



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45. The IUPAC name of the given compound



- A. 2-Ethyl-2-propyl propanediotic acid
- B. 2- Propyl-2- ethyl propanediotic acid
- C. 2-Ethyl-2-carboxy pentanoic acid
- D. 2-Carboxy-2-ethyl pentanoic acid

Answer: A



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46. The IUPAC name of $\text{CH}_2 = \underset{\text{CH}_3}{\underset{\text{CH}-\text{CH}_3}{\text{C}}} - \text{CH}_2 - \text{CH}_3$ is

A. 2-Ethyl-3-methyl butene-1

B. 2-Isopropyl butene-2

C. 2-Methyl-3-ethyl butene-3

D. Ethyl isopropyl ethane

Answer: A



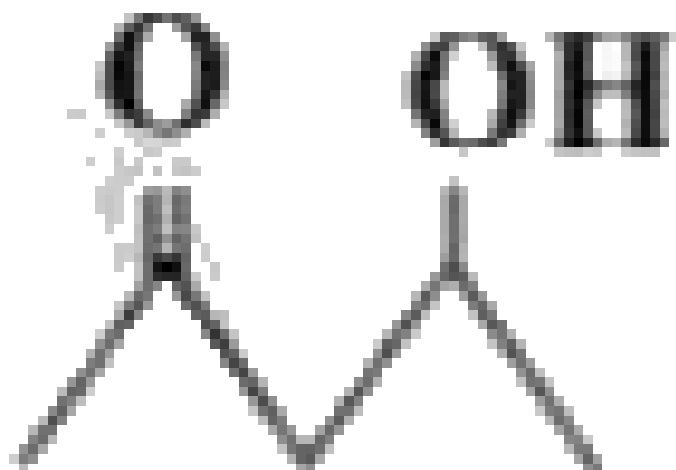
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47.

IUPAC

name

of



is

A. 4-one -2-pentenol

B. 4-hydroxy -2-pentanone

C. Pentane-4-ol-2-one

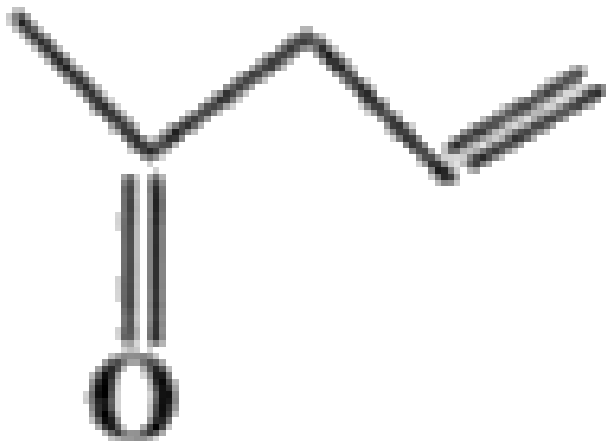
D. Pentane-2-one -4-ol

Answer: B



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48. The correct IUPAC name of the compound



A. Pent-4-en-2-one

B. 3-Buten-1-al

C. 3-Acetyl propene-1

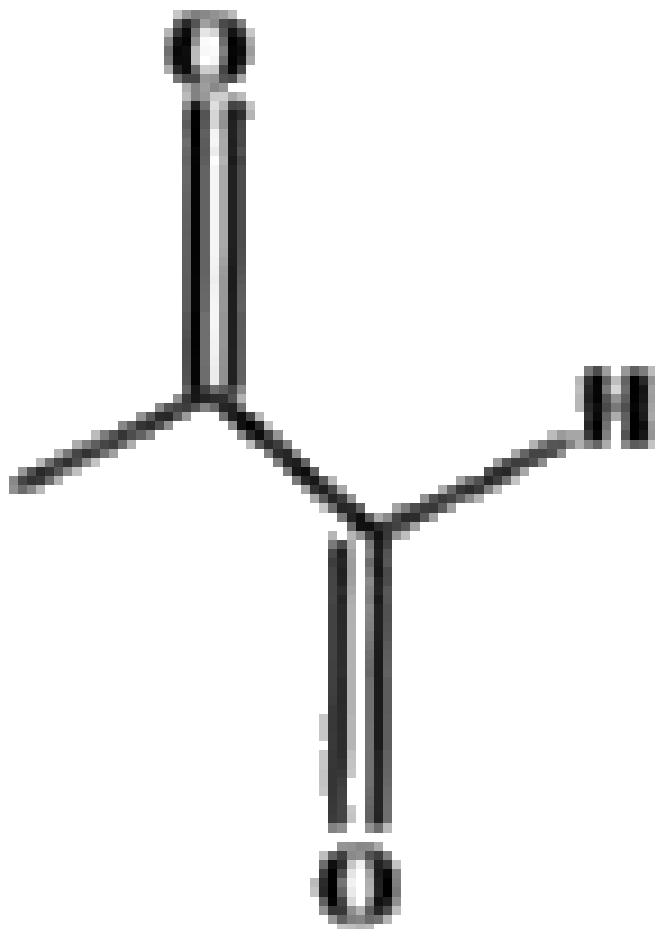
D. Formyl propene

Answer: A



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49. The correct IUPAC name



A. Ethanedial

B. 2-Ketopropanal

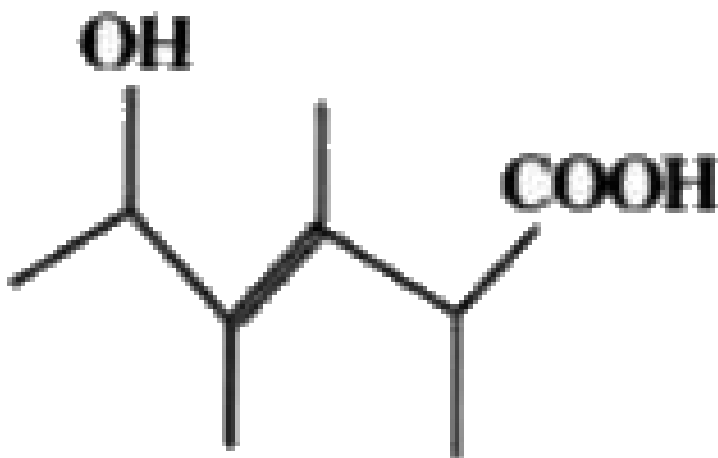
C. 2, 3-Butane dione

D. Ethane dione

Answer: B



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50.

Correct

IUPAC name of this compound is

- A. 5-Hydroxy-2, 3, 4-trimethyl-3-hexenoic acid
- B. 2-Hydroxy-2, 3, 4-trimethyl-3-hexene-1-oic acid
- C. 2-Hydroxy-2, 3, 4-trimethyl-3-hexene-5-oic acid
- D. 2-Hydroxy-2, 3-4-trimethyl-3-hexene-1-oic acid

Answer: A



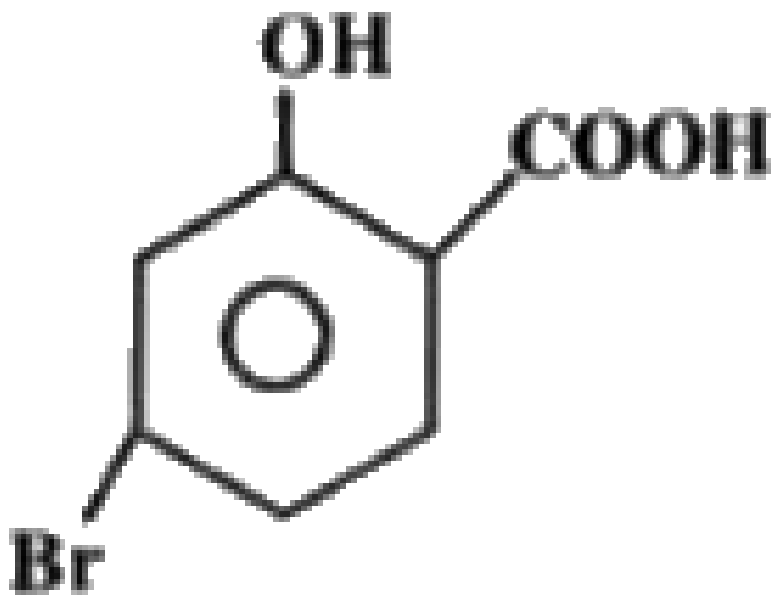
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51.

IUPAC

name

of



- A. 4-Bromo-2-hydroxy benzoic acid
- B. 1-Bromo-3-hydroxy benzoic acid
- C. 1-Bromo-3-hydroxy-4-benzoic acid
- D. 1-Carboxy-2-bromo phenol

Answer: A



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52. The IUPAC names of the following pair of compounds



are

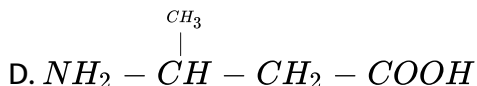
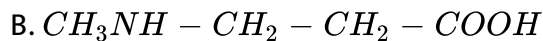
- A. Cis-2-butene and trans-2-butene
- B. 2-Butene and methylpropene
- C. Trans -2-butene and cis-2-butene
- D. Methylpropene and methylpropene

Answer: A



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53. The structure of 3-(methylamino) propanoic acid is



Answer: B



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54. The IUPAC name of acraldehyde is

A. 2-propenal

B. propenyl aldehyde

C. propenaldehyde

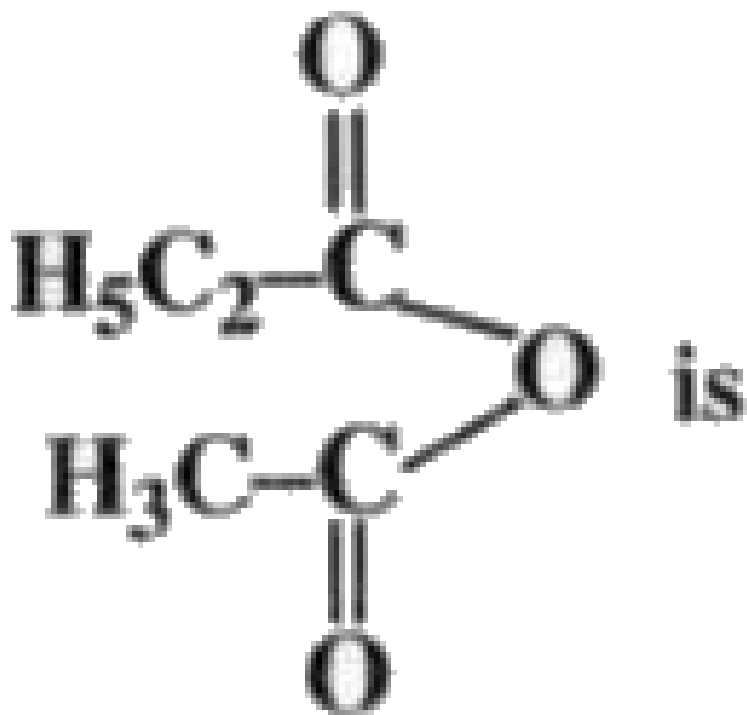
D. propenone

Answer: A



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55. The IUPAC name of the compound



- A. Propionic acetic anhydride
- B. Ethanoic propanoic anhydride
- C. Propionic ethanoic anhydride

D. Acetic propanoic anhydride

Answer: B



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LIST - 1

(Compound)

A) Dimethyl acetylene

B) Propionic acid

C) Chloroform

D) Acetone

LIST - 2

(IUPAC name)

1) Propanone

2) Trichloromethane

3) Propanoic acid

4) But -2-yne

5) But -1-yne

56.

The correct match is

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
4	3	2	1

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
5	4	2	1

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
5	3	2	4

D.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	4	1	2

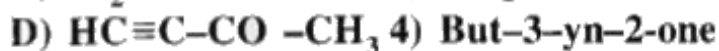
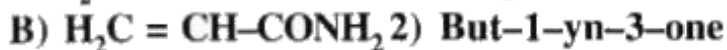
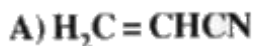
Answer: A



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LIST - 1

(Structural formula)



LIST - 2

(Name of compound)

1) Propenamide

2) But-1-yn-3-one

3) Propenenitrile

4) But-3-yn-2-one

5) Propenal

57.

The correct match is

A.

A	B	C	D
1	3	5	2

B.

A	B	C	D
3	1	5	2

C.

A	B	C	D
3	1	5	4

D.

A	B	C	D
3	1	4	5

Answer: C



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LIST - 1**(compound)****A) Propenol****B) 1,4-Dimethylbenzene****C) Propanone****D) Hydroxybenzene****LIST - 2****(common name)****1) Allyl alcohol****2) p-Xylene****3) Phenol****4) Acetone****5) m-Xylene****58.**

The correct match is

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
----------	----------	----------	----------

1	2	4	3
---	---	---	---

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
----------	----------	----------	----------

3	2	4	1
---	---	---	---

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
----------	----------	----------	----------

3	5	4	1
---	---	---	---

D.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
----------	----------	----------	----------

1	5	4	3
---	---	---	---

Answer: A**Watch Video Solution**

59. Compounds with $C_4H_{11}N$ as molecular formula can exhibit

- A. Position isomerism
- B. Metamerism
- C. Functional isomerism
- D. All the three

Answer: D



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60. Ortho, meta and para dichloro-benzenes are

- A. Chain isomers
- B. Position isomers
- C. Functional isomers
- D. Tautomers

Answer: B



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61. Primary, secondary and tertiary amines are

- A. Chain isomers
- B. Position isomers
- C. Functional isomers
- D. Tautomers

Answer: C



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62. Which pair of isomers given below are position isomers?

- A. Propanal and propanone

B. 1° Butyl alcohol and Isobutyl alcohol

C. 3° Butyl alcohol and Isobutyl alcohol

D. 2° Butyl alcohol and 3° Butyl alcohol

Answer: C



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63. n-propyl amine and isopropyl amine are examples of

A. Position isomerism

B. Chain isomerism

C. Tautomerism

D. Geometrical isomerism

Answer: A



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64. The number of isomeric amines possible for the formula C_3H_9N

A. 4

B. 3

C. 5

D. 6

Answer: A



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65. The type of isomerism that is not found in alkenes is

A. Metamerism

B. Chain isomerism

C. Geometrical isomerism

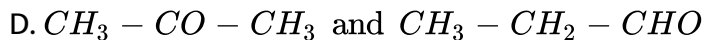
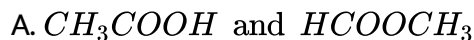
D. Position isomerism

Answer: A



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66. Which pair does not represent isomers?



Answer: C



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67. Number of isomers for the compound dihydroxy benzene

A. 1

B. 2

C. 3

D. 4

Answer: C



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68. The number of isomeric structures possible for a molecule having molecular formula C_5H_{12}

A. 2

B. 3

C. 4

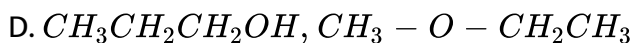
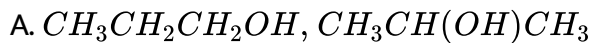
D. 5

Answer: B



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69. A pair of functional isomers



Answer: D



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70. Out of the following the alkene that exhibits optical isomerism is

A. 2-methyl-2-pentene

B. 3-methyl-2-pentene

C. 3-methyl-1-pentene

D. 4-methyl-1-pentene

Answer: C



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71. Number of possible geometrical isomers for 2, 4 - hexadiene is

A. 8

B. 4

C. 3

D. 2

Answer: C



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72. Removal of hydride ion from a methane molecule will give a

A. Methyl radical

B. Carbonium ion

C. Carbanion

D. Methyl group

Answer: B



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73. The most stable carbonium ion is

A. Methyl carbonium ion

B. Primary carbonium ion

C. Secondary carbonium ion

D. Tertiary Carbonium ion

Answer: D



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74. Which one of the following is most stable?

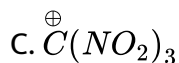
- A. Isobutylene
- B. 2-Methyl-2-butene
- C. 2, 3-Dimethyl-2-butene
- D. Ethylene

Answer: C



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75. Which of the following is the least stable carbonium ion?

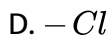
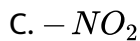
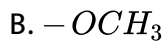
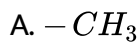


Answer: C



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76. Which is the following shows maximum $-I$ effect?



Answer: C



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77. Which of the following has maximum number of hyper conjugative structures?

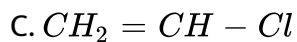
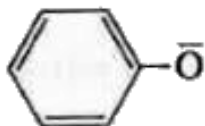
- A. isopropyl carbonium ion
- B. tetrinary butyl carbonium ion
- C. n-propyl carbonium ion
- D. Benzyl carbonium ion

Answer: B



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78. The substance stabilized by resonance



D. All of the above

Answer: D



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79. What are the shapes of ethyne and methane?

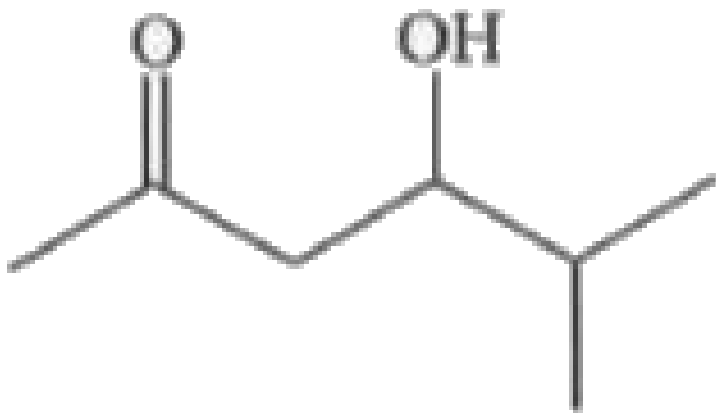
- A. square planar and linear
- B. tetrahedral and trigonal planar
- C. linear and tetrahedral
- D. trigonal planar and linear

Answer: C



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80. The IUPAC name of the following compound is



- A. 5-oxo-2-methyl-hexan-3-ol
- B. 4-hydroxy-5-methyl-hexan-2-one
- C. 2-oxo-5-methyl-hexan-4-ol
- D. 3-hydroxy-2-methyl-hexan-5-one

Answer: D

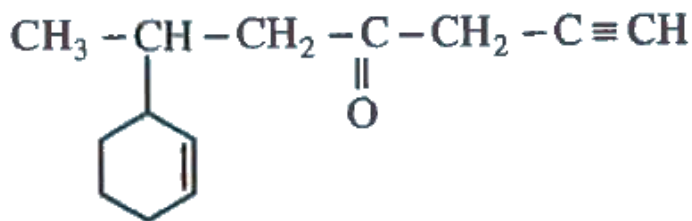


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1. What are the main natural sources of organic compounds?

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2. Indicate hybrid state of each carbon atom in the following molecule :



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3. Explain the structures of CH_4 and C_2H_6 .

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4. Discuss the structure and hybridisation in ethylene.

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5. Explain sp hybridisation taking acetylene as example.

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6. Give the order of bond lengths of various hybrid carbon atoms and hydrogen atom bonds.

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7. Comment on the bond-line structural representation of hydrocarbons

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8. Draw the bond-line structural formula of cyclohexane and cyclohexanol.

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1. Discuss the principles involved in a) Sublimation and b) Crystallisation



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2. What type of liquids can be purified by steam distillation ?



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



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4. Which of the following can not be used as adsorbent in adsorption chromatography?



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Exercise 1 1 3

1. What is the function of fusing the organic compound with sodium metal ?

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2. How are carbon and hydrogen of an organic compound estimated?

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3. Write the equations involved in the detection of Nitrogen, Halogens and Sulphur in or-ganic compounds.

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4. Mention the colours of the precipitates obtained in Lassaigne's test when the organic compound contains various halogen.



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5. Discuss the estimation of nitrogen present in an organic compound by Dumas method. Mention the principles.



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



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7. Explain the estimation of phosphorus and sulphur present in the organic compound



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8. Explain the estimation of phosphorus and sulphur present in the organic compound



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9. How oxygen present in an organic compound is estimated?



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Exercise 114

1. What are alicyclic compounds? Give two examples.



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2. All heterocyclic compounds need not be aromatic. Explain.



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3. What are the characteristics of homologous series ?



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4. What is a functional group? Give three examples of functional groups.



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5. Give the structural formula of the following functional groups :

(a) Carboxylic acid, (b) Acid amide anhydride and (d) Ester.



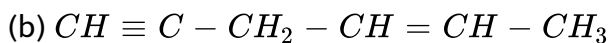
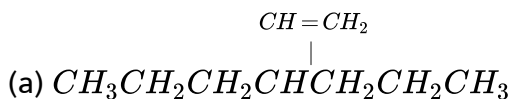
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1. Mention different rules for naming hydrocarbons.



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2. Write the IUPAC names of the following hydrocarbons :



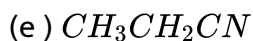
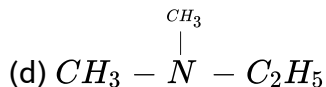
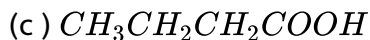
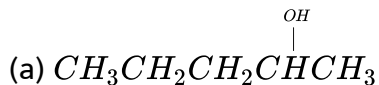
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3. Write the preferential order in naming polyfunctional compounds



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4. Write the IUPAC names of the following monofunctional compounds



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5. Write the structural formula of the following,

(a) 2 - Butenamide

B) Ethylethanote

(c) 2-Methyl-3-hexyne

(d) Propanoic anhydric

(e) Pentan - 2,4 - dione



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6. Write the IUPAC names of the given poly functional compounds

- (a) $\text{HOCH}_2\text{CH}_2\text{CH}_2\text{COOH}$ (b) $(\text{CH}_3)_2\overset{\text{O}}{\underset{||}{\text{C}}}\text{CH}_2\text{COOCH}_3$ (c) $\text{CH}_3\text{CH}(\text{NH}_2)\text{CH}_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$ (d) $\text{CH}_3\text{OCH}_2\text{COCH}_3$ (e) $\text{CH}_2\text{CHBrCH}_2\text{CONHCH}_2\text{CH}_3$



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7. Write the systematic names of the following bond line formulae :

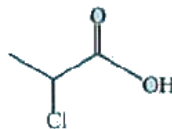
(a)



(b)

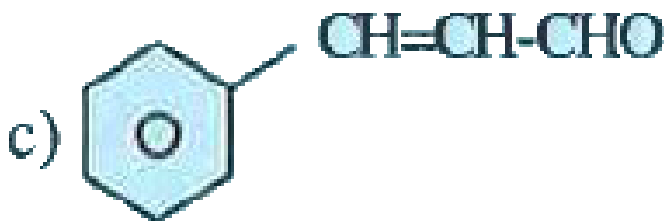
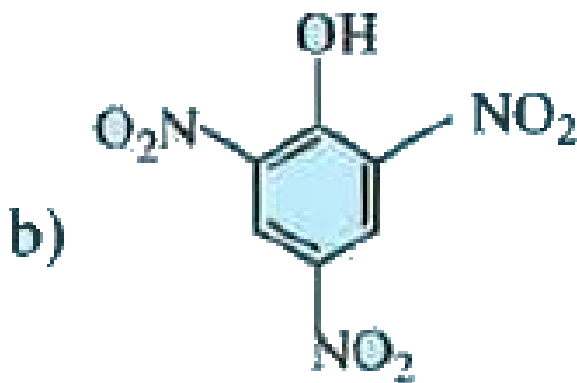


(c)



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8. Write the IUPAC and common names of the following :



(a)



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1. How many isomeric carbonyl compounds are possible with the molecular formula, $C_3H_{10}O$? Draw their structures .



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2. Mention the number of isomeric ethers having molecule formula, $C_5H_{12}O$. Write their names.



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3. Predict the number of isomers possible with the formula C_3H_8O . Write the names of these isomers.



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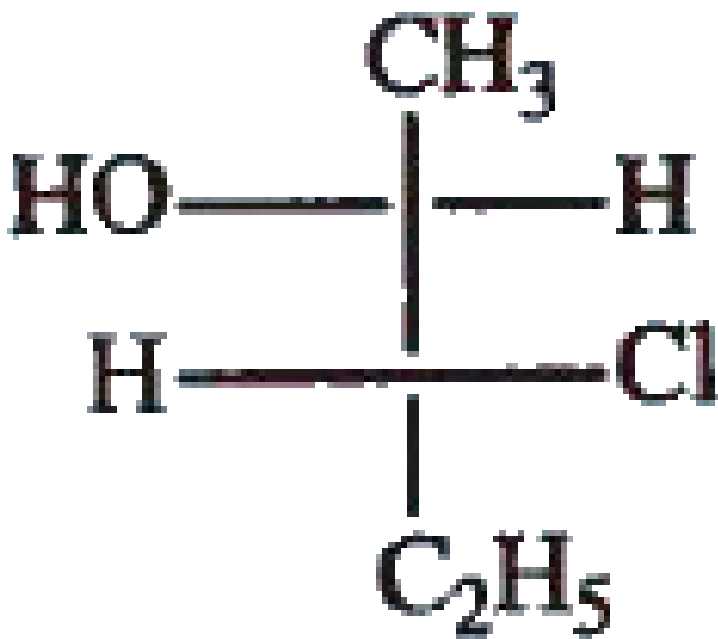
4. Write down the four structural formulae of aromatic isomers possible with the molecular formula, C_8H_{10} .

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5. What are the reasons for optical activity of a compound ?

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6. Write the full name of the compound

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7. What are diastereomers? Give two suitable examples.



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8. What is racemisation ?



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9. Differentiate between enantiomers and diastereomers.



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10. Discuss the stereoisomers present in tartaric acid ? Draw their structures. How many of them are optically active ?



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11. How many stereoisomers of 2,3-dichloro-butanoic acid ? Write the structures of the stereoisomers of the compound.



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Questions For Descriptive Answers

1. Mention the hybridisation state of each carbon in the following compounds.



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2. Indicate the σ and π bonds in naphthalene and isobutane molecules.



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3. What type of organic compounds can be purified by sublimation ? Give two examples.



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



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



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6. Write the equations involved in the detection of Nitrogen, Halogens and Sulphur in organic compounds.

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7. Nitrogen, sulphur and phosphorus present in organic compounds are detected by the formation of which of the following coloured substances respectively.

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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 0.27g and 0.66g respectively. Calculate the percentage of carbon and hydrogen in it

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9. 0.22g of an organic compound on combustion in an atmosphere of carbon -dioxide gave 34 cm^3 of moist nitrogen at 17°C and 733.4mm

pressure. If the aqueous tension at 17°C is 13.4 mm, calculate the percentage of nitrogen in the compound



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10. 0.303 g of an organic compound was analysed for nitrogen by Kjeldahl's method. The ammonia gave 0.2584 g of silver bromide. Calculate the weight percentage of bromine in the organic compound.



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11. 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 residue. Calculate the weight percentage of bromine in the organic compound



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



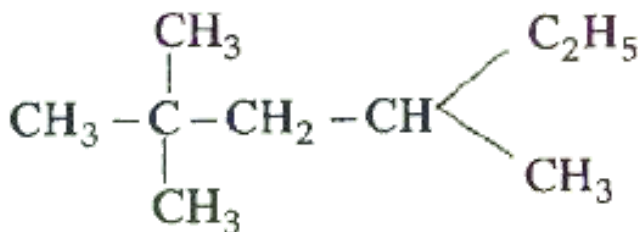
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13. 1.5 g of an organic compound in a quantitative determination of phosphorus gave 2.5090 g of $Mg_2P_2O_7$. Calculate the percentage weight of phosphorus.



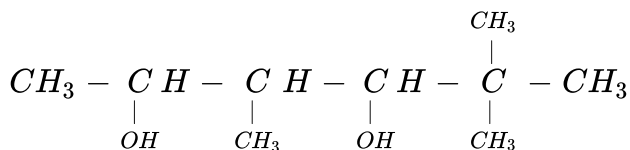
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14. Indicate the number of 1° , 2° , 3° and 4° carbon atoms in the following molecule :



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15. Give IUPAC name of the compound.

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16. Write the structures of the following compounds: 2-Amino - 3 - methylbutanoic acid, 5-(2,2- Dimethylpropyl)nonate, 2-Hydroxy-5-methylhex-3-ynal.

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17. What are the common names of the following compounds ?

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18. An alkane has molecular mass 86. What is the molecular formula of the alkane ?



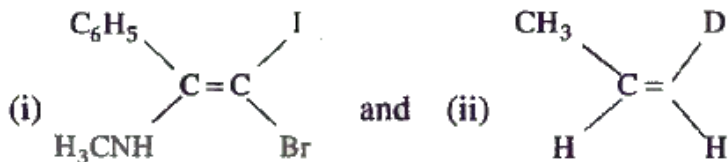
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19. Identify molecules containing chirality centre among the following :
sec-Butyl chloride, Ethanediol, 2-Methyl-butane and 3-Bromohexane



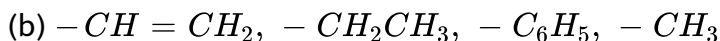
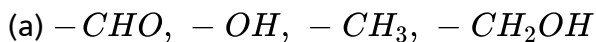
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20. Assign E and Z configuration to the following structures :



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21. Assign priority number to each of the following groups:



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



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23. For the following cyclic compounds, write down the bond line formulae : Cyclopentane, Methylcyclobutane, 1,1-Dimethylcyclopropane and 1,2- Dimethylcyclo-propane.



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24. Identify correct IUPAC names among the following pairs.

(i) 2,2 - Dimethylpentane or 2-Dimethylpentane

(ii) But - 3- yn - 1 - ol or But - 4-ol-yne

(iii) 2-Chloro-4-methylpentane o 4-Chloro-2-methylpentane



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25. Give the IUPAC names of the following compounds:

$(CH_3)_2CH - CO - COOH$, $HOCH_3 - CH = CH - CH_2OH$, CH_3CH_2



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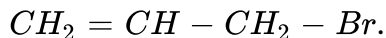
26. Write the common and IUPAC of the compound :

$(CH_3)_2C - CH_2CH_2CH_3$



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27. Write the common name and of the compound



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28. How many cyclic isomeric structures are possible for C_3H_6O ?



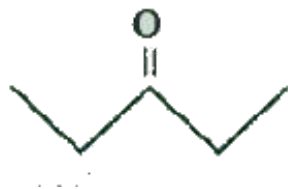
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29. Give two structural isomers of $C_3H_4Br_2$ Which can exhibit geometrical isomerism ?



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30. Explain the relationship between the members of following pair of structures.



and



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



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



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



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34. Write the structure of iso-butyric acid and acrylonitrile molecules.



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35. 2,3- Dibromobutane has two stereogenic centres, but it has only 3 isomers. Why?



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