Brain Molecules

Chemistry for class 11 and 12 CBSE Board.

GENERAL PRINCIPALS OF ORGANIC CHEMISTRY

Class 11 - Chemistry

1. What are hybridisation states of each carbon atom in the following compounds? **[5]**

   i. $CH_2 = C = O$

   ii. $CH_3CH = CH_2$

   iii. $(CH_3)_2CO$

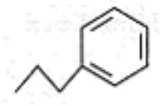
   iv. $CH_2 = CHCN$

   v. C_6H_6

2. Write bond-line formulas for: Isopropyl alcohol, 2,3- Dimethylbutanal, Heptan-4-one. **[2]**

3. Give the IUPAC names of the following compounds: **[2]**

   i.

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   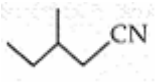

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   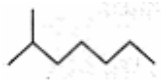

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   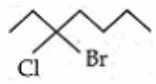

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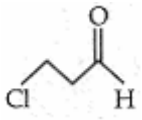
   

   vi. Cl_2CHCH_2OH

4. Which of the following represents the correct IUPAC name for the compounds concerned? **[2]**

   a. 2, 2-Dimethylpentane or 2-Dimethylpentane

   b. 2, 4, 7-Trimethyloctane or 2, 5, 7-Trimethyloctane

   c. 2-Chloro-4-methylpentane or 4-Chloro-2-methylpentane

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

5. Which of the two: $O_2NCH_2\ CH_2O^-$ or $CH_3CH_2O^-$ is expected to be more stable and why? **[2]**

6. Explain why alkyl groups act as electron donors when attached to a π system. **[2]**

7. Draw the resonance structures for the following compounds. Show the electron shift using curved-arrow **[5]**

notation.

a. C_6H_5OH

b. $C_6H_5NO_2$

c. $CH_3CH=CHCHO$

d. $C_6H_5–CHO$

e. $C_6H_5 - \overset{+}{C}H_2$

f. $CH_3CH = CH\overset{+}{C}H_2$

8. What are electrophiles and nucleophiles? Explain with examples. **[3]**

9. Identify the reagents shown in bold in the following equations as nucleophiles or electrophiles **[1]**

a. $CH_3COOH + HO^- \longrightarrow CH_3COO^- + H_2O$

b. $CH_3COOH_3 + CN \longrightarrow (CH_3)_2C(CN)(OH)$

c. $C_6H_6 + CH_3CO \longrightarrow C_6H_5COCH_3$

10. Classify the following reactions in one of the reaction type studied in this unit. **[2]**

i. $CH_3CH_2Br + HS^- \longrightarrow CH_3CH_2SH + Br^-$

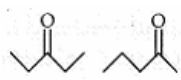
ii. $(CH_3)_2C = CH_2 + HCl \longrightarrow (CH_3)_2CCl - CH_3$

iii. $CH_3CH_2Br + HO^- \longrightarrow CH_2 = CH_2 + H_2O + Br^-$

iv. $(CH_3)_3C\text{-}CH_2OH + HBr \longrightarrow (CH_3)_2CBr\ CH_2CH_3 + H_2O$

11. What is the relationship between the members of following pairs of structures? Are they structural or geometrical isomers or resonance contributors? **[3]**

i.



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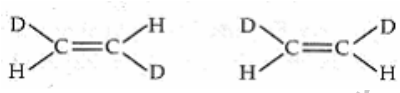


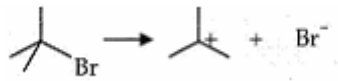
iii. H - $\overset{+OH}{\overset{\|}{C}}$ - OH H - $\overset{OH}{\overset{|}{C}}^{+}$ - OH

12. For the following bond cleavages, use curved arrows to show the electron flow and classify each as hemolysis or heterolysis. Identify reactive intermediate produced as free radical, carbocation and carbanion? **[3]**

i. $CH_3O\text{-}OCH_3 \longrightarrow CH_3\dot{O} + \dot{O}CH_3$

ii.

iii.



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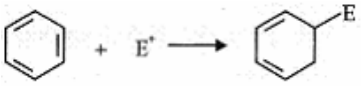


13. Explain the terms inductive and electromeric effects. Which electron displacement effect explain the following correct orders of acidity of the carboxylic acids? **[5]**

i. Cl_3 CCOOH > Cl_2CHOOH > $ClCH_2COOH$

ii. CH_3CH_2COOH > $(CH_3)_2$ CHOOH > $(CH_3)_3$C.COOH

14. Draw formulas for the first five members of each homologous series beginning with the following compounds. **[3]**

i. H-COOH

ii. CH_3COCH_3

iii. H-CH=CH_2

15. Give condensed and bond line structural formulas and identify the functional groups present, if any, for: **[3]**

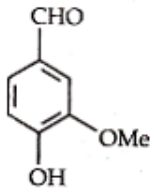
a. 2, 2, 4-Trimethylpentane

b. 2-Hydroxy-1, 2, 3-propanetricarboxylic acid

c. Hexanedial?

16. Identify the functional groups in the following compounds: **[2]**

i.



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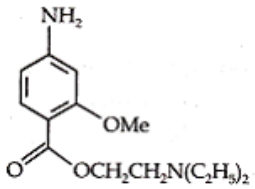

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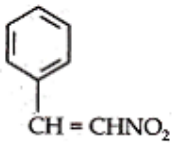

17. In the organic compound CH_2=CH–CH_2–CH_2–C≡CH, the pair of hydridised orbitals involved in the formation of C_2–C_3 bond is: **[1]**

a) sp^3-sp^3 b) sp-sp^2

c) sp-sp^3 d) sp^2-sp^3

18. Which of the following carbocation is most stable? **[1]**

a) $(CH_3)_3\overset{\oplus}{C}$ b) $(CH_3)_3C\overset{\oplus}{C}H_2$

c) $CH_3\overset{\oplus}{C}HCH_2CH_3$ d) $CH_3CH_2\overset{\oplus}{C}H_2$