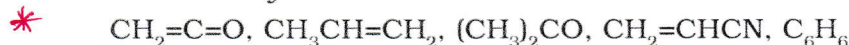
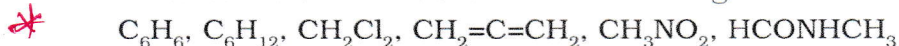


NCERT EXERCISES

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



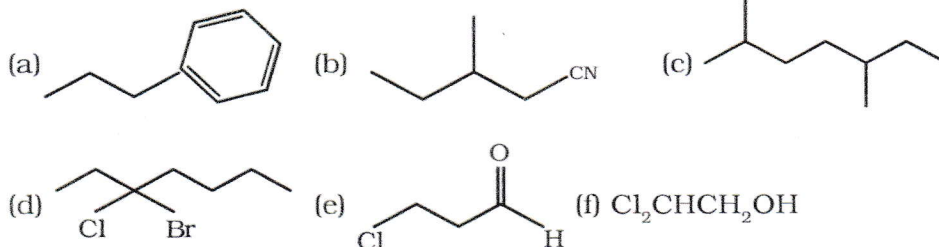
12.2 Indicate the σ and π bonds in the following molecules :



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

12.4 Give the IUPAC names of the following compounds :

* *



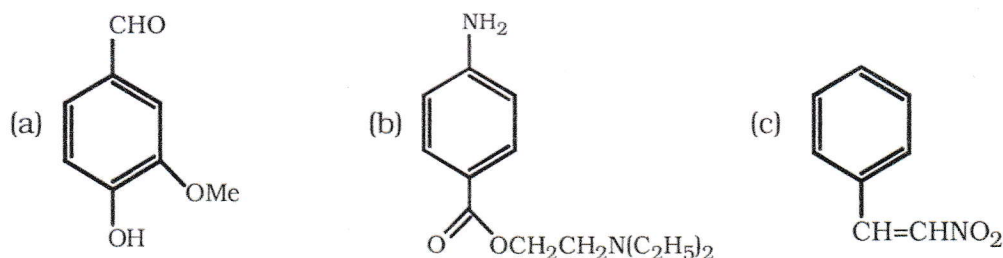
12.5 Which of the following represents the correct IUPAC name for the compounds concerned ? (a) 2,2-Dimethylpentane or 2-Dimethylpentane (b) 2,4,7-Trimethyloctane or 2,5,7-Trimethyloctane (c) 2-Chloro-4-methylpentane or 4-Chloro-2-methylpentane (d) But-3-yn-1-ol or But-4-ol-1-yne.

12.6 Draw formulas for the first five members of each homologous series beginning with the following compounds. (a) $\text{H}-\text{COOH}$ (b) CH_3COCH_3 (c) $\text{H}-\text{CH}=\text{CH}_2$

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

- (a) 2,2,4-Trimethylpentane
 (b) 2-Hydroxy-1,2,3-propanetricarboxylic acid
 (c) Hexanedial

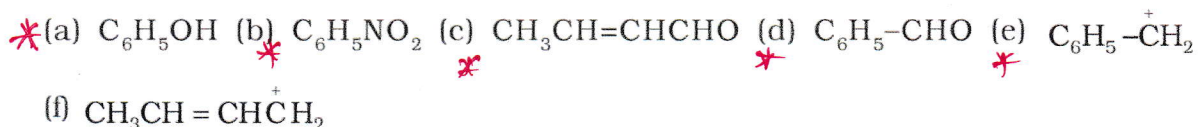
12.8 Identify the functional groups in the following compounds



12.9 Which of the two: $\text{O}_2\text{NCH}_2\text{CH}_2\text{O}^-$ or $\text{CH}_3\text{CH}_2\text{O}^-$ is expected to be more stable and why ?

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

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



12.12 What are electrophiles and nucleophiles ? Explain with examples.

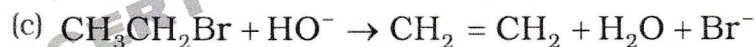
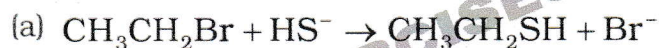
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12.13 Identify the reagents shown in bold in the following equations as nucleophiles or electrophiles:

*

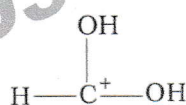
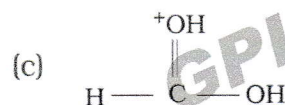
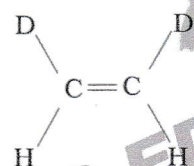
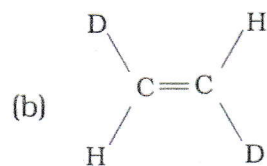
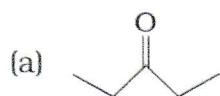


12.14 Classify the following reactions in one of the reaction type studied in this unit.

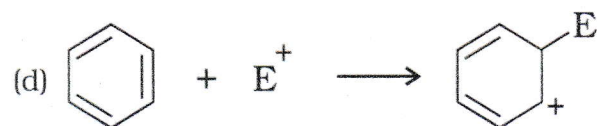
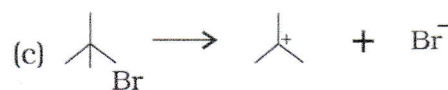
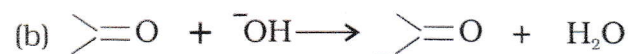
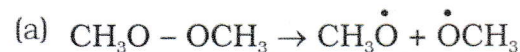


12.15 What is the relationship between the members of following pairs of structures? Are they structural or geometrical isomers or resonance contributors?

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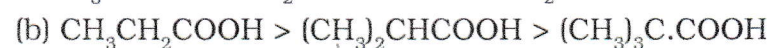


12.16 For the following bond cleavages, use curved-arrows to show the electron flow and classify each as homolysis or heterolysis. Identify reactive intermediate produced as free radical, carbocation and carbanion.



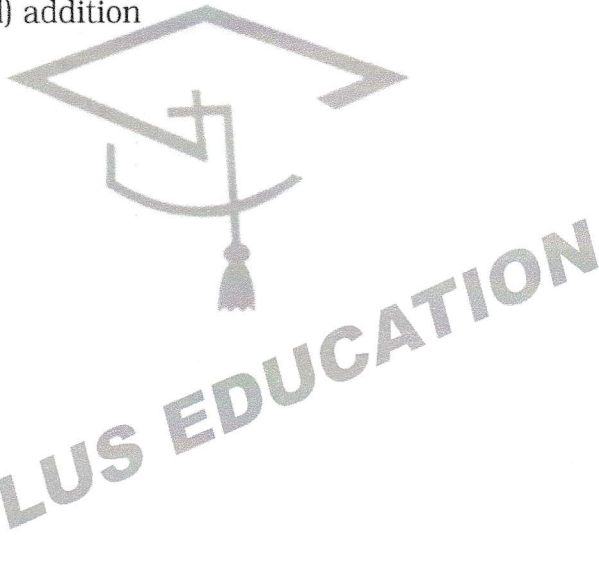
12.17 Explain the terms Inductive and Electromeric effects. Which electron displacement effect explains the following correct orders of acidity of the carboxylic acids?

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- 12.18 Give a brief description of the principles of the following techniques taking an example in each case.
*
(a) Crystallisation (b) Distillation (c) Chromatography
- 12.19 Describe the method, which can be used to separate two compounds with different solubilities in a solvent S.
- 12.20 What is the difference between distillation, distillation under reduced pressure and steam distillation ?
- 12.21 Discuss the chemistry of Lassaigne's test.
*
- 12.22 Differentiate between the principle of estimation of nitrogen in an organic compound by (i) Dumas method and (ii) Kjeldahl's method.
*
- 12.23 Discuss the principle of estimation of halogens, sulphur and phosphorus present in an organic compound.
- 12.24 Explain the principle of paper chromatography.
- 12.25 Why is nitric acid added to sodium extract before adding silver nitrate for testing halogens?
- 12.26 Explain the reason for the fusion of an organic compound with metallic sodium for testing nitrogen, sulphur and halogens.
- 12.27 Name a suitable technique of separation of the components from a mixture of calcium sulphate and camphor.
- 12.28 Explain, why an organic liquid vaporises at a temperature below its boiling point in its steam distillation ?
- 12.29 Will CCl_4 give white precipitate of AgCl on heating it with silver nitrate? Give reason for your answer.
- 12.30 Why is a solution of potassium hydroxide used to absorb carbon dioxide evolved during the estimation of carbon present in an organic compound?
- 12.31 Why is it necessary to use acetic acid and not sulphuric acid for acidification of sodium extract for testing sulphur by lead acetate test?
- 12.32 An organic compound contains 69% carbon and 4.8% hydrogen, the remainder being oxygen. Calculate the masses of carbon dioxide and water produced when 0.20 g of this substance is subjected to complete combustion.
- 12.33 A sample of 0.50 g of an organic compound was treated according to Kjeldahl's method. The ammonia evolved was absorbed in 50 ml of 0.5 M H_2SO_4 . The residual acid required 60 mL of 0.5 M solution of NaOH for neutralisation. Find the percentage composition of nitrogen in the compound.
- 12.34 0.3780 g of an organic chloro compound gave 0.5740 g of silver chloride in Carius estimation. Calculate the percentage of chlorine present in the compound.
- 12.35 In the estimation of sulphur by Carius method, 0.468 g of an organic sulphur compound afforded 0.668 g of barium sulphate. Find out the percentage of sulphur in the given compound.
- 12.36 In the organic compound $\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{CH}_2 - \text{C} \equiv \text{CH}$, the pair of hybridised orbitals involved in the formation of: $\text{C}_2 - \text{C}_3$ bond is:
*
(a) $sp - sp^2$ (b) $sp - sp^3$ (c) $sp^2 - sp^3$ (d) $sp^3 - sp^3$

- 12.37 * In the Lassaigne's test for nitrogen in an organic compound, the Prussian blue colour is obtained due to the formation of:
 (a) $\text{Na}_4[\text{Fe}(\text{CN})_6]$ (b) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$ (c) $\text{Fe}_2[\text{Fe}(\text{CN})_6]$ (d) $\text{Fe}_3[\text{Fe}(\text{CN})_6]_4$
- 12.38 * Which of the following carbocation is most stable ?
 (a) $(\text{CH}_3)_3\text{C} \cdot \overset{+}{\text{C}}\text{H}_2$ (b) $(\text{CH}_3)_3\overset{+}{\text{C}}$ (c) $\text{CH}_3\text{CH}_2\overset{+}{\text{C}}\text{H}_2$ (d) $\text{CH}_3\overset{+}{\text{C}}\text{HCH}_2\text{CH}_3$
- 12.39 * The best and latest technique for isolation, purification and separation of organic compounds is:
 (a) Crystallisation (b) Distillation (c) Sublimation (d) Chromatography
- 12.40 * The reaction:
 $\text{CH}_3\text{CH}_2\text{I} + \text{KOH}(\text{aq}) \rightarrow \text{CH}_3\text{CH}_2\text{OH} + \text{KI}$
 is classified as :
 (a) electrophilic substitution (b) nucleophilic substitution
 (c) elimination (d) addition



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