ಎಸ್ಎಸ್ಎಲ್ಸಿ–ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ

SCIENCE

Carbon and its Compounds

15. How can ethanol and ethanoic acid be differentiated on the basis of their physical and chemical properties?

Ans: Physical properties: Ethanol has specific smell whereas ethanoic acid has vinegar like smell.

Chemical properties: Ethanol does not react with sodium hydrogen-carbonate whereas ethanoic acid liberates carbon dioxide gas on treatment with sodium hydrogen-carbonate**.**

$$\underset{\text{Ethanoic acid}}{CH_3COOH} + NaHCO_3 \rightarrow CH_3COONa + H_2O + CO_2$$

16. Why does micelle formation take place when soap is added to water? Will a micelle be formed in other solvents like ethanol also?

Ans: Soap has hydrophilic and hydrophobic parts. Hydrocarbon portion is hydrophobic which forms clusters called micelles in water. Micelle formation will not take place in ethanol because hydrocarbon part is attracted by ethanol so it will be less attracted towards dirt and oil**.**

17. Why are carbon and its compounds used as fuel for most applications?

Ans: (i) It is because they are inflammable and have high calorific value.

(ii) They are easily combustible.

(iii) They are easily storable and transportable.

18. Explain the formation of scum when hard water is treated with soap.

Ans: Soap is sodium or potassium salts of fatty acids Hard water contains Ca^{2+} and Mg^{2+} ions, which react with soap to form calcium and magnesium salts of fatty acids which are insoluble and are called scum.

$$\underset{\substack{\text{Sodium stearate}\\(\text{Soap})}}{2C_{17}H_{35}COONa} + \underset{\text{Calcium ion}}{Ca^{2+}} \rightarrow \underset{\text{Sodium ion}}{2Na^{+}} + \underset{\text{Calcium stearate}}{(C_{17}H_{35}COO)_2Ca}$$

19. What is hydrogenation? What is its industrial application?

Ans: Hydrogenation is a process in which a substance reacts with hydrogen in presence of nickel as catalyst.

Industrial application:

$$\text{Vegetable oil} + H_2 \xrightarrow{Ni} \text{Vegetable ghee}$$

Hydrogen is used to prepare vegetable ghee from vegetable oil.

20. Which of the following hydrocarbons will undergo addition reactions:

C_2H_6, C_3H_8, C_3H_6, C_2H_2, CH_4 ?

Ans: C_3H_6 and C_2H_2 are unsaturated hydrocarbons; therefore, they will undergo addition reactions.

21. Give a test that can be used to differentiate chemically between butter and cooking oil.

Ans: Add bromine water to each of them. Cooking oil will decolourise bromine water showing that it is unsaturated whereas butter will not decolourise bromine water showing that it is saturated.

22. Explain the mechanism of the cleaning action of soaps.

Ans: Soap has hydrophobic and hydrophilic parts hydrophobic part is hydrocarbon which forms cluster of molecules called micelles. They attract dirt, grease etc. whereas hydrophilic part attracts water. Dirt, grease etc. is washed away with the help of water.

23. How would you distinguish experimentally between an alcohol and a carboxylic acid?

Ans: Add sodium hydrogen carbonate solution to each of them. Alcohol will not react whereas carboxylic acid will give brisk effervescence due to carbon dioxide gas.

24. What are oxidizing agents? Give an example.

Ans: Those compounds which add oxygen to other reactants or remove hydrogen from reactants are called oxidizing agents, e.g., alkaline solution of potassium permanganate ($KMnO_4$) is an oxidizing agent.

25. What is meant by functional group in an organic compound? State in tabular from the structural formula and the functional groups present in (i) ethanol and (ii) ethanoic acid.

Ans: Functional group is an atom or group of atoms or reactive part of compound which determine mainly chemical properties of the compound.

Structural formula:

(*i*) CH_3CH_2OH	(*ii*) $CH_3—\overset{\overset{O}{\|}}{C}—OH$
Functional group —OH	$\overset{\overset{O}{\|}}{C}—OH$

26. Two carbon compounds P and Q have the molecular formula C_3H_6 and C_3H_8 respectively. Which one of the two is most likely to show addition reaction? Justify your answer. Also give the chemical equation to explain the process of addition reaction in this case.

Ans: C_3H_6 is likely to show addition reaction because it has double bond.

Addition Reaction:

$$\underset{\text{Propene}}{CH_2=CH-CH_3} + H_2 \xrightarrow[\text{Heat}]{Ni} \underset{\text{propane}}{CH_3-CH_2-CH_3}$$

27. What are functional groups? Write the formula of the functional group present in *(Contd)*