ಎಸ್‌ಎಸ್‌ಎಲ್‌ಸಿ–ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ

SCIENCE

Carbon and its Compounds

34. A carboxylic acid $C_2H_4O_2$ reacts with an alcohol in the presence of H_2SO_4 to form a compound 'X'. The alcohol on oxidation with alkaline $KMnO_4$ followed by acidification gives the same carboxylic acid, $C_2H_4O_2$. Write the name and structure of (i) carboxylic acid, (ii) alcohol and (iii) the compound 'X'.

Ans:

(*i*) CH_3COOH is ethanoic acid $CH_3—\overset{\overset{O}{\|}}{C}—OH$

(ii) CH_3CH_2OH is ethanol CH_3CH_2-OH

(*iii*) 'X' is $CH_3COOC_2H_5$ (ethyl ethanoate) $CH_3—\overset{\overset{O}{\|}}{C}—OC_2H_5$

35. What are oxidizing agents? Write their role in the carboxylation to ethanol and give the chemical equation.

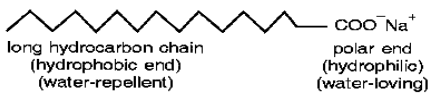
Ans: Those substance which can add oxygen or remove hydrogen are called oxidizing agents.

Alkaline $KMnO_4$ is oxidizing agent to oxidize ethanol to ethanoic acid**.**

$$CH_3CH_2OH + 2[O] \xrightarrow[KMnO_4]{\text{Alkaline}} CH_3COOH + H_2O$$

36. Describe the structure of a soap molecule with the help of a diagram.

Ans: Soap is a long hydrocarbon chain which is non-polar therefore hydrophobic (water-hating part) whereas –COONa is polar end, therefore, hydrophilic (water loving)



Hydrophilic (water-loving) and hydraphobic (water-repellent) ends of a soap molecule

37. Write the equation for reaction when acetic acid and ethyl alcohol are warmed together in the presence of conc. H_2SO_4. Name the reaction. Also write the reaction by which acetic acid and ethyl alcohol can be obtained back from the product formed. Name this reaction also.

Ans: Esterification

$$CH_3COOH + C_2H_5OH \xrightarrow{\text{Conc. } H_2SO_4} CH_3COOC_2H_5 + H_2O$$

This reaction is called esterification

$$CH_3COOC_2H_5 + H_2O \xrightarrow{\text{dil. NaOH}} CH_3COOH + C_2H_5OH$$

The reaction is called saponification basic or alkaline hydrolysis of ester.

38. A carbon compound X turns blue litmus to red and has a molecular formula $C_2H_4O_2$. Identify X and draw its structure. Write chemical equation for the reaction and name of the product formed in each case when X reacts with

(a) Ethanol in the presence of conc. H_2SO_4

(b) Sodium carbonate.

Ans: 'X' is ethanoic acid.

$$\text{Its structure is } CH_3-\overset{\overset{O}{\|}}{C}-OH$$

(a) $\underset{\text{Ethanoic acid}}{CH_3COOH} + \underset{\text{Ethanol}}{C_2H_5OH} \xrightarrow{\text{conc } H_2SO_4} \underset{\text{Ethyl ethanoate}}{CH_3COOC_2H_5} + \underset{\text{Water}}{H_2O}$

(b) $\underset{\text{Ethanoic acid}}{2CH_3COOH} + \underset{\text{Sodium corbonate}}{Na_2CO_3} \rightarrow \underset{\text{Sodium ethanoate}}{2CH_3COONa} + \underset{\text{Water}}{H_2O} + \underset{\text{Carbon dioxide}}{CO_2}$

39. (a) Define the term 'isomers'.

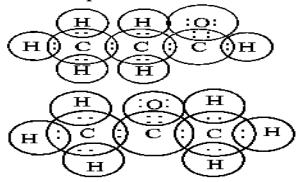
(b) Draw two possible isomers of the compound with molecular formula C_3H_6O and write their names.

(c) Give the electron dot structures of the above two compounds

Ans: (a) Isomers are those compounds which have same molecular formula and different structural formula.

(*b*) $CH_3—CH_2—\overset{\overset{O}{\|}}{C}—H$ Propanal and $CH_3—\overset{\overset{O}{\|}}{C}—CH_3$ Propanone

(*c*)



40. Why is scum formed only with hard water? Mention the disadvantages of the formation of scum.

Ans: Ca^{2+} and Mg^{2+} present in hard water react with soap to form scum which is insoluble in Ca^{2+} and Mg^{2+} salts of fatty acids.

(i) It is deposited on heating rods of boilers and make them less effective.

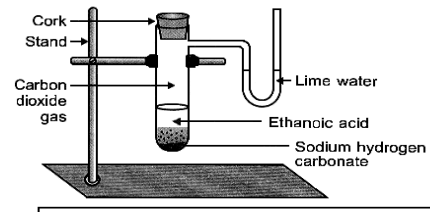
(ii) Soap goes waste and soap forms less lather in hard water.

41. When ethanoic acids reacts with sodium hydrogen carbonate a salt X is formed along with a gas Y. Name X and Y. Describe an activity and draw the diagram of the apparatus used to prove that the gas Y is one which you have named. Also write the chemical equation for the reactions involved.

Ans: 'X' is sodium ethanoate. 'Y' is CO_2 gas.

Aim: To demonstrate the reaction of carboxylic acid with sodium hydrogen carbonate and sodium hydrogen carbonate.

Materials Required: Ethanoic acid, sodium hydrogen carbonate, sodium hydrogen carbonate



Evolution of carbon dioxide gas by reaction of ethanoic acid with sodium hydrogen carbonate

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