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MBBS

19/MHS01/057

Chem Coz Assignment:

1 Give the IUPAC names to the following compounds

$\text{HCOOH} \Rightarrow$ Methanoic acid

$\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH} \Rightarrow$ Pentan-1,5 dioic acid.

$\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH} \Rightarrow$ Butanoic acid.

$\text{HO}_2\text{C}-\text{CO}_2\text{H} \Rightarrow$ Ethanedioic acid

$\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH} \Rightarrow$ Hex-4-enoic acid.

2 Discuss briefly the physical properties of carboxylic acids under the following headings.

i) Physical appearance: All simple aliphatic carboxylic acids up to C_6 are liquids at room temperature. Most other carboxylic acids are solid at room temperature although anhydrous carboxylic acid (acetic acid) also known as glacial ethanoic acid freezes to an ice like solid below the room temperature.

ii) Boiling point: It increases with increasing relative molecular mass. Aromatic carboxylic acids are crystalline solids and have higher melting points than their aliphatic counterparts of comparable relative molecular mass.

Solubility: Lower molecular mass carboxylic acid carbon atoms in their molecules are soluble in water. This is largely due to their ability to form hydrogen bonds with water molecules. The water solubility of the acids decreases as the relative molecular mass increases because the structure becomes relatively more hydrocarbon in nature and has covalent. All carboxylic acids are soluble in organic solvents.

2.1c has industrial preparations of carboxylic acids.

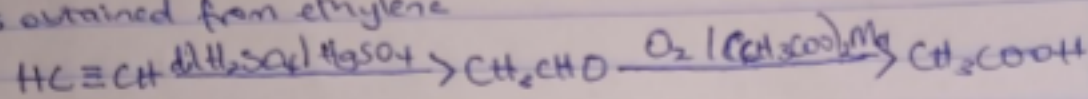
i) From Carbon (II) oxide.

Methanoic acid (formic acid) is manufactured by adding CO under pressure to hot aqueous solution of NaOH . The free carboxylic acid is liberated by careful reaction with H_2SO_4 .

$$\text{CO} \xrightarrow{\text{NaOH}} \text{HCOONa} \xrightarrow{\text{H}_2\text{SO}_4} \text{HCOOH} + \text{NaHSO}_4$$

ii) From ethanol

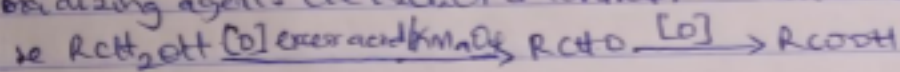
Ethanoic acid is obtained commercially by the liquid phase air-oxidation of 5% solution of ethanol to ethanoic acid using manganate(II) ethanoate catalyst. Ethanol itself is obtained from ethylene.



4 With equations and brief explanation discuss the synthetic preparation of carboxylic acid.

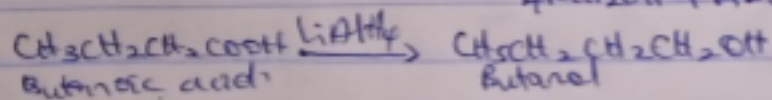
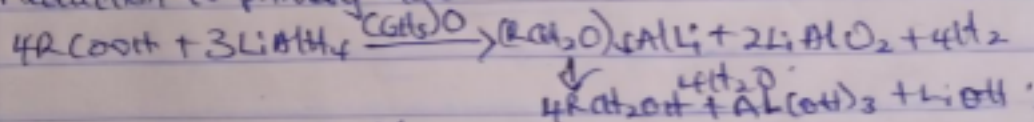
i) Oxidation of primary alcohols and aldehyde

This can be used to prepare carboxylic acids using the usual oxidizing agents (i.e. $\text{K}_2\text{Cr}_2\text{O}_7$ or KMnO_4) in acidic solution.

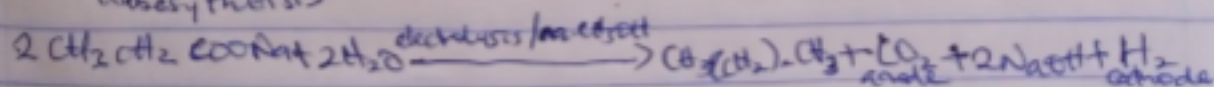
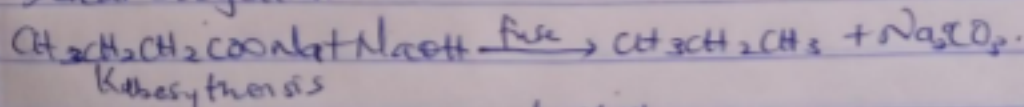


5 With chemical equation only continue the reduction, decarboxylation and esterification of carboxylic acid.

i) Reduction to primary alcohol.



ii) Decarboxylation:



iii) Esterification.

