MBBS 19/MHS01/235 LEBILE CELINE MOTUMROHA

CHEMISTRY 102 ASSIGNMENT THREE (3)

1. a) $HCOOH$ – Methanoic acid
b) $HOOCCH_2CH_2CH_2COOH$ – Pentan-1,5, dioic acid
c) $CH_3CH_2CH_2COOH$ – Butanoic acid
d) HO_2C-CO_2H – Ethanedioic acid
e) $CH_3(CH_2)_4COOH$ – Hexanoic acid
f) $CH_3CH=CHCH_2CH_2COOH$ – Hex-4-eneoic acid

2. i Physical appearance:- Simple alphatic carboxylic acids up to C_{10} are liquids at room temperature, while others are solid. Anhydrous carboxylic acids freezes to an ice-like solid below room temperature.

ii Boiling point:- It increases with increase in relative molecular mass. Aromatic carboxylic acids have higher melting points than Aliphatic.

iii Solubility:- The acids with low molecular mass with up to four C-atoms in their molecules are soluble in water. Solubility decreases as the molecular mass increases.

3 From Ethanol

i $\underset{\text{Ethyne}}{HC\equiv CH} \xrightarrow{dil\ H_2SO_4} \underset{\text{Ethanal}}{CH_3CHO} \xrightarrow[O_2]{(CH_3COO)_2Mn} \underset{\text{Ethanoic acid}}{CH_3COOH}$

iv) From Carbon (ii) oxide

$$CO \xrightarrow{NaOH} HCOONa \xrightarrow{H_2SO_4} HCOOH + NaHSO_4$$

4 Oxidation of primary alcohols and aldehydes

oxidation of primary alcohols and aldehydes can be used to prepare carboxylic acids using the usual oxidizing agents ie $K_2Cr_2O_7$ or $KMnO_4$ in acidic solution

$$RCH_2OH \xrightarrow[\text{Excess acid}]{[O]\ KMnO_4} RCHO \xrightarrow{[O]} RCOOH$$

5 Reduction to primary alcohol

$$CH_3CH_2CH_2COOH \xrightarrow{LiAlH_4} CH_3CH_2CH_2CH_2OH$$

Butanoic acid Butanol

ii) Decarboxylation

$$CH_3CH_2CH_2COONa + NaOH \xrightarrow{fuse} CH_3CH_2CH_3 + Na_2CO_3$$

u Esterification

$$CH_3CH_2CH_2COOH + CH_3CH_2CH_2OH \rightleftharpoons CH_3CH_2CH_2COO- -CH_2CH_2CH_3 + H_2O$$