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DEPARTMENT: Pharmacy

MATRIC NO.: 19/MHS11/018

COURSE: CHEMISTRY( CHM102)

Assignment

1.a HCOOH Methanoic acid

b. HOOCCH2CH2CH2COOH Pentan-1,5-dioic acid

c. CH3CH2CH2COOH Butanoic acid

d. HO2C-CO2H Ethanedioic acid

e. CH3(CH2)4COOH Hexanoic acid

f. CH3CH=CHCH2CH2COOH Hex-4-eneoic acid

2. Physical appearances

All simple aliphatic carboxylic acids up to C10 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.

Boiling points

Boiling point 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 acids with up to four carbon atoms in their molecules are soluble in water; this 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 hence covalent. All carboxylic acids are soluble in organic solvents

3.A.From ethanal

Ethanoic acid is obtained commercially by the liquid phase air-oxidation of 5% solution of ethanal to ethanoic acid using manganite (II) ethanoate catalyst. Ethanalitself is obtained from ethylene

HC CH dil. H2SO4/HgSO4 CH3CHO O2/ (CH3COO)2Mn CH3COOH

B.From petroleum

Liquid phase air oxidation of C5-C7 alkanes, obtainable from petroleum at high temperature and pressure will give C5-C7 carboxylic acids with methanoic, propanoic and butanedioic acids as by-products.

C5-C7 O2/ High temperature and pressure C5-C7 carboxylic acids

4. Hydrolysis of nitriles (cyanides) or esters

RCN + 2H2O H+ RCOOH + NH4+

(R=alkyl or aryl radical)

RCOOR’ H2O/H+ reflux RCOOH + R’OH

C6H5CH2CN + 2H2O H+ C6H5CH2COOH + NH4+

5. a. reduction - CH3CH2CH2COOH LiAlH4 CH3CH2CH2CH2OH

Butanoic acid Butanol

b. decarboxylation - CH3CH2CH2COONa + NaOH fused CaO CH3CH2CH3 + Na2CO3

c. esterification - CH3CH2CH2COOH + CH3CH2CH2OH H+ CH3CH2CH2COOCH2CH2CH3 + H2O.