ONYENEKE FRANCES CHINEMELUM

PHARMACY 19/MHS11/119

1.) - HCOOH= Methanoic acid

-HOOCCH2CH2CH2COOH= Pentan-1, 5-dioic acid

-CH3CH2CH2COOH= Butanoic acid

-HO2C-CO2H= Ethanedioic acid

-CH3 (CH2)4COOH= Hexanoic acid

-CH3CH=CHCH2CH2COOH= Hex-4-eneoic acid

2i.) Physical appearances: All simple aliphatic carboxylic acids up to C10 are liquid 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: Boiling point increases with increasing relative molecular mass. Aromatic carboxylic acids are crystalline solids and have higher melting points than their aliphatic counterparts of comparative relative molecular mass.

iii.) Solubility: Lower molecular mass carboxylic acids with up to four carbon atoms in their molecules are soluble in water; this 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 become relatively more hydrocarbon in nature and hence covalent. All carboxylic acids are soluble in organic solvent.

3.)-From Carbon (II) Oxide  
 -From ethanol

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 (i.e. K2Cr2O7 or KMnO4) in acidic solution.

RCH2OH [O], excess acid/KMnO4 RCHO [O] RCOOH

-Carbonation of Grignard reagent: Aliphatic carboxylic acids are obtained by bubbling carbon (IV) oxide into the Grignard reagent and then hydrolyzed with dilute acid.

RMgBr + Co2 (C2H5)2O RCOOMgBr H2O/dil.acid RCOOH + MgBrOH

R may be 10, 20, 30 aliphatic alkyl or aryl radical

In the preparation of benzoic acid, the reagent is added to solid carbon (IV) oxide (dry ice) which also serves as coolant to the reaction mixture

C6H5MgBr + Co2 (C2H5)2O C6H5COOMgBr H2O/H+ C6H5COOH + MgBrOH

-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+

CH3CH2COOCH3 H2O/H+ reflux CH3CH2COOH + CH3OH

5.)-Reduction to primary alcohol

4RCOOH + 3LiAlH4 (C2H5)2O ( RCH2O)4AlLi + 2LiAlO2 + 4H2

4H2O

4RCH2OH + Al (OH)3 + LiOH

CH3CH2CH2COOH LiAlH4 CH3CH2CH2CH2OH

Butanoic acid Butanol

-Decarboxylation

CH3CH2CH2COONa + NaOH fuse CH3CH2CH3 + Na2CO3

-Esterification

CH3CH2CH2COOH + CH3CH2CH2OH H+ CH3CH2CH2COOCH2CH2CH3 + H2O