

NZEGUO RALUCHUKU CHINKIE FREDA

MHS

DENTISTRY

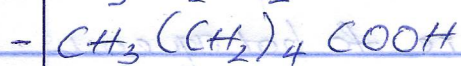
19/MHS 09/016

21st/04/2020

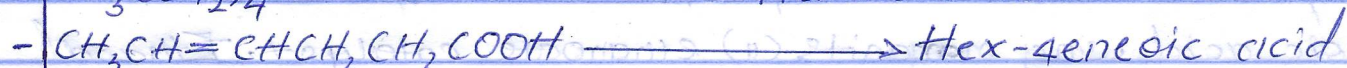
CHEM 102

ASSIGNMENT ON CARBOXYLIC ACIDS

1 Give the IUPAC names of the following compounds:



Ans:



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

i) Physical appearance ii) Boiling point iii) Solubility

Ans:

i) Physical appearance: All simple aliphatic carboxylic acids up to C_{10} are liquids at room temperature. Most other carboxylic acids are solid at room temperature although anhydrous carboxylic acid also known as glacial ethanoic acid freezes to an ice-like solid below the room temperature.

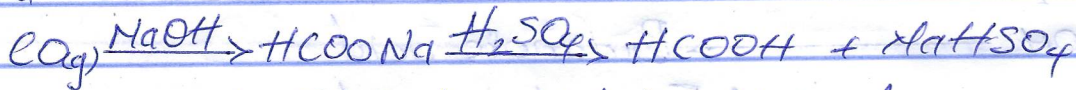
ii) Boiling point: This increases with increasing relative molecular mass. Aromatic carboxylic acids are crystalline solids and have higher melting points than their aliphatic counterparts of comparable relative molecular mass.

water; this largely due to their ability to form hydrogen bonds with water molecules. Water solubility of acids decreases with increase in relative molecular mass because the structure becomes relatively more hydrocarbon in nature and hence covalent. All carboxylic acids are soluble in organic solvents.

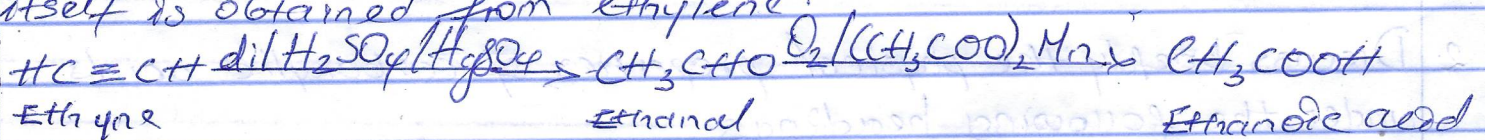
3 Write two industrial preparations of carboxylic acids.

Ans:

a From carbon (II) oxide: Methanoic acid is manufactured by adding carbon (II) oxide under pressure to hot aqueous solution of sodium hydroxide. The free carboxylic acid is liberated by careful reaction with tetraoxosulphate (VI) acid



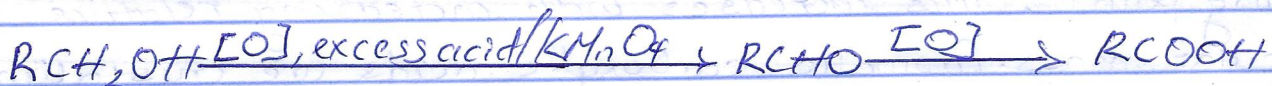
b From ethanol: Ethanoic acid is obtained commercially by the liquid phase air-oxidation of 5% solution of ethanol to ethanoic acid using manganite (II) ethanoate catalyst. Ethanol itself is obtained from ethylene.



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

Ans:

Oxidation of primary alcohols and aldehydes: 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.



alcohol

aldehyde

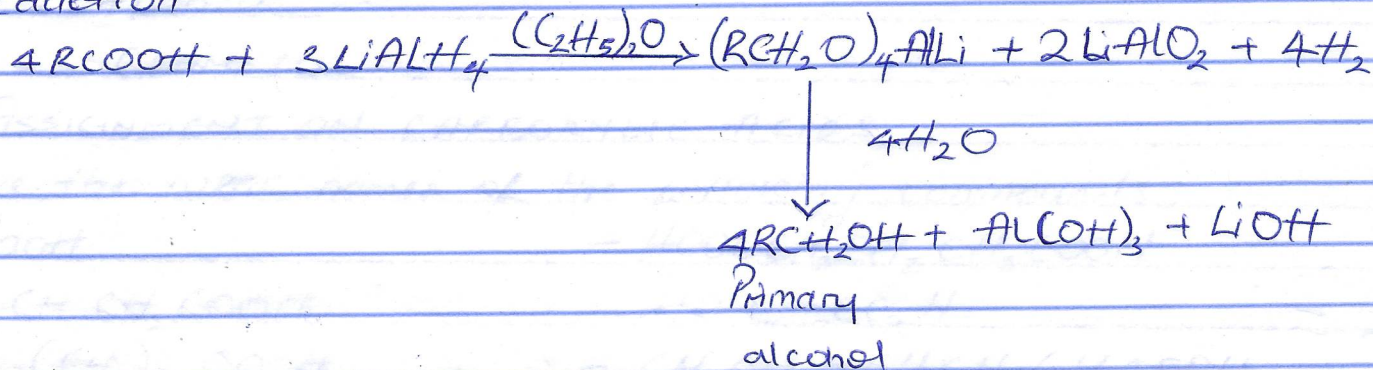
carboxylic acid

Hence, oxidation of alcohol gives rise to an aldehyde which is further oxidized to a carboxylic acid.

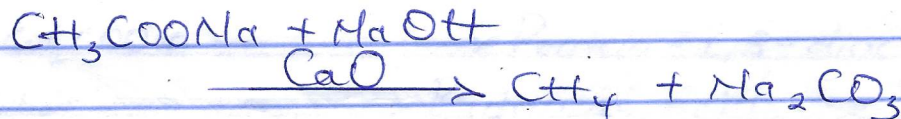
5 With chemical equation only, outline the reduction, decarboxylation, and esterification of carboxylic acid.

Ans:

- Reduction



- Decarboxylation



- Esterification

