

30/4/20

Chemistry Assignment

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MBBS

(i) HCOOH — Methanoic acid

(ii) $\text{HOOC}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{COOH}$ — Pentan-1,5-dioic acid

(iii) $\text{HOOC}-\text{COOH}$ — Ethanedioic acid

(iv) $\text{HOOC}-\text{CH}_2-\text{CH}_2-\text{COOH}$ — Butanedioic acid

(v) $\text{HOOC}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{COOH}$ — Hexanedioic acid

(vi) $\text{HOOC}-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_2-\text{COOH}$ — Hex-4-enoic acid

(a) Discuss physical properties

(i) physical appearance

All simple aliphatic carboxylic acids up to C_6 are liquid at room temperature. Most of the others are solid at room temperature however anhydrous carboxylic acid (acetic acid) freezes to an ice-like solid below room temperature.

(ii) Boiling point

Boiling point increases with increasing relative molecular mass.

Aromatic Carboxylic acids are crystalline solids and have higher melting point than their aliphatic counterparts (of comparable AMM.)

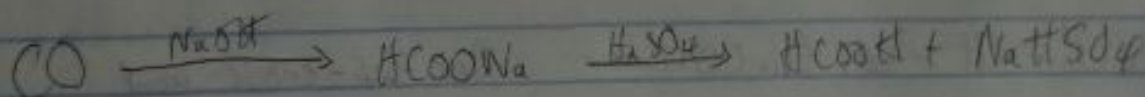
(181) Solubility

Lower molecular mass Carboxylic acids with up to 4 carbons in the molecule are soluble in water: this is largely due to their ability to form hydrogen bonds with water molecules. Solubility decreases as AMM increases, but they are soluble in organic solvent.

(4) Industrial preparation of Carboxylic acid

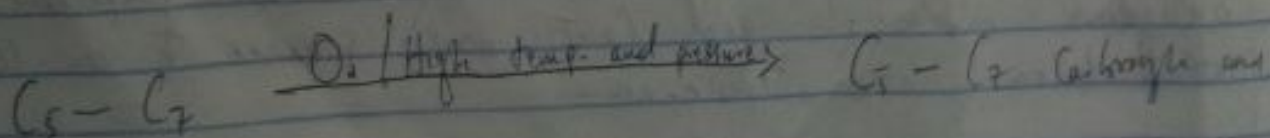
(a) From Carbon (II) oxide

Methanoic acid is formed by adding CO to hot aqueous NaOH. Free carboxylic acid is liberated by careful reaction with H_2SO_4 .



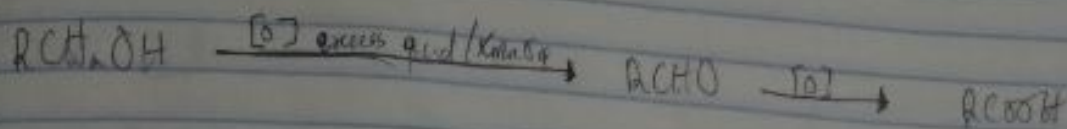
(ii) From petroleum

Liquid phase air oxidation of $C_5 - C_7$ alkanes, obtainable from petroleum at high temperature and pressure will give $C_5 - C_7$ Carboxylic acids with Methanoic, propanoic & butanoic acid as by-product.

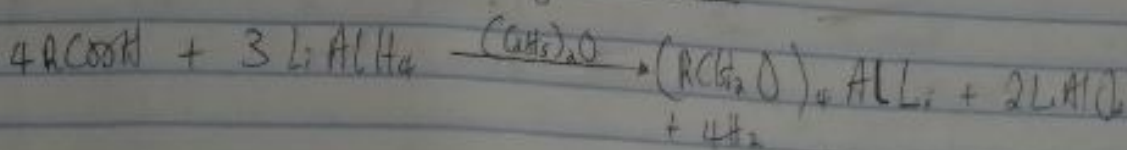


② Synthetic preparation

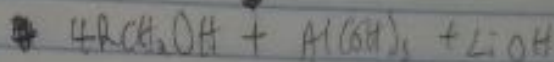
It is prepared from the oxidation of primary alcohols and aldehydes using oxidizing agents like $K_2Cr_2O_7$ or $KMnO_4$ in acidic solution.



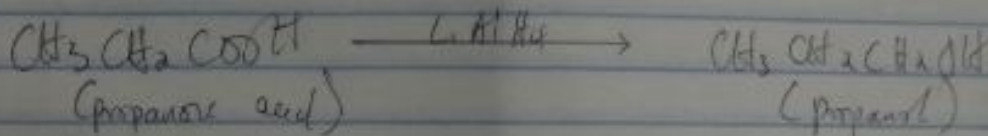
③ Reduction of Carboxylic acid



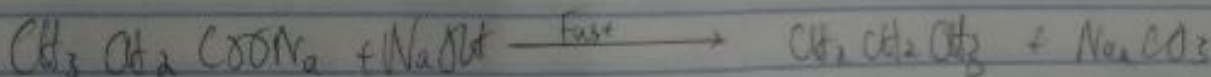
$4H_2O$



Eg



④ Decarboxylation



⑤ Esterification

