

CHM 102

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MBBS

1. Give the IUPAC names of the following compounds.

a. HCOOH — Methanoic Acid

b. $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH}$ — Pentan-1,5-dioic Acid

c. $\text{HO}_2\text{C}-\text{CO}_2\text{H}$ — Ethanedioic Acid

d. $\text{CH}_3(\text{CH}_2)_4\text{COOH}$ — Hexanoic Acid

e. $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH}$ — Hex-4-enoic Acid

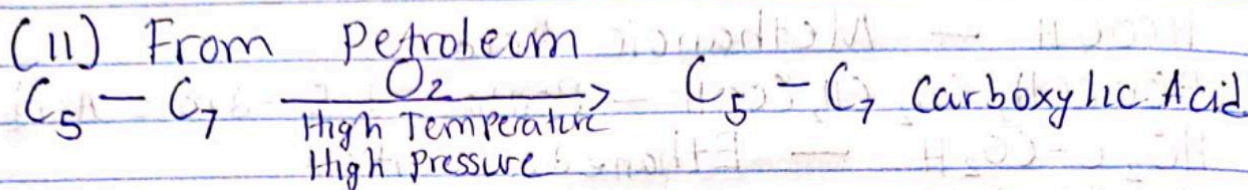
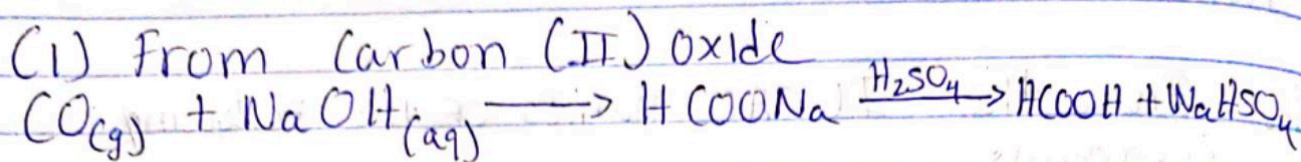
2. Discuss briefly the physical properties of Carboxylic Acids under the following headings, (i) physical appearance (ii) boiling point (iii) solubility.

(i) Physical appearance: All simple aliphatic carboxylic acids up to carbon-10 are liquid at room temperature. Above carbon-10 they are solids. Anhydrous carboxylic acids freeze to an ice-like solid below room temperature.

(ii) Boiling point: Increases with increasing relative molecular mass. Aromatic carboxylic acids have higher melting points than their aliphatic counterparts.

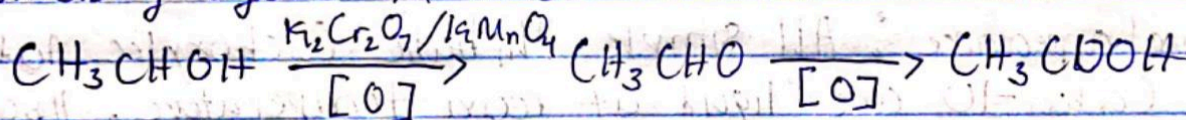
(iii) Solubility: Lower molecular mass carboxylic acids with up to four carbon atoms in their molecules are soluble in water. Solubility decreases as the relative molecular mass increases. All carboxylic acids are soluble in organic solvents.

3. Write two Industrial Preparations of Carboxylic Acids.



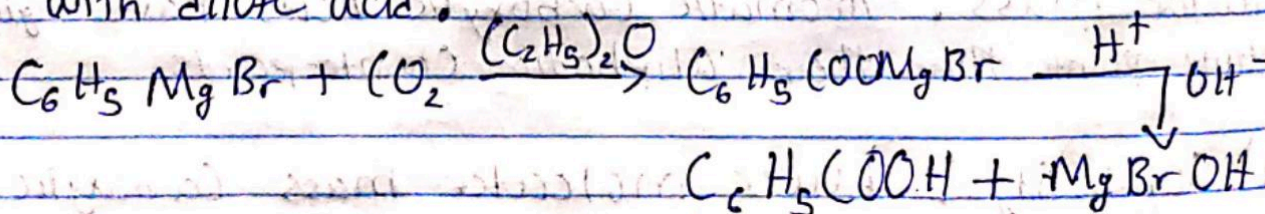
4. With equations and brief explanation discuss the Synthetic preparation of Carboxylic Acid.

(i) Oxidation of Primary Alcohols and Aldehydes
- Can be used to prepare Carboxylic acids using the usual oxidizing agents in acidic solution.

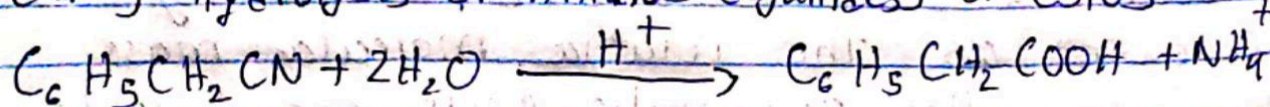


(ii) Carbonation of Grignard reagent

- Aliphatic Carboxylic acids are obtained by bubbling Carbon (IV) oxide into the Grignard reagent and then hydrolyzed with dilute acid.

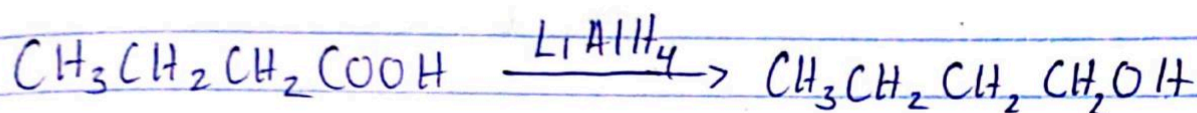


(iii) Hydrolysis of nitrates (cyanides) or esters

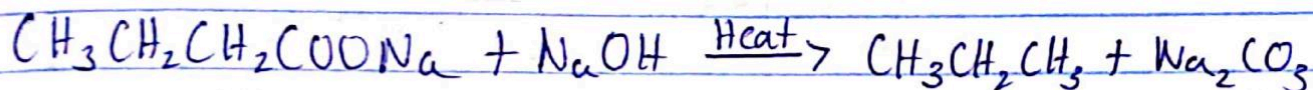


5. With Chemical equation only, outline the reduction, decarboxylation and esterification of carboxylic acids.

(I) Reduction



(II) decarboxylation



(III) Esterification

