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ASSIGNMENT

Department: Medical Laboratory Science

Matric No: 119/MHS06/027

Course code: UTM 102

1.  $\text{HOOC(CH}_2\text{)}_4\text{COOH}$  - pentan-1,5-dioic acid  
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$  - Butanoic acid  
 $\text{HO}_2\text{C-CO}_2\text{H}$  - Ethanedioic acid  
 $\text{CH}_3(\text{CH}_2)_4\text{COOH}$  - Hexanoic acid  
 $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH}$  - Hex-4-enoic acid

2. Physical appearance: All simple, aliphatic carboxylic acids up to  $\text{C}_{10}$  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.

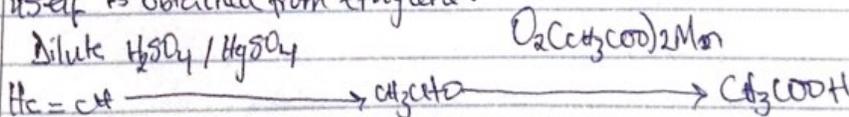
- Boiling points: Boiling points increases with increasing relative molecular mass. Aromatic carboxylic acids are crystalline solids have higher melting points than their aliphatic counterparts of comparable relative molecular mass.

- 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.

3. From  $\text{CO}_2$ : Methanoic acid is manufactured by adding  $\text{CO}_2$  under pressure to hot aqueous solution of sodium hydroxide.

The free carboxylic acid is liberated by careful reaction with tetraoxosulphate(VI) acid ( $\text{H}_2\text{SO}_4$ ).

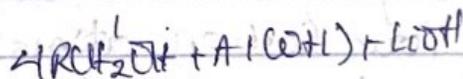
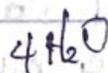
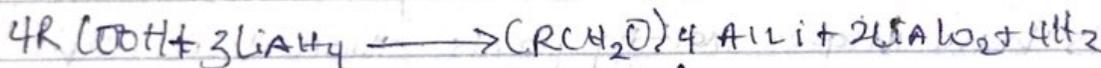
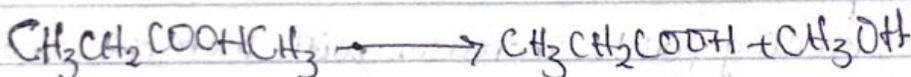
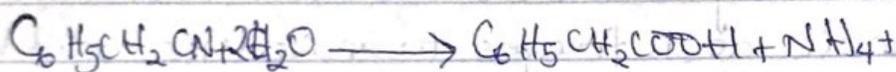
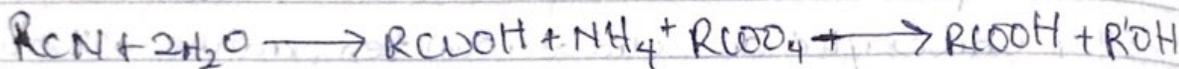
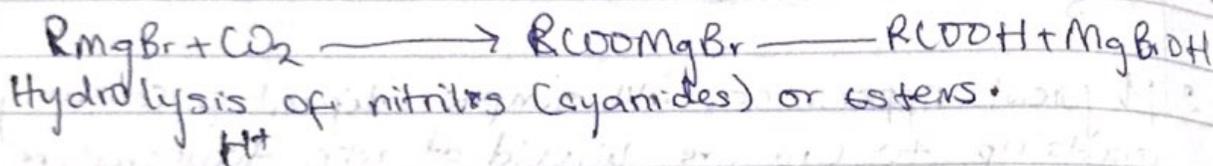
from ethanol: ethanoic acid is obtained commercially by the liquid phase air-oxidation of 5% solution of ethanol to ethanoic acid using manganese(II) ethanoate catalyst. Ethanol itself is obtained from ethylene.



• Oxidation of primary alcohols and aldehydes: Oxidation of primary alcohols and aldehydes can be used to prepare carboxylic acids using the usual oxidizing agents in acidic solution.



Carbonation of Grignard reagent: Aliphatic carboxylic acids are obtained by bubbling carbon dioxide into the Grignard reagent and then hydrolyzed with dilute acid.



• Butanoic acid      • Butanol

• Decarboxylation

