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MATRIC NO: 19/MHS01/079

COURSE: CHEM 102

DEPT: MBBS; 100L

- i. HCOOH - Methanoic acid
- ii. $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH}$ - Pentan-1,5-dioic acid
- iii. $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ - Butanoic acid
- iv. $\text{HO}_2\text{C}-\text{CO}_2\text{H}$ - Ethanedioic acid
- v. $\text{CH}_3(\text{CH}_2)_4\text{COOH}$ - Hexanoic acid
- vi. $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH}$ - Hex-4-enoic acid

2. PHYSICAL APPEARANCE;

All simple aliphatic carboxylic acids up to C_{10} are liquids 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;

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.

iii. SOLUBILITY

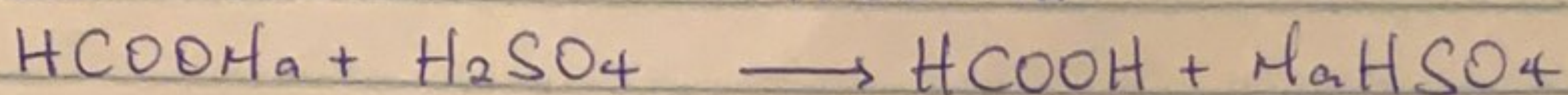
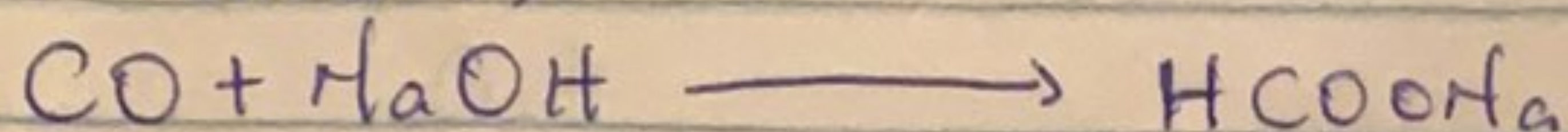
Lower molecular mass carboxylic acids with up to four carbon atoms in their molecules are soluble in water this largely due to their ability to form hydrogen bonds with water molecules. The water solubility of the acids decreases as the relative molecular mass increases because the structure becomes relatively more hydrocarbon in nature and hence covalent. All carboxylic acids are

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soluble in organic solvents.

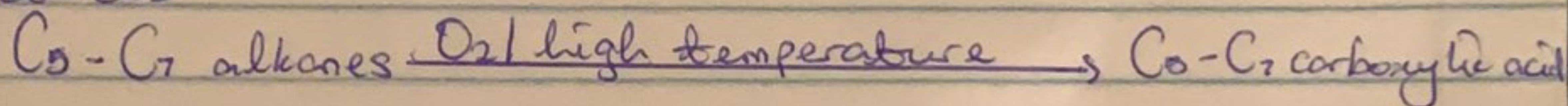
3: i] From Carbon(II) oxide

Methanoic acid (formic 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 (H_2SO_4)

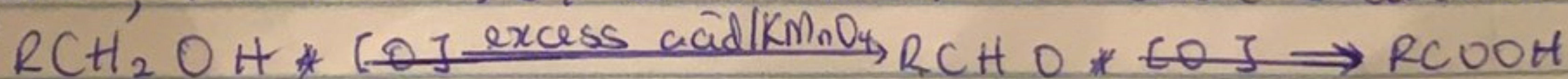


ii] From petroleum

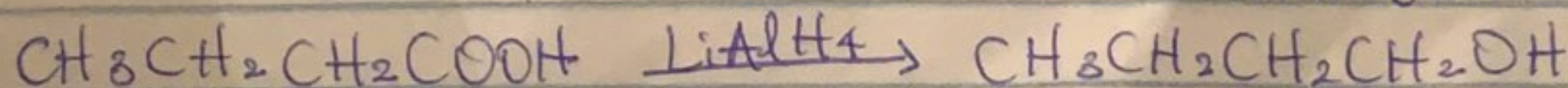
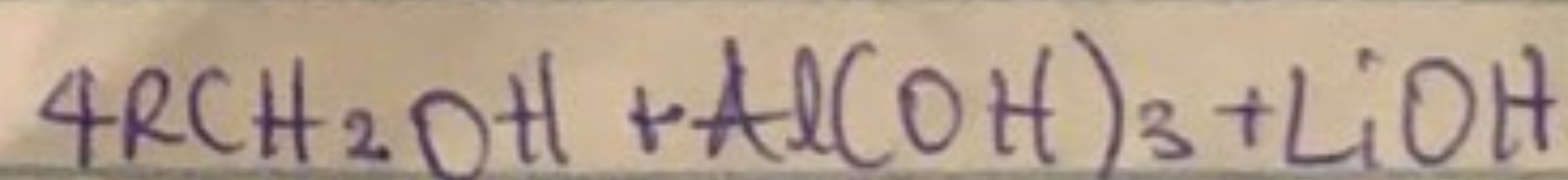
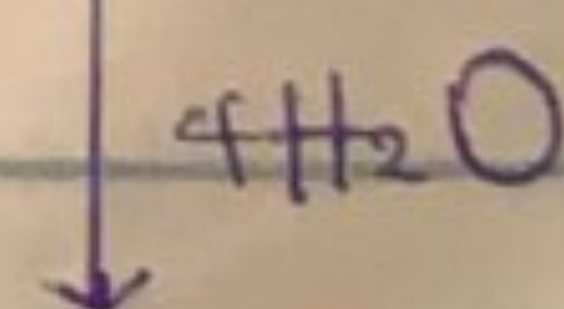
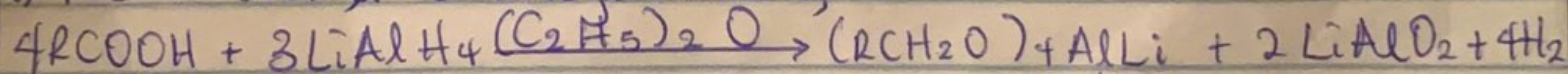
Liquid phase air oxidation of $C_5 - C_7$ alkanes, obtainable from petroleum at high temperature and pressure will give $C_5 - C_7$ carboxylic acids with methanoic, propanoic and butanedioic acids as by-products.



4 The oxidation of primary alcohols and aldehydes can yield carboxylic acids. They can be used to prepare carboxylic acids using the usual oxidizing agents, i.e. $K_2Cr_2O_7$ or $KMnO_4$ in acidic solution



5: i] Reduction of carboxylic acids;



Butanoic acid

Butanol

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