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CHEM102 ASSIGNMENT
19/MAY/2019 MBBS

- 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 carboxylic acids are solid at room temperature apart from anhydrous carboxylic acid which freezes to an ice-like solid below room temperature.

ii) Boiling point: The boiling point of carboxylic acid increases with increasing molecular mass. Aromatic carboxylic acids have a higher melting point than aliphatic counterparts of comparable relative molecular mass.

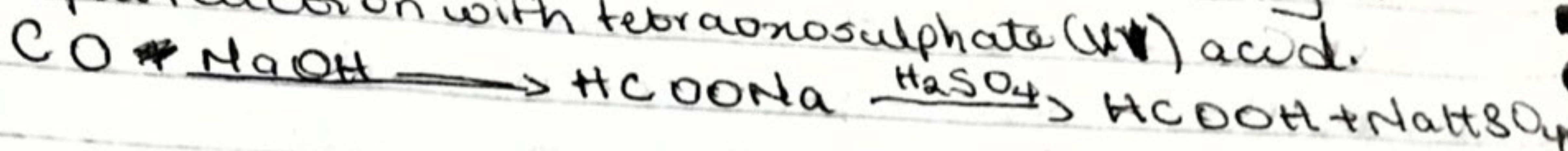
iii) Solubility: Lower molecular mass carboxylic acids with up to four carbon atoms in their molecules are soluble in water. The water solubility of acids decreases as the relative molecular mass increases. ^{All carboxylic} acids are soluble in organic solvent.

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3. Industrial preparations of Carboxylic acids

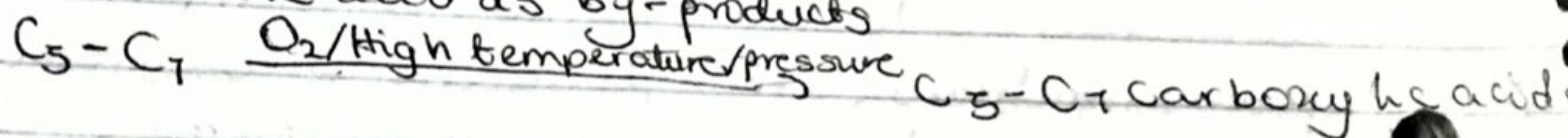
a. From Carbon(II) oxide

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



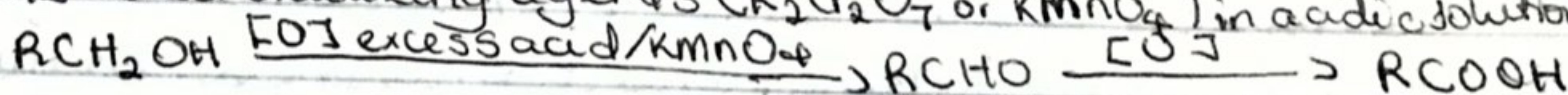
b. From petroleum

Liquid phase air oxidation of $\text{C}_5 - \text{C}_7$ alkanes, obtained from petroleum at high temperature and pressure will give $\text{C}_5 - \text{C}_7$ carboxylic acids with methanoic, propanoic and butanedioic acid as by-products

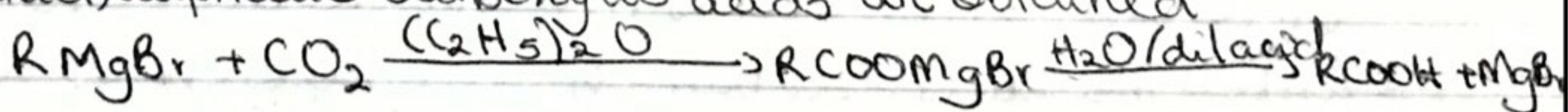


4. Synthetic preparations of carboxylic acids.

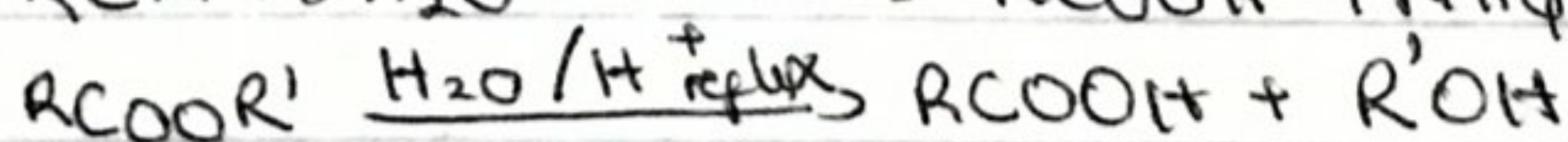
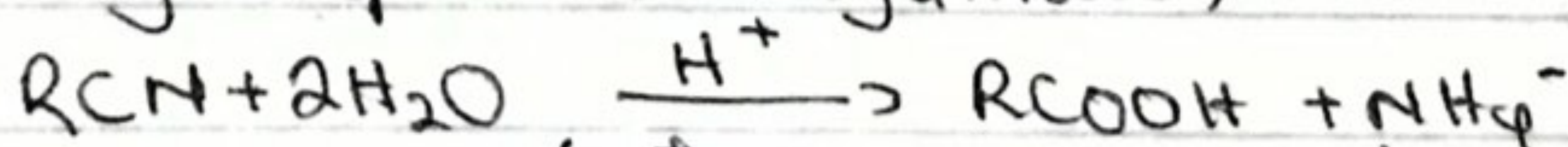
a. By the oxidation of ~~primary~~ ^{primary} alcohols and aldehydes and using the usual oxidizing agents ($\text{K}_2\text{Cr}_2\text{O}_7$ or KMnO_4) in acidic solution



b. By the carbonation of Grignard reagent:- When bubbling carbon dioxide into Grignard reagent and then hydrolyzed with dilute acid, aliphatic carboxylic acids are obtained

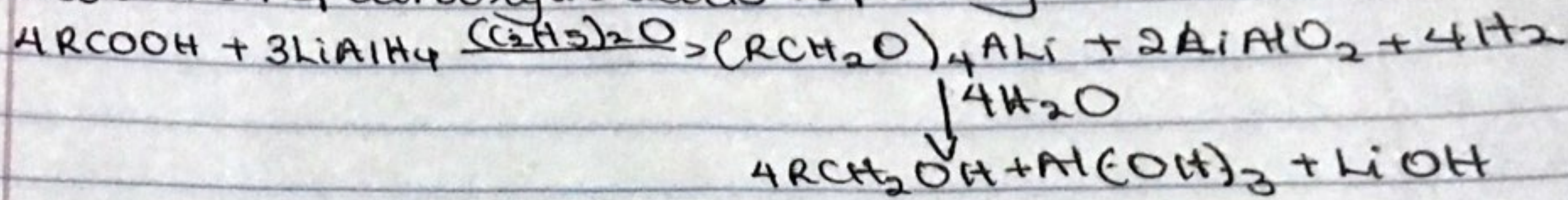


c. Hydrolysis of nitriles (cyanides) or esters

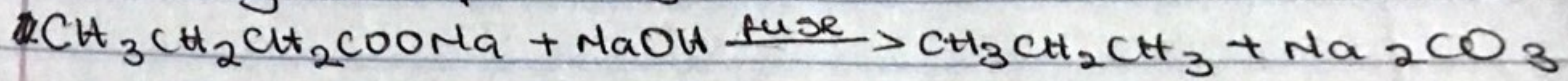


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5a Reduction of carboxylic acids to primary alcohols



b Decarboxylation of Carboxylic acids.



⊗ Esterification

