

Name: Raji Fatimah Jimal
Matic no: 19/MHS01/356
Dept: MBBS
Course: Chem 102

1. a. $\text{HCOOH} \rightarrow$ Methanoic acid

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

c. $\text{HO}_2\text{C}-\text{CO}_2\text{H} \rightarrow$ Ethanedioic acid

d. $\text{CH}_3(\text{CH}_2)_4\text{COOH} \rightarrow$ Hexanoic acid

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

f.

2. Physical properties of Carboxylic acid

a) Physical appearances:

All simple aliphatic carboxylic acids up to C_{10} are liquids at room temperature. Most other carboxylic acids are solid at room temperature.

b. Boiling points:

Boiling point 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.

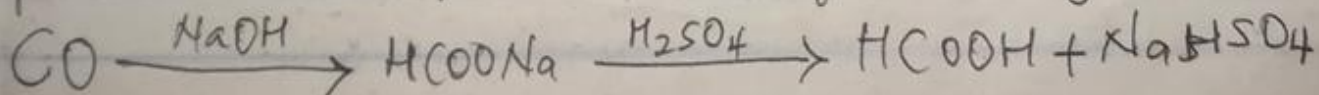
c. Solubility:

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 soluble in organic solvents.

3. Industrial preparation of Carboxylic acids

a) From carbon(II)oxide:

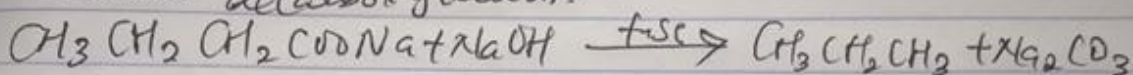
Methanoic acid is manufactured by adding CO_2 under pressure to hot aqueous solution of sodium hydroxide.



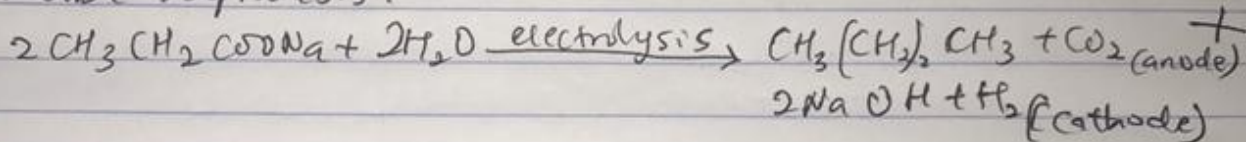
5) Chemical reactions of carboxylic acids-

a) Decarboxylation:

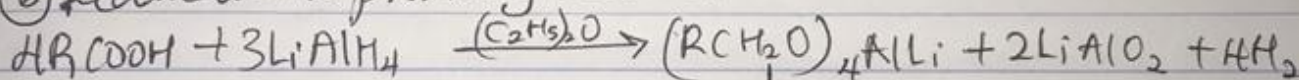
Thermal decarboxylation:



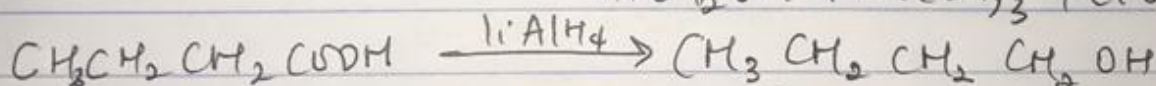
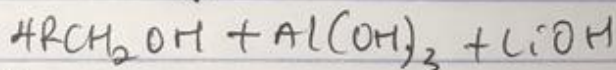
Kolbe Synthesis:



(b) Reduction to primary alcohol.



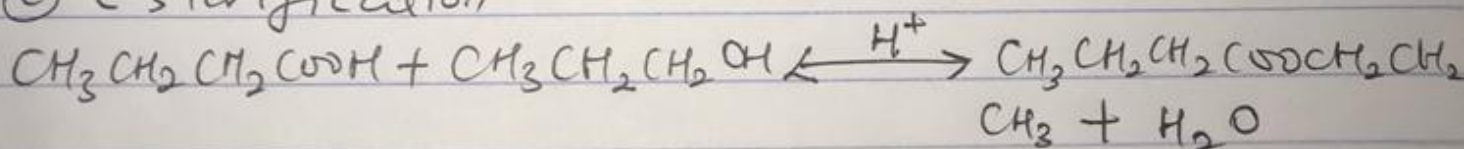
4H₂O



Butanoic acid

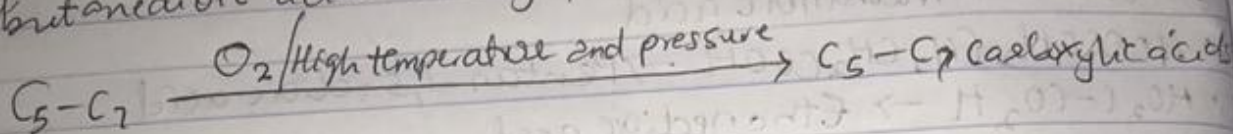
Butanol

(c) Esterification



b. From petroleum:

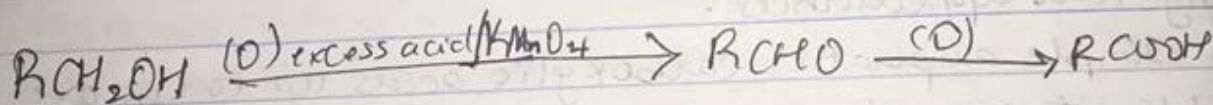
Liquid phase air oxidation of C₅-C₇ alkanes, obtainable from petroleum at high temperature and pressure will give C₅-C₇ carboxylic acids with methanoic, propanoic and butanedioic acids as by products.



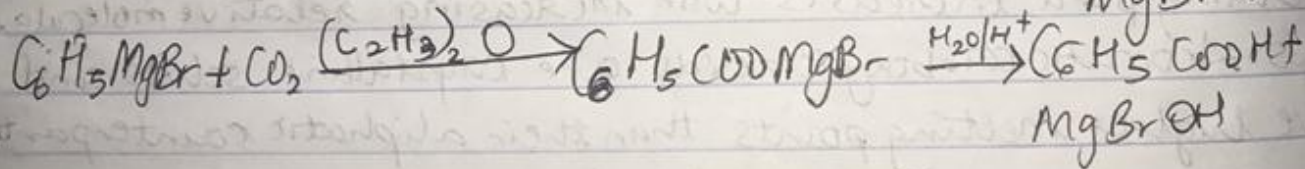
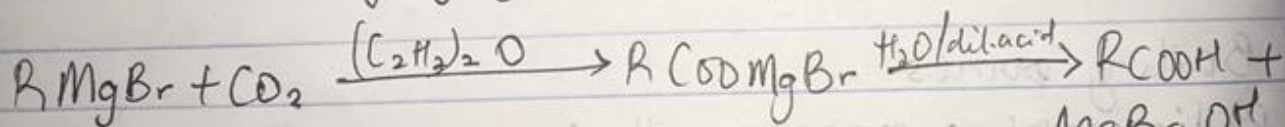
4. Synthetic preparations of Carboxylic acids

(a) Oxidation of primary alcohols and aldehydes:

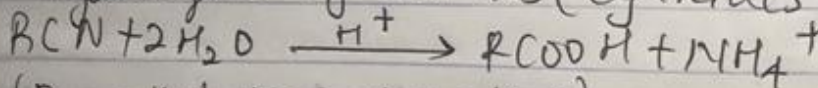
It can be used to prepare carboxylic acids using the usual oxidizing agents (i.e. K₂Cr₂O₇ or KMnO₄) in acidic solution.



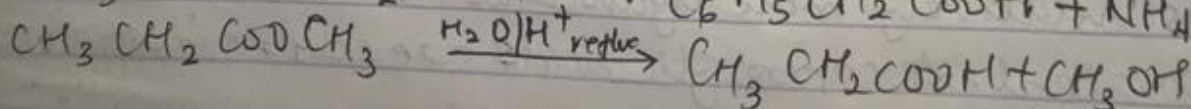
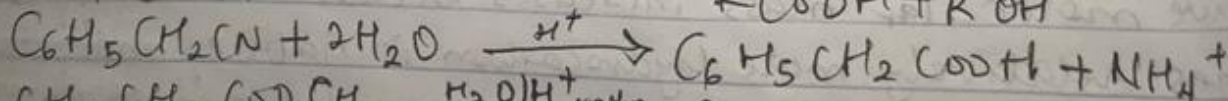
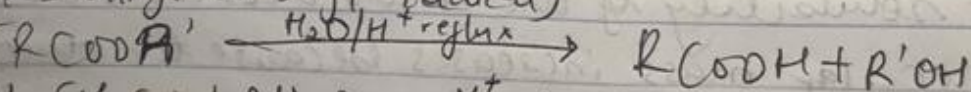
(b) Carbonation of Grignard reagent



(c) Hydrolysis of Nitriles (Cyanides) or esters



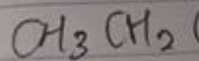
(R = alkyl or aryl radical)



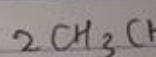
(5)

5) Chemi C

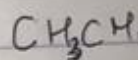
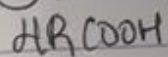
a) Decarb thermal



Kolbe



(b) Reduc



But

(c) E S

