

Osober Dumbolu Ejumoyhona.  
191, mibv1364.

Medicine and Surgery.

Medicine and Health Sciences -

Assignment in Carboxylic acid.

①  $\text{CH}_3\text{COOH}$  - Methanoic acid

②

① Give the IUPAC names of the following compounds.

(a)  $\text{HCOOH}$  - Methanoic acid.

(b)  $\text{HOOC(CH}_2)_4\text{COOH}$  - pentan-1,5-dioic acid.

(c)  $\text{HO}_2\text{C-CO}_2\text{H}$  - 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-2-enoic acid.

② (a) Physical appearance:

All simple aliphatic carboxylic acids up to  $\text{C}_{10}$  are liquids at room temperature. Most other carboxylic acids are solid at room temperature although anhydrous carboxylic acid (acetic acid) also known as <sup>glacial</sup> ~~glacial~~ ethanoic acid freezes to an ice-like solid below the room temperature.

(b) Boiling Point:

Boiling point increases with increasing relative molecular



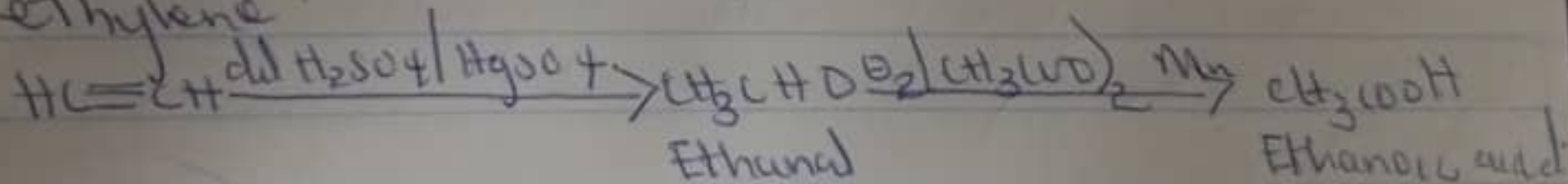
mass. Aromatic carboxylic acids are crystalline solids and have higher melting points than their aliphatic counterparts of comparable relative molecular mass.

### ② 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.

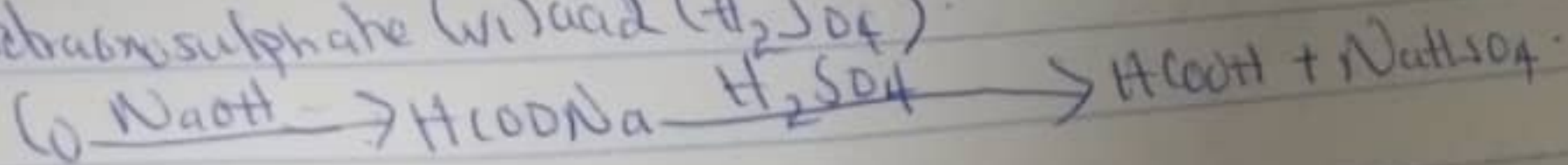
### ③ (a) From Ethanol

Ethanoic acid is obtained commercially by the liquid phase oxidation of 5% solution of ethanol to ethanoic acid using manganate (VI) ethanoate catalyst. Ethanal itself is obtained from ethylene.

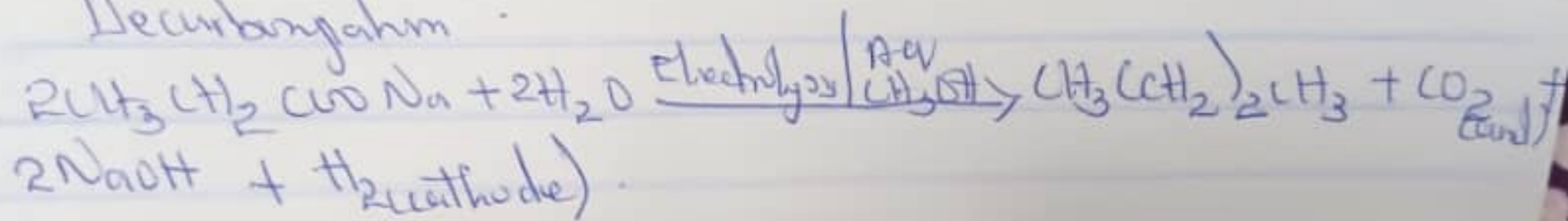


### ⑥ From Carbon (I) oxide.

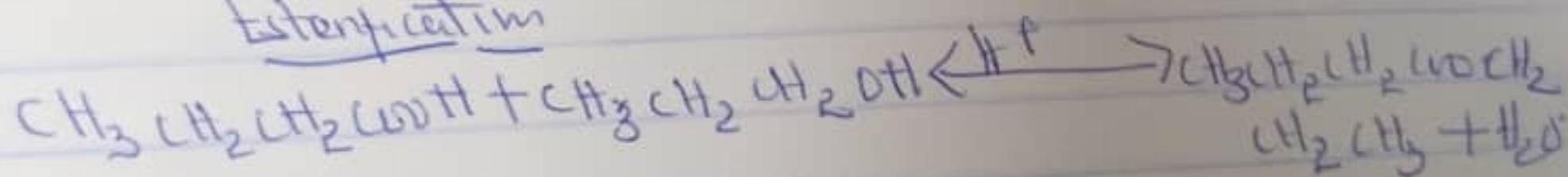
Methanoic acid (formic acid) is manufactured by adding carbon (I) oxide under pressure to aqueous solution of sodium hydroxide. The free carboxylic acid is liberated by careful reaction with tetrabromosulphate (VI) acid ( $\text{H}_2\text{SO}_4$ ).



### Decarboxylation



### Esterification

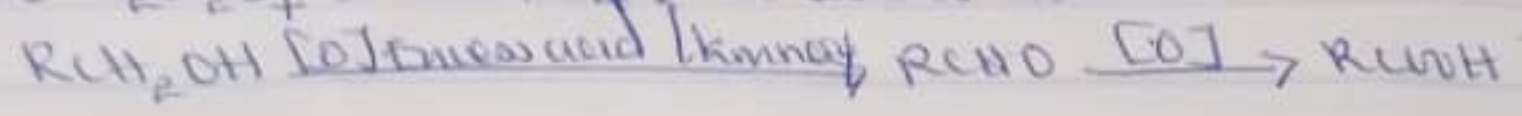




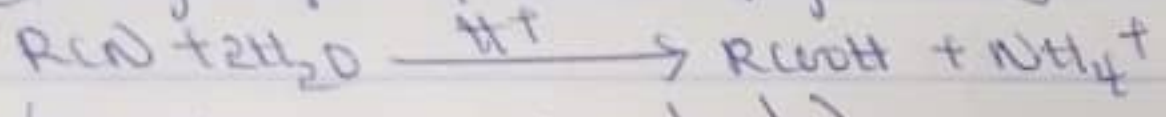
59

(4) Oxidation of primary alcohols and aldehydes.

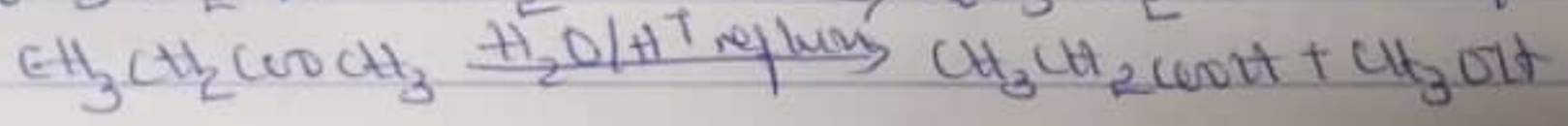
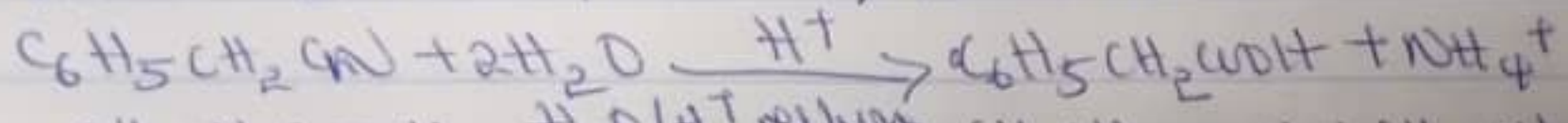
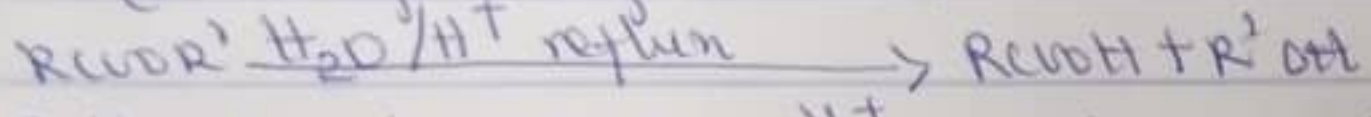
Oxidation of primary alcohols and aldehydes can be used to prepare carboxylic acids using the usual oxidizing agents (ie  $K_2Cr_2O_7$  or  $KMnO_4$ ) in acidic solution.



(5) Hydrolysis of Nitriles (cyanides) or esters.

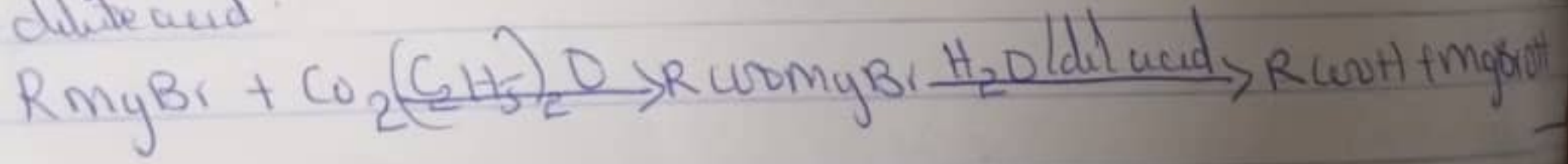


(R = Alkyl or aryl radical)



(6) Carboxylation of Grignard reagent.

Aliphatic carboxylic acids are obtained by bubbling carbon dioxide (dry ice) into the Grignard reagent and then hydrolyzed with dilute acid.



(7) Reduction

