

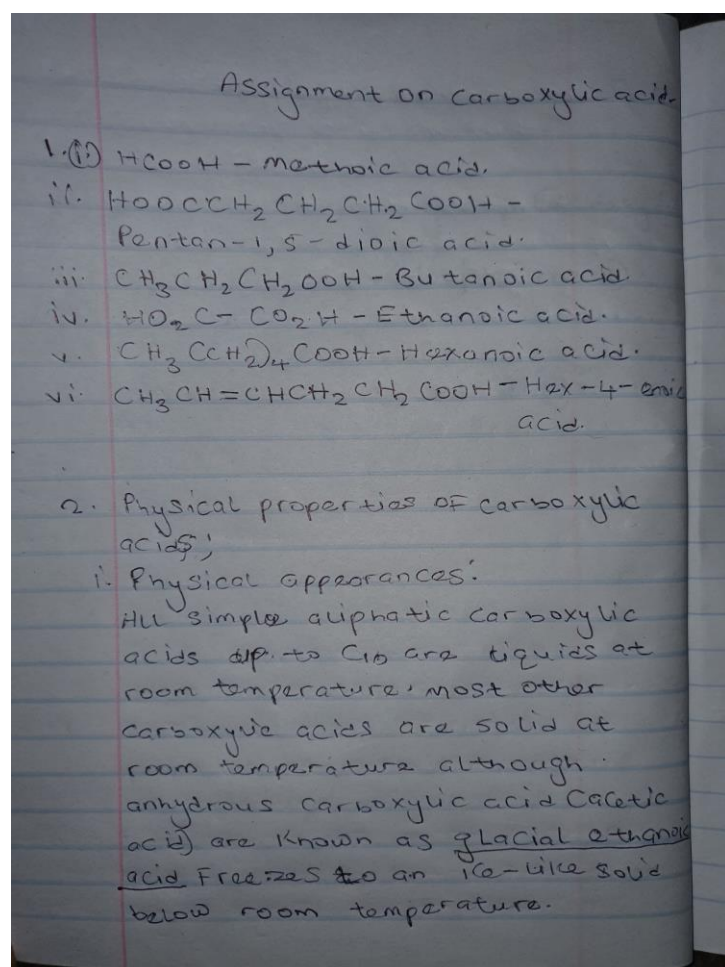
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DEPARTMENT: Department

MATRIC NUMBER: 19/MHS09/004

COURSE: CHM 102

Assignment:



## ii. 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.

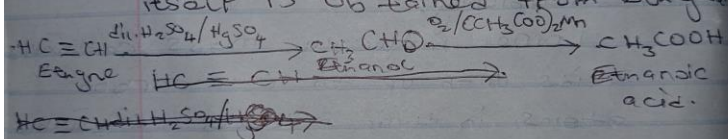
## iii. Solubility:

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 soluble in organic solvents.

### 3. Industrial preparations of Carboxylic acids include;

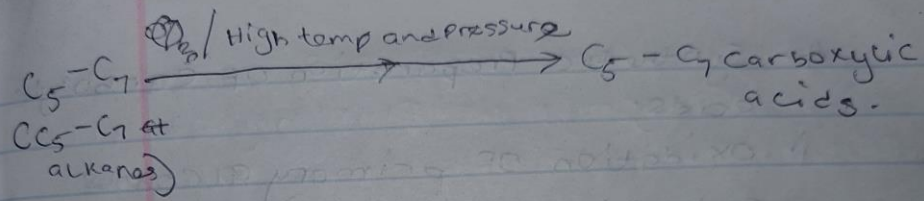
#### i. From ethanol.

Ethanoic acid is obtained commercially by the liquid phase air-oxidation of ~~CS<sub>2</sub>S<sub>2</sub>~~ solution of ethanal to ethanoic acid using ~~may~~ manganite (II) ethanoate catalyst. Ethanal itself is obtained from ethylene.



#### ii. From Petroleum?

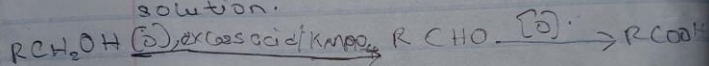
Liquid phase air oxidation of C<sub>5</sub>-C<sub>7</sub> alkenes, obtainable from petroleum at high temperature and pressure will give C<sub>5</sub>-C<sub>7</sub> carboxylic acids with methanoic, propanoic and butanedioic acids by-products.



#### 4 Synthetic Preparation of Carboxylic acids;

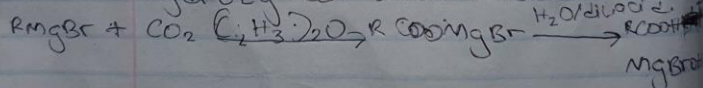
i. Oxidation of primary alcohols and aldehydes;

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



ii. Carbonation of Grignard Reagent:

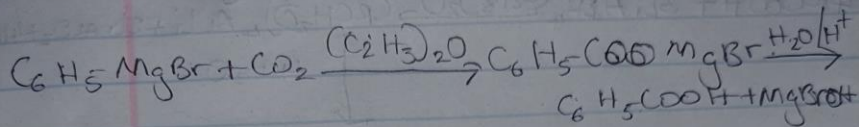
Aliphatic carboxylic acids are obtained by bubbling carbon (iv) oxide into the Grignard reagent and then hydrolyzed with dilute acid.



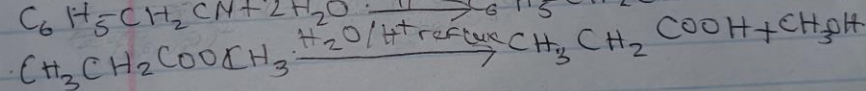
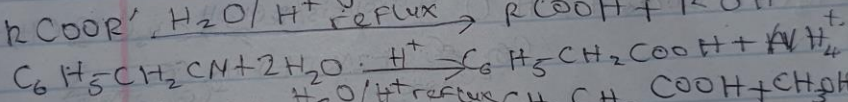
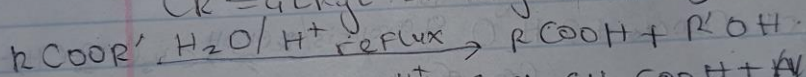
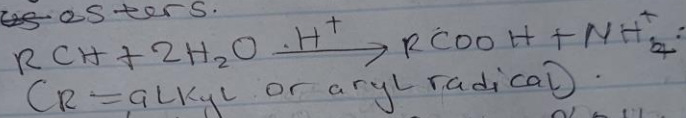
$\cdot R$  may be  $1^\circ$ ,  $2^\circ$ ,  $3^\circ$  aliphatic alkyl or aryl radical.

in the preparation of benzoic acid, the reagent is added to solid carbon (iv) oxide.

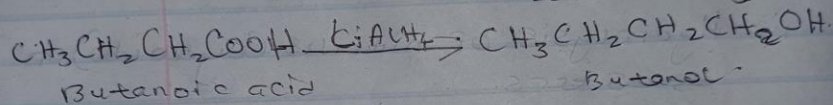
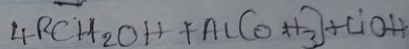
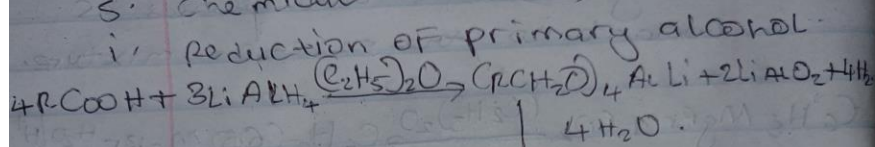
dry ice) which also serves as coolant to the reaction mixture.



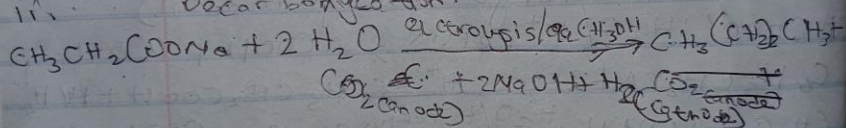
iii. Hydrolysis of nitriles (Cyanides) or esters.



5. Chemical reactions;



ii. Decarboxylation:



iii. Esterification:

