

19/ENG04/024

CHM 102

DIANA ANTHONY EMMOMEN

Electrical Electronics Engineering

1. i)  $\text{HCOOH}$  - ~~Formic~~ <sup>Metanoic</sup> Acid

ii)  $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH}$  - pentanedioic acid

iii)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$  - Butanoic Acid / ~~Butyric 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

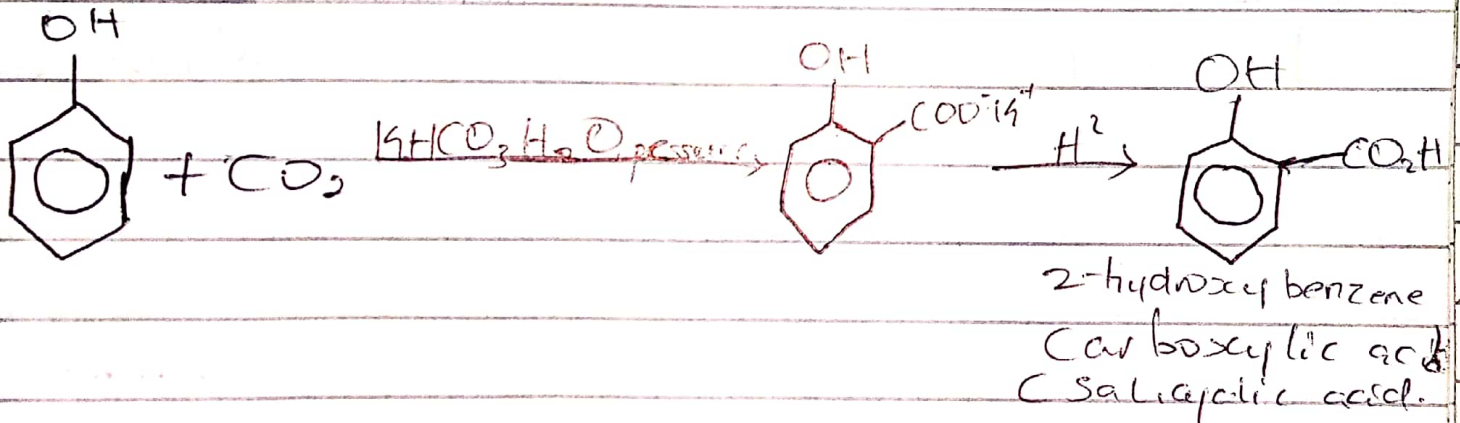
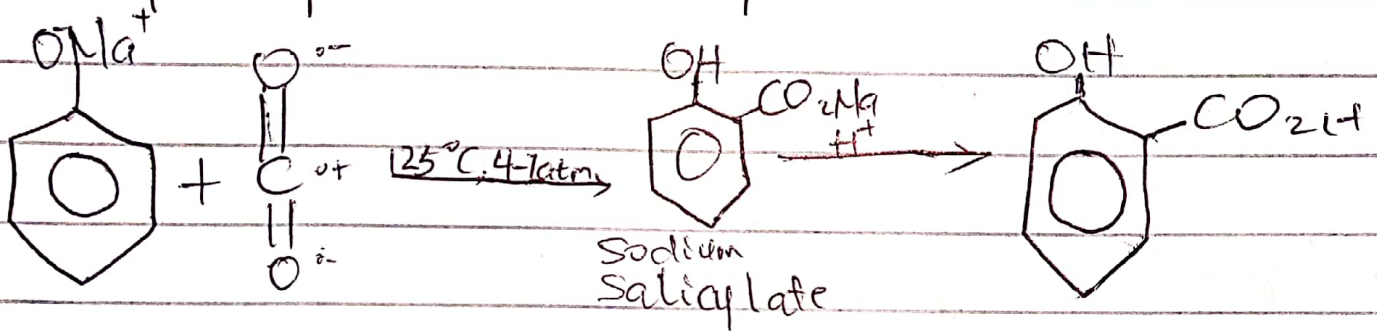
2 ii) Boiling Point: Carboxylic acids tend to have higher boiling points than water, because of their greater surface area and their tendency to form stabilized dimers through hydrogen bonds. For boiling to occur, either the dimer bonds must be broken or the entire dimer arrangement must be vaporized increasing the enthalpy of vaporization requirements, significantly.

111) Solubility: Carboxylic acids are polar. Because they both hydrogen <sup>bond</sup> acceptors and donors, they also participate in hydrogen bonding. Together, the hydroxyl and carbonyl group form the functional group carboxyl. Carboxylic acids usually exist as dimers in nonpolar media due to their tendency to 'self-isolate'. Smaller carboxylic acids (1 to 5 carbons) are soluble in water, whereas higher carboxylic acids have limited solubility due to the increasing hydrophobic nature of the alkyl chain.

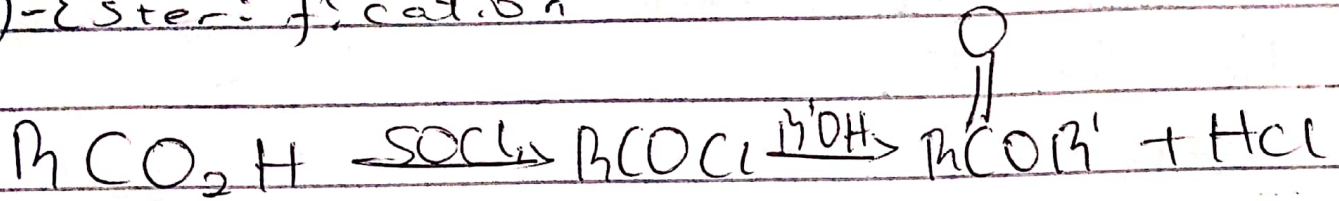
### 3. Industrial Preparations

- i) Oxidation of ethene using Silicotungstic acid catalyst.
- ii) Based catalyzed dehydrogenation of alcohols

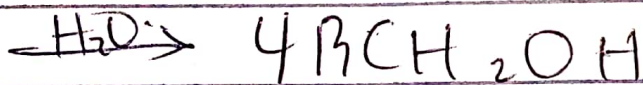
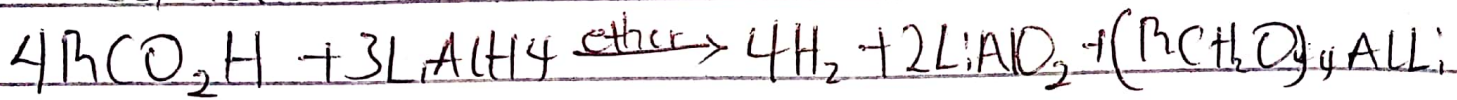
5) Synthesis of Phenolic Acid, by Kolbe reaction  
 In the Kolbe reaction, the phenoxide ion attacks  $\text{CO}_2$  to give the salt or 2-hydroxybenzene carboxylic acid which is then hydrolysed to the acid, 2-hydroxybenzene carboxylic acid.



5) - Esterification



- Reduction



- Decarboxylation

