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Course CODE: CHEM 102

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Dept: MBBS.

Assignment

1. Give the IUPAC names of the following compounds.

a. $\text{HCOOH} \rightarrow$ Methanoic Acid.

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

$\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH} \rightarrow$ Butanoic Acid

$\text{HO}_2\text{C}-\text{CO}_2\text{H} \rightarrow$

$\text{CH}_3(\text{CH}_2)_4\text{COOH} \rightarrow$ Hexanoic Acid

$\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH} \rightarrow$ Hex-4

2. Discuss briefly the physical properties of carboxylic acids under the following headings.

1. Physical Appearance.

All simple aliphatic carboxylic acids up to are liquid at room temperature. Most other carboxylic acids are solid at room temperature although carboxylic acid (acetic acid) also known as glacial ethanoic acid freezes to make like solid below room temperature.

ii) Boiling Points.

The boiling points increase with increasing relative molecular mass. Aromatic carboxylic acids are crystalline solids and have higher melting points than their aliphatic counterparts of comparative relative molecular masses.

iii) Solubility.

Lower molecular mass carboxylic acids with up to four carbon atoms in their molecules are soluble in water, this is 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. Write two industrial preparations of carboxylic acids.

a. From carbon (II) oxide

b. From ethanol.

4. With equations and brief explanation discuss the synthetic preparation of carboxylic acid.

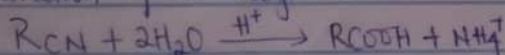
a. Oxidation of primary alcohols and aldehydes.

This can be used to synthesize prepare carboxylic acids using the usual oxidizing agents (i.e. $K_2Cr_2O_7$ or $KMnO_4$) in acid solution.

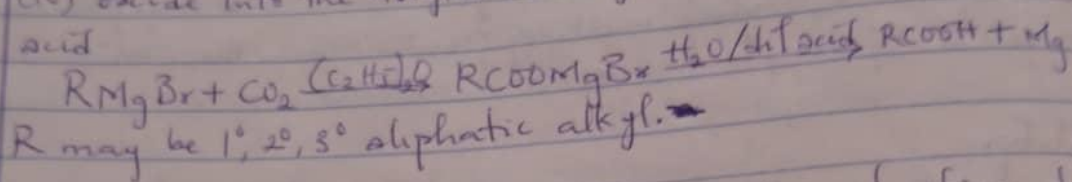


b. Hydrolysis of nitriles or esters.

They are organic molecules retaining a cyclic group which leads to the preparation of carboxylic acids.

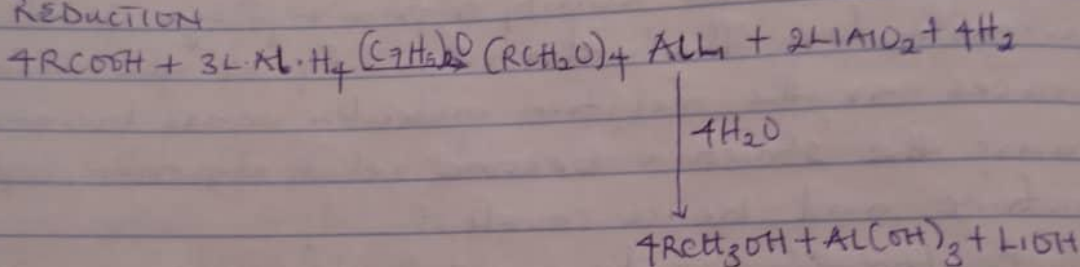


c carbonation of Grignard reagent
 Aliphatic carboxylic acids are obtained by bubbling CO_2 (or CO) oxide into the Grignard reagent then hydrolyzed with dil. acid

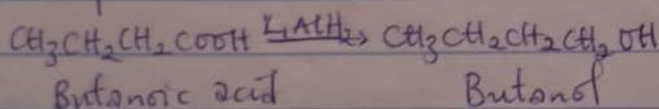


5. with chemical equations only, outline the reduction, decarboxylation and esterification of carboxylic acid.

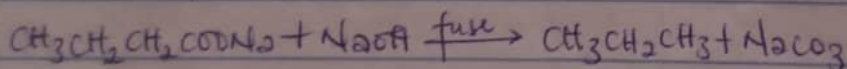
REDUCTION



Example



DECARBOXYLATION



ESTERIFICATION

