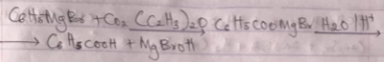
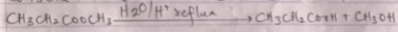
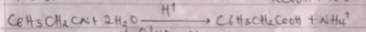
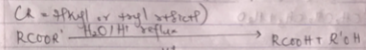
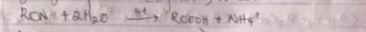


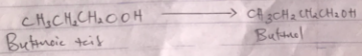
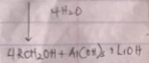
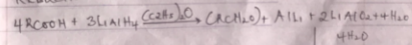
In the preparation of benzoic acid, the reagent is added to solid carbon dioxide (dry ice) which also serves as coolant to the reaction mixture.



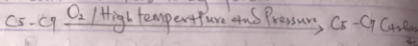
Hydrolysis of nitriles (Cyanides) or esters



5 REDUCTION

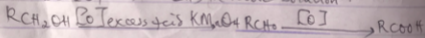


Liquid phase O_2 Oxidation of C5-C9 alkanes, obtainable from petroleum at high temperature and pressure will give C5-C7 Carboxylic acids with methanoic, propionic and butanoic acids as by-products.



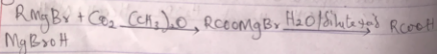
4) Oxidation of primary alcohols and aldehydes

Oxidation of primary alcohols and aldehydes can be used to prepare acids using the best oxidizing agent ($\text{Cr}_2\text{O}_7^{2-}$ or KMnO_4) in acidic solution.



5) Carbonation of Grignard reagent

Aliphatic Carboxylic acids are obtained by bubbling carbon (C) oxide into the Grignard reagent and then hydrolysis with dilute alcohol.



R may be 1°, 2°, 3° aliphatic alkyl or aryl radical

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COURSE CHM 102
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MATICNO 15/MHS01/326
DATE 1-05-2020

Answers

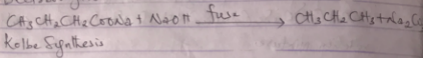
- i) HCOOH \longrightarrow Methanoic acid
- ii) $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH}$ \longrightarrow Pentan-1,5 diacid
- iii) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ \longrightarrow Butanoic acid
- iv) $\text{HO}_2\text{C}-\text{CO}_2\text{H}$ \longrightarrow Ethanedioic acid
- v) $\text{CH}_3(\text{CH}_2)_4\text{COOH}$ \longrightarrow Hexanoic acid
- vi) $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH}$ \longrightarrow Hex-4-enoic acid

2) Physical Appearance;

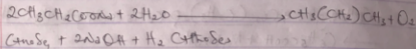
All simple aliphatic carboxylic acids up to C_{10} are liquids at room temperature. Most other carboxylic acids are solids at room temperature although anhydrous carboxylic acid (acetic acid) also known as glacial ethanoic acid freezes to an ice-like solid below the room temperature.

• Boiling Points;

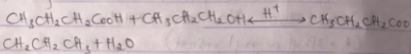
ii Decarboxylation



Kolbe Synthesis



iii Esterification



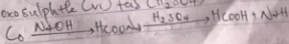
Boiling points increases with increasing relative molecular masses.
Aromatic carboxylic acids are crystalline solids and have higher melting points than their aliphatic counterparts of comparable relative molecular masses.

ii Solubility;

Lower molecular mass carboxylic acids with up to four carbon atoms in their molecules are soluble in water. This is 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 carboxylic acids are soluble in organic solvents.

31 From Carbon (II) Oxide

Methanoic acid is manufactured by CO reacting under the pressure to aq. solution of sodium hydroxide. The free carboxylic acid is by careful reaction with tetraoxosulphate (VI) acid (H_2SO_4)



ii From Petroleum