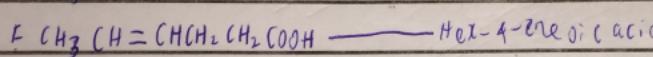
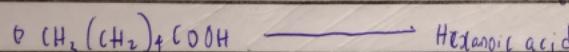
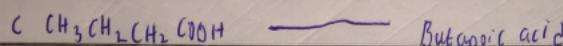
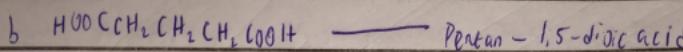
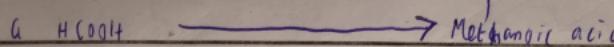


1 Give the IUPAC names of the following



2 Discuss briefly the physical properties of carboxylic acids the following headings; physical appearance Boiling point Solubility

Answers

Physical appearance: All simple aliphatic carboxylic acids up to C₁₀ are liquids at room temperature. Most other carboxylic acids are solid 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 point — This 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.

Solubility — Lower molecular mass carboxylic acids with up to four carbon atoms their molecules are soluble in water; this is largely due to their ability to form hydrogen bonds with water molecules.

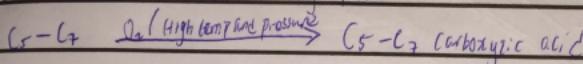
The water solubility of the ~~tony~~ acids decreases as the relative molecular mass increases because the structure becomes relatively more hydrocarbon in nature and hence less polar. All carboxylic acids are soluble in organic solvents.

3) Write two industrial preparations of carboxylic acids

Answer

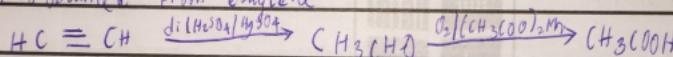
a) From petroleum

Liquid phase air oxidation of C₅-C₇ alkanes, obtainable from petroleum at high temperature and pressure will give C₅-C₇ carboxylic acids with methanic, propanic acid, butanoic acids as by-products



b) From ethanol

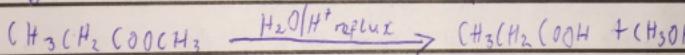
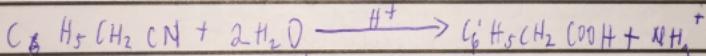
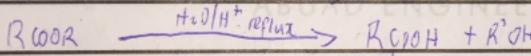
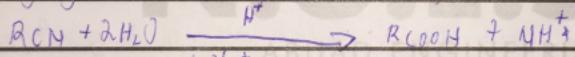
Ethanoic acid is obtained commercially by the liquid phase air oxidation of 5% solution of ethanol to ethanoic acid using Manganite (II) ethanoate catalyst. Ethanol itself is obtained from ethylene



A) With mechanism and brief explanation discuss the synthetic preparation of carboxylic acid

Answer

Hydrolysis of nitriles (cyanides) or esters



R = alkyl

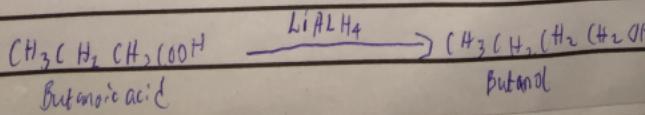
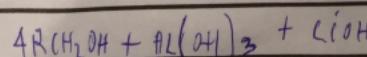
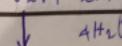
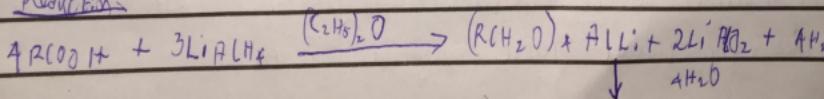
or aryl

radical

5) With chemical reagent only. Outline the reduction, decarboxylation and esterification of carboxylic acid

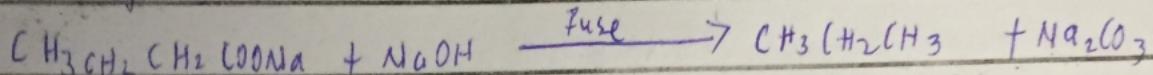
Answer

(a) Reduction

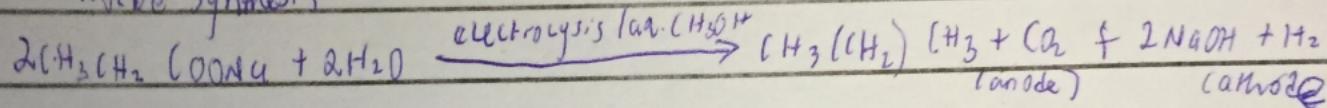


Butanol

b Decarboxylation



Kalbe Synthesis



C. Esterification

