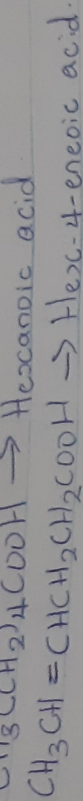
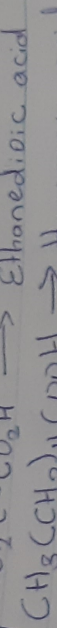
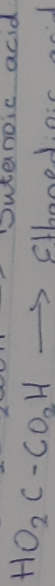
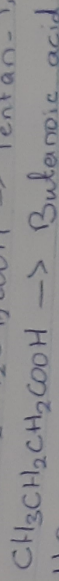
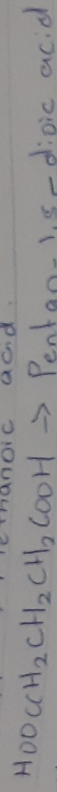
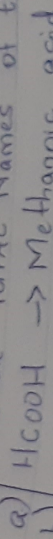


Assignment on carboxylic acid

1) Give the IUPAC Names of the following compounds.



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

i) 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.

ii) Boiling points

Boiling points increase 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. They are soluble in organic

solvents

3) Write

Tasks

ii)

From

Met

Carb

Sodi

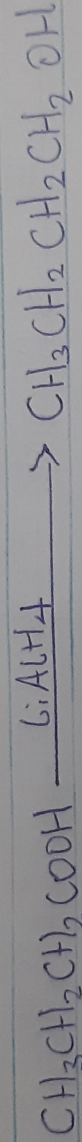
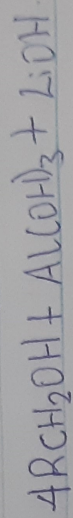
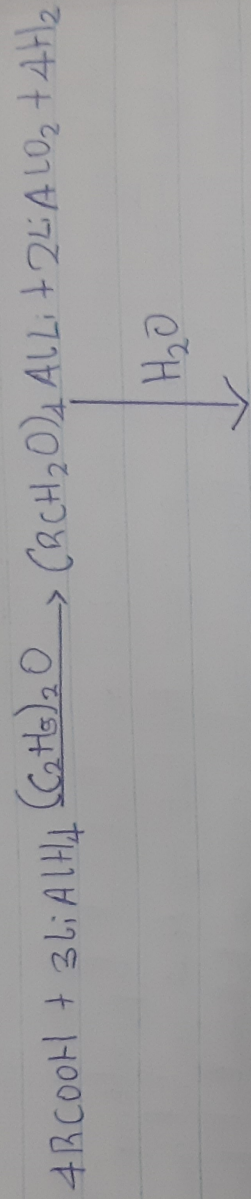
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iii) Fr

4

5. With chemical equation only, outline the reduction, decarboxylation and esterification of carboxylic acid.

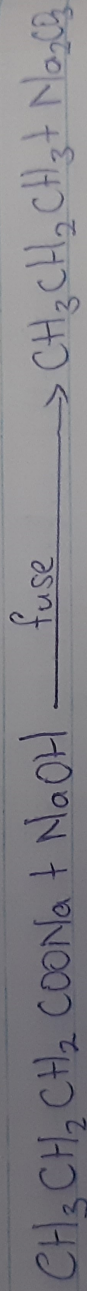
i) Reduction



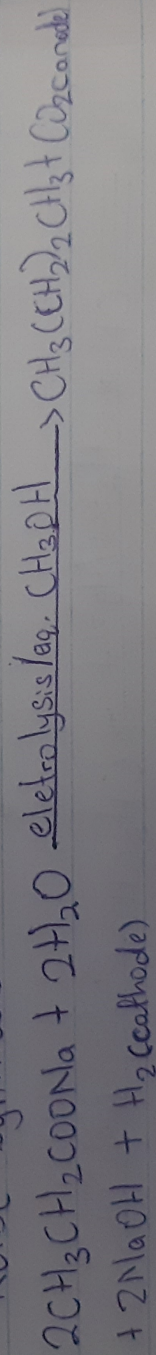
Butanoic acid

Butanol

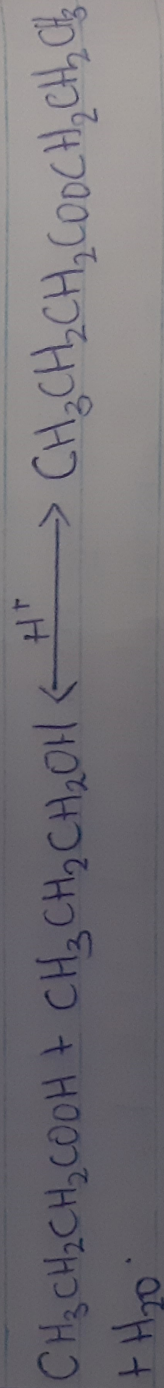
ii) Decarboxylation



Kolbe synthesis



iii) Esterification



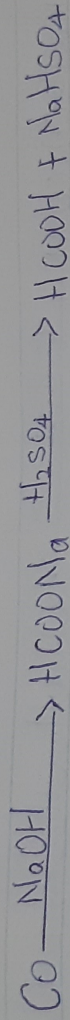
solvents.

3) Write two industrial preparations of carboxylic acids.

Industrial Preparations

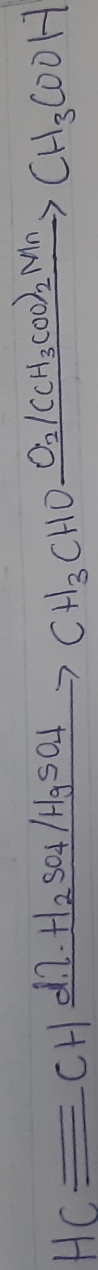
i) From Carbon(II) oxide.

Methanoic acid (formic acid) is manufactured by adding Carbon(II) oxide under pressure to hot aqueous solution of sodium hydroxide. The free carboxylic acid is liberated by careful reaction with tetraoxosulphate(VI) acid (H_2SO_4).



ii) From ethanal.

Ethanoic acid is obtained commercially by the liquid phase air-oxidation of 5% solution of ethanal to ethanoic acid using manganate(II) ethanoate catalyst. Ethanal itself is obtained from ethylene.



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

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.

