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MATRIC NO: 19/191501/010

- 1. a) $\text{HCOOH} \rightarrow$ Methanoic acid
- b) $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH} \rightarrow$ Pentanoic acid
- c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH} \rightarrow$ Butanoic acid
- d) $\text{HO}_2\text{C}-\text{CO}_2\text{H} \rightarrow$ Ethanedioic acid
- e) $\text{CH}_3(\text{CH}_2)_6\text{COOH} \rightarrow$ Heptanoic acid
- f) $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH} \rightarrow$ Hex-4-enoic acid

2) a. Physical appearance

All simple aliphatic carboxylic acids up to C_{10} are liquids at room temperature. Most carboxylic acids are solid at room temperature although many carboxylic acids freeze to an ice-like solid below the room temperature.

b. 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.

c. Solubility & lower carbon atoms in their molecules are soluble in water, but due to their ability to form hydrogen bonds with water molecules.

3. a) from petroleum: liquid phase are obtained C_5-C_{11} alkanes, obtainable from petroleum at high temperature and pressure will give C_3-C_7 carboxylic acids with methanes, propanoic and butanoic acids as by-products.

C_5-C_7 Oxidation of ethane is obtained commercially from ethane: ethanoic acid is obtained from ethane by the liquid phase oxidation of 5% solution of ethane in ethanoic acid using manganese(II) ethanoate catalyst. Ethanol itself is obtained from ethylene.

HC≡
Hydro
R(OH)
R-COO
C₆H₅Cl
C₄H₉Cl

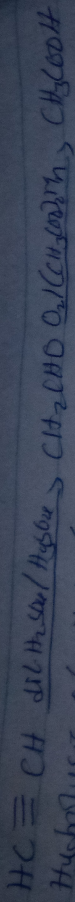
5) a.
2+R₂CO

CH₃
Buta

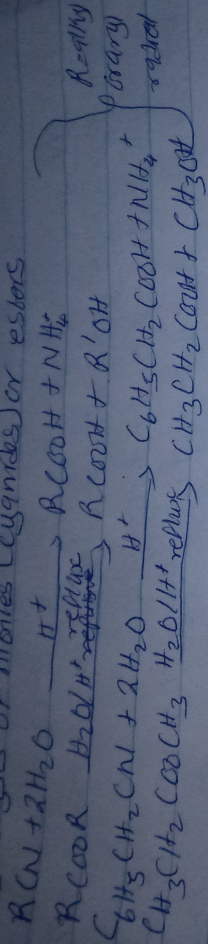
b. Dil
CH₃

2C

C₂ E.
CH₃

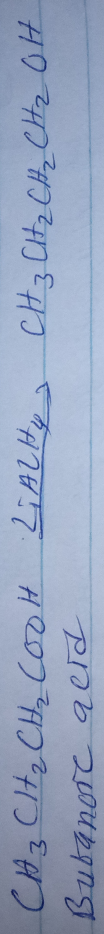
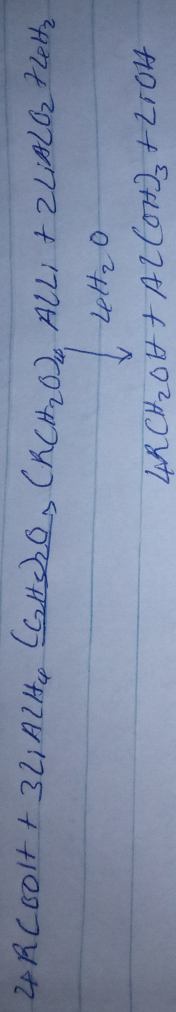


4. Hydrolysis of nitriles (cyanides) or esters

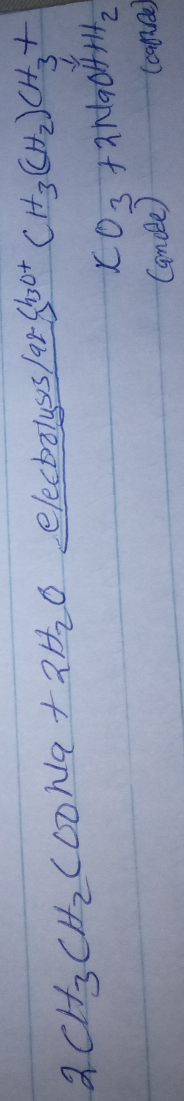
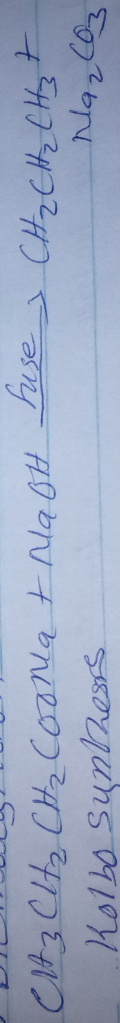


R-allyl
is allyl
a methyl

5) 9. Reduction



b. Dimerization



c. Eschenbayer

