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Computer Engineering

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Chem 102 assignment

1) Give the IUPAC names of the following compounds.

$\text{HCOOH}$  - Methanoic acid

$\text{HOOC(CH}_2\text{)}_3\text{COOH}$  - Pentan-1,5-dioic acid -

$\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$  - Butanoic acid -

$\text{H}_2\text{OC-CO}_2\text{H}$  - Ethanedioic acid -

$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$  - Hexanoic acid -

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

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

i) Physical appearance: Simple aliphatic carboxylic acids up to  $\text{C}_6$  are liquid at room temperature, while others except formic anhydrous carboxylic acid like acetic acid which freezes to an ice-like solid below room temperature, are solid at room temperature.

ii) Boiling points: The boiling points increase with increasing molecular mass.

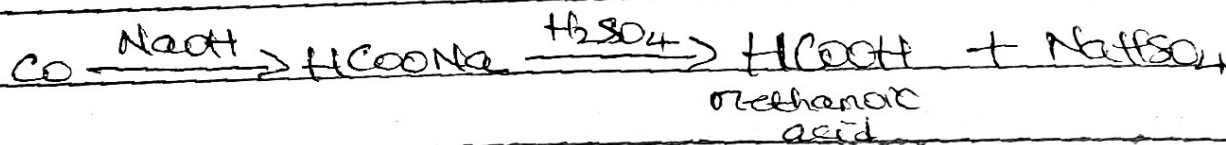
iii) Solubility: Carboxylic acids with up to four carbon atoms in

their molecules are soluble in water due to their ability to form hydrogen bond with water molecules. But as the relative molecular mass increases the water solubility decreases as there is more hydrocarbon ~~at~~ in its molecule. All carboxylic acids are soluble in organic solvents.

3) Write two industrial preparations of carboxylic acids.

a) From carbon (II) oxide:

When carbon (II) oxide is added under pressure to hot aqueous solution of sodium hydroxide. It is then carefully reacted with ~~tetrasulphate~~ tetraoxosulphate (VI) acid to yield / liberate methanoic acid.



b) From ethanol

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

