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CHEM 102
19/MHS01/263
Assignment on Ether

1). CH_3OCH_3 – Methoxymethane
$CH_3CH_2OCH_2CH_3$ – Ethoxyethane
$(CH_3CH_2CH_2CH_2)_2O$ – Butoxybutane
$CH_3CH_2OCH_3$ – Methoxyethane
$CH_3CH_2CH_2OCH_2CH_3$ – Ethoxypropane

2). Properties of Ethers;
·) Physical States: At room temperature, ethers are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable gases or volatile liquids.
·) Solubility: Ethers are less soluble in water than their corresponding alcohols. Lower molecular weight ethers such as methoxymethane and methoxyethane are fairly soluble in water, but as the hydrocarbon content increases, there is a rapid decline in solubility. They are also miscible with most organic solvents.
·) Density: Most of the simple ethers are less dense than water, although density increases with increasing relative molecular mass and some of the aromatic ethers are in fact denser than water.
·) Boiling Point: Low molecular mass ethers have a lower boiling point than the corresponding alcohols but those ethers containing alkyl radicals larger than four carbon atoms, the reverse is true.
·) Reactivity: Ethers are inert at moderate temperature. This leads to their wide use as reaction media.

3) Methods of Preparing Ethers;
;). Partial dehydration of alcohols: Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol in excess and concentrated tetraoxosulphate (vi) acid is heated at a carefully maintaining temperature of 140°C. This process is known as continuous etherification-

If excess alcohol is not used, the temperature is as high as 170-180°C, further dehydration to yield alkene occurs;

$$2ROH \xleftarrow{\text{conc. } H_2SO_4/140^\circ C} R\text{-}O\text{-}R + H_2O$$

ii) From Haloalkanes and dry Silver (I) Oxide;

$$2RX + Ag_2O \xrightarrow{\text{warm}} R\text{-}O\text{-}R + 2AgX$$

4). Three uses of Ethylene Oxide;

i). It is used as an intermediate in the hydrolytic manufacture of ethylene glycol

ii). It is used as a gaseous Sterilizing agent.

iii). It is used in the preparation of nonionic emulsifying agents, plastics, plasticizers and several synthetic textiles