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# **COLLEGE: ENGINEERING**

## **DEPARTMENT: MECHANICAL**

## **MATRIC NO: 19/ENG06/040**

# COURSE: CHM102

#### ASSIGNMENT

- 1> CH<sub>3</sub>OCH<sub>3</sub> Methoxy methane CH<sub>3</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>3</sub> Ethoxy ethane (CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>O Butoxy methane CH<sub>3</sub>CH<sub>2</sub>OCH<sub>3</sub> Methoxy ethane CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>3</sub> Ethoxy propane
- A. Physical States: At room temperature, ethers are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable gases or volatile liquids.
  B. Solubility: Ethers are less soluble in water than the corresponding alcohols. Lower molecular weight ethers such as methoxy methane are fairly soluble in water but as the hydrocarbon content of the molecules increase, there is a rapid decline in solubility.
  C. 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.

D. 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.

E. Reactivity: Ethers are inert at moderate temperature. Their inertness at moderate temperatures leads to their wide we as reaction media.

3> A. Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol in excess and concentrated H<sub>2</sub>SO<sub>4</sub> acid and is heated at a carefully manufactured temperature of140°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.

 $2ROH \quad \longleftarrow \quad R-O-R + H_2O$   $Conc H_2SO_4/ 140^{\circ}c$ e.g.  $2CH_3CH_2OH \quad \longleftarrow \quad CH_3CH_2 - O-CH_2CH_3 + H_2O$   $Conc H_2SO_4/ 140^{\circ}c$ 

B. From haloalkanes and dry silver(i)oxides 2RX + Ag<sub>2</sub>O → R-O-R + 2Agx Warm

#### e.g. $2CH_3CH_2CH_2CI + Ag_2O \longrightarrow CH_3CH_2CH_2CH_2CH_2CH_3 + 2AgCI$

4> A. Ethylene oxide is used as an intermediate in the hydrolytic manufacture of ethylene glycol.

B. Ethylene oxide is used in the preparation on nonionic emulsifying agents, plastics, plasticizers and several synthetic textiles.

C. Ethylene oxides is used as a gaseous sterilizing agent.