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DEPARTMENT: MEDICINE AND SURGERY

COURSE CODE: CHM 102

1. A.) CH3OCH3 – Methoxymethane

B.) CH3CH2OCH2CH3 – Ethoxyethane

C.) (CH3CH2CH2CH2)2O – Butoxymethane

D.) CH3CH2OCH3 – Methoxyethane

E.) CH3CH2CH2OCH2CH3 – Ethoxypropane

2. Properties of Ethers

* Reactivity: Ethers are inert at moderate temperature which leads to wide use as reaction media.
* Density: Density increases with increasing relative molecular mass but most of the simple ethers are less dense than water and some of the aromatic ethers are in fact denser than water.
* Boiling point: Ethers with low molecular mass have low boiling point than the corresponding alcohols while ethers containing alkyl radicals larger than four carbon atoms, the reverse is true.
* Solubility: Ethers are less soluble in water than the corresponding alcohols. Lower molecular weight ethers are fairly soluble in water but as the hydrocarbon content of the molecules increases, there is rapid decline in solubility. They are miscible in organic solvents.
* Physical states: Ethers are colourless, neutral liquids with pleasant odour at room temperature. The lower aliphatic ethers are highly flammable gases or volatile liquids.

1. Methods of preparing ethers
2. Partial dehydration of alcohols: Simple ethers are manufactured from alcohols by catalytical dehydration. The alcohol in excess and conc. H2SO4 are heated at a carefully maintained temperature of 140­0C which is known as continuous etherification. If the alcohol is not in excess, the temperature will be as high as 1700C – 1800C and further dehydration yields alkene.

2ROH CONC. H2SO4 / 1400C R-O-R + H2O

Example

2CH3CH2OH CONC. H2SO4 / 1400C CH3CH2-O-CH­2CH3 + H2O

1. Controlled catalytical hydration of olefins: Olefins are also called alkenes. When alkenes are hydrated and controlled catalytically, they yield ethers.

2CH3CH=CH2 + H2O (CH3)2CH-O-CH (CH3)2

2- Isopropoxypropane

1. Uses of Ethylene Oxide

* It is used as a gaseous sterilizing agent.
* It is used in the preparation of nonionic emulsifying agents, plastics, plasticizers and several synthetic textiles.
* It is used as an intermediate in the hydrolytic manufacture of ethylene glycol.