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DEPARTMENT: PHARMACY
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1) a. CH_3OCH_3 – Methoxymethane
b. $CH_3CH_2OCH_2CH_3$ – Ethoxyethane.
c. $(CH_3CH_2CH_2CH_2)_2O$ – Butoxymethane.
d. $CH_3CH_2OCH_3$ – Methoxyethane.
e. $CH_3CH_2CH_2OCH_2CH_3$ – Ethoxypropane.

2) Properties of ethers.

a. Reactivity:

Ethers are inert at moderate temperature, which leads to their wide use as reaction media.

b. Density:

Ethers Simple ethers are less dense than water, although the density increase with increasing relative molecular mass and some of the aromatic ethers are denser than water.

c) Solubility:

Ethers are less soluble in water than are the corresponding alcohols. Lower molecular weight ethers such as methoxymethane are fairly soluble in water since the molecule are able to form hydrogen bonds with the water molecules but as the hydrocarbon content of the molecules increases, there is a rapid decline in solubility.

d) Physical states:

At room temperature, ethers are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable gases or volatile liquids.

e) Boiling point:

Low molecular mass ethers have a lower boiling point than the corresponding alcohols but those ethers containing alkyl radicals larger than carbon atoms reverse is true.

3. Preparation of ethers

a 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 maintained temperature of 140°c. This process is known as continuous esterification.

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

Examples

$$2CH_3CH_2OH \xleftarrow{\text{conc } H_2SO_4 / 140^\circ} CH_3CH_2-O-CH_3CH_3 + H_2O$$

b. Controlled catalytic hydration of olefins.

$$2CH_3CH=CH_2 + H_2O \longrightarrow (CH_3)_2CH-O-CH(CH_3)_2$$

2-isopropoxypropane

Uses of ethylene oxide.

1. It is used as an intermediate in the hydrolytic manufacture of ethylene glycol.
2. It is used in the production of nonionic emulsifying agents.
3. It is used as a gaseous sterilizing agent.