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19/MHS01/103 MBBS.
CHM 102.
General Chemistry II
- Assignment

(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) (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) Density: Most of the simple ethers are less dense than water, although the density increase with increasing relative molecular mass and some of the aromatic ethers are in fact denser than water.
(c) Reactivity: Ethers are inert at moderate temperature. Their inertness at moderate temperature leads to their wide use as reaction media.

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

$$2ROH \xrightarrow[140^{\circ}C]{Conc.\ H_2SO_4} R-O-R + H_2O.$$

Example.

$$2CH_3CH_2OH \xrightarrow[140^{\circ}C]{Conc.\ H_2SO_4} CH_3CH_2-O-CH_2CH_3 + H_2O.$$

(b) Controlled catalytic hydrations of olefins.

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

(c) ~~from~~

4. (1) Ethylene oxide is used in the preparation of nonionic emulsifying agents, plastics, plasticizers and several synthetic textiles.

(2) Ethylene oxide is used as a gaseous sterilizing agent.

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