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DEPT: DENTISTRY AMD DENTAL SURGERY

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Assignment

**1. Give the IUPAC names of the following organic compounds**

CH3OCH3 = Methoxymethane

CH3CH2OCH2CH3 = Ethoxyethane

(CH3CH2CH2CH2)2O =  Butoxybutane

CH3CH2OCH3 = Methoxyethane

CH3CH2CH2OCH2CH3 = Ethoxypropane

**2. Discuss the 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 soluble in water than are the corresponding alcohols. Lower molecular weight ethers such as methoxymethane and methoxyethane 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. They are miscible with most organic solvents.
* Density: Most of the simple ethers are less dense than water, although the 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. The boiling point of ethers tend to approximate those of hydrocarbon of same relative molecular mass from which it can be concluded that the molecules are not associated in the liquid phase as there are no suitable available hydrogen for association through hydrogen bonds.
* Reactivity: Ethers are inert at moderate temperature. Their inertness at moderate temperature leads to their wide use as reaction media. Simple ethers are not found commonly in nature but the ether linkage is present in such natural products as sugars, starches, and cellulose.

**3. Discuss explicitly two methods of preparing ethers and show equations of reaction;**

* Partial decomposition 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 140oC. This process is known as continuous etherification. If excess alcohol is not to yield alkene occurs

 Conc. H2SO4/140oC

2ROH <-------------------------------------------> R-O-R + H20

Conc. H2SO4/140oC

2CH3CH2OH <--------------------------------------> CH3CH2-O-CH2CH3 + H20

* From Haloalkanes and dry silver (1) oxide

 warm

2RX + Ag2O ---------------------> R-O-R + 2AgX

 warm

2CH3CH2CH2Cl + Ag2O ---------------------> CH3CH2CH2OCH2CH2CH3 + 2AgCl

 Propoxypropane

**4. State three uses of ethylene oxide**

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