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ASSIGNMENT

1. GIVE THE IUPAC names of the following organic compounds

i) CH_3OCH_3 - Methoxymethane

ii) $CH_3CH_2OCH_2CH_3$ - Ethoxyethane

iii) $(CH_3CH_2CH_2CH_2)_2O$ - Butoxymethane

iv) $CH_3CH_2OCH_3$ - Methoxyethane

v) $CH_3CH_2CH_2OCH_2CH_3$ - Ethoxypropane

2. Properties of ether

i) Physical states - Ethers are colourless, neutral liquids with pleasant odour at room temperature. The lower aliphatic ether are highly flammable gases or volatile liquids.

ii) Solubility - Ethers are less soluble in water than are the corresponding alcohols. Lower molecular weight ethers such as methoxymethane and methoxyethane are fairly soluble in water. They are miscible with most organic solvents.

iii) 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.

1. Boiling Point: Low molecular mass ether have a lower boiling point than the corresponding alcohols but those ethers containing alkyl radicals larger than four carbon atoms, the reverse is true

2. Reactivity - Ethers are inert at moderate temperature. Their inertness at moderate temperatures leads to their wide use as reaction media

3. Methods of Preparing ethers

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

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

Example $2CH_3CH_2OH \xrightarrow{\text{conc } H_2SO_4/140^\circ C} CH_3CH_2-O-CH_2CH_3 + H_2O$

ii) Controlled catalytic hydration of alkenes

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

2 - isopropoxypropane

4 Uses of ethylene oxide

i) Ethylene oxide is used as an intermediate in the hydrolytic manufacture of ethylene glycol (ii) Ethylene oxide is used as a gaseous sterilizing agent (iii) It is used in the preparation of non-ionic emulsifying agents, plastics, plasticizers and several synthetic textiles