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Assignment 2 [ETHERS]

1. Give the IUPAC names of the following compounds.

a) CH_3OCH_3 — Ethanol

b) $CH_3CH_2OCH_2CH_3$ — Butan-1-ol

c) $(CH_3CH_2CH_2CH_2)_2O$ —

d) $CH_3CH_2OCH_3$ — Propan-1-ol

e) $CH_3CH_2CH_2OCH_2CH_3$ — 2-Methyl butanol

2) Discuss the properties of ethers.

i) Physical states: At room temperature, ethers are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable gasses or volatile liquids

ii) Solubility: Ethers are less soluble in water than the alcohols. They are also miscible with most organic solvents.

iii) Density: Most 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.

iv) Boiling Point: Lower molecular mass ethers have a lower melting point than alcohols but those ethers containing alkyl radicals larger than four carbon atoms have higher melting point.

v) Reactivity: Ethers are inert at moderate temperatures, which lead to the use of wide reaction media

3) Discuss the explicitly two methods of preparing ethers and show equations of reaction.

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 an~~ carefully and it maintained a temperature of 140°c and this process is called the etherification process. If excess alcohol is not used, the temperature is as high as 170-180°c, fathe dehydration to yield alkene occurs.

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

ii) Controlled catalytic hydration of olefins

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

2- isopropoxypropane

4) State three uses of ethylene oxide.

i) It is used to make antifreeze, adhesives, detergents, polyester, fumigants and Pesticides.

ii) It is used to sterilize medical equipment.

iii) It is flammable and explosive and is used as a main Component of thermobaric weapons which is commonly handled and shipped as a refrigerated liquid to control its hazardous nature.