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MATRIC NO: 19/MHS01/306
DEPARTMENT: Medicine and sugery
Course: Chemistry 102

1) Give the IUPAC names of the following organic compounds
a) CH_3OCH_3 (b) $CH_3CH_2OCH_2CH_3$ (c) $(CH_3CH_2CH_2CH_2)_2O$
d) $CH_3CH_2OCH_3$ (e) $CH_3CH_2CH_2OCH_2CH_3$

a) CH_3OCH_3 : Methoxymethane.
b. $CH_3CH_2OCH_2CH_3$: Ethoxyethane.
c. $(CH_3CH_2CH_2CH_2)_2O$: pentanamide.
d. $CH_3CH_2OCH_3$: Methoxyehane.
e. $CH_3CH_2CH_2OCH_2CH_3$: Ethoxypropane.

2) Discuss the properties of ethers.
a. Physical propeties
* Anether molecule has a net dipole moment due to the Polarity of C-O bonds.
* The boiling point of ether is comparable to the alkanes but much lower than that of alcohols of comparable molecular mass despite the polarity of the C-O bond.
* Ether molecules are miscible in water. This is attributed to the fact that like alcohol, the oxygen atom of ether can also form hydrogen bonds with a water molecule.

b. Chemical properties.
* Doesn't react with bases, active metals, oxcidizing agents and reducing agents.
* Strong acids will cleave esters at elevated temperatures.
* When stored in the presence of oxygen, esters will form explosive peroxides such as diethyl ether peroxide.

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

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

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 pressure of 140°C this process is known as Continues esterification of excess alcohol is not used, the temperature is as high as 170-180°C further dehydration to alkane occurs

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

examples

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

b.) Controlled catalytic hydration of Olefins

Controlled hydration of olefins with a catalyst can lead to the production of ethers. If this is not controlled it can lead to the production of an alcohol instead of an ether

$$2CH_3CH=CH_2 + H_2O \longrightarrow (CH_3)_2CH-O-CHC(H_3)_2$$

Propene water 2-isopropoxypropane

4) State three uses of ethylene oxide.

a. It is used as an intermediate in the hydrolytic manufacture of ethylene glycol

b. It is used in the preparation of anionic emulsifying agents: plastics, plasticizers and several Synthetic textiles

c. Ethylene oxides is used as a gaseous sterilyzing agent.