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DEPARTMENT: NURSING

COURSE CODE: CHM 102

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

* CH3OCH3- Methoxymethane
* CH3CH2OCH2CH3- Ethoxymethane
* (CH3CH2CH2CH2)2O-Butoxymethane
* CH3CH2OCH3-Methoxyethane
* CH3CH2CH2OCH2CH3- Ethoxypropane.

1. Discuss the properties of ethers:

* 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 are in fact denser than water.
* Boiling point; low molecular mass ethers have a lower boiling point than the corresponding alcohols is 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 hydrocarbons of same relative molecular mass from which it can be concluded that the molecules are not associated in 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.
* 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 less soluble in water than the corresponding alcohols. Lowe 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.

1. Discuss explicitly two methods of preparing ethers and show of reaction;

* Partial dehydration of alcohols;

Simple ethers is manufactured by partial dehydration of alcohols through catalytic dehydration. Alcohol in excess and concentrated H2SO4 acid is heated at a carefully maintained temperature of 140℃, the process is called continuous etherification. If excess alcohol is not used, the temperature is as high as 170-180℃, further dehydration to yield alkene occurs.

Conc H2SO4/140℃

2ROH R-O-R + H2O

Examples; conc H2SO4/140℃

2CH3CHOH CH3CH2-O-CH2CH3+H20

* Controlled catalytic hydration of olefins;

2CH3CH=CH + H2O (CH3)2CH-O-CH(CH3)2

2-isopropoxypropane

1. State three uses of ethylene oxide

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