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DEPARTMENT –PHARMACY

MATRIC NO- 19/MHS11/117

COURSE CODE – CHM 102

ASSIGNMENT TITLE- ASSIGNMENT ON ETHER

**QUESTION 1-** GIVE THE IUPAC NAMES OF THE FOLLOWING ORGANIC COMPOUNDS

1. CH3OCH3 - METHOXYMETHANE
2. CH3CH2OCH2CH3 - ETHOXYETHANE
3. (CH3CH2CH2CH2)2O - BUTOXYBUTANE
4. CH3CH2OCH2CH3 - ETHOXYMETHANE
5. CH3CH2CH2OCH2CH3 - ETHOXYPROPANE

**QUESTION 2 -** DISCUSS THE PROPERTIES OF ETHERS

1. PHYSICAL PROPERTIES-
2. LOW ETHERS ACT AS ANASTHETICS WHILE THEIR VAPOURS ARE HIGHLY INFLAMMABLE
3. ETHERS ARE POLAR MOLECULES
4. ETHERS ARE LIGHTER THAN WATER AND ARE SPARINGLY SOLUBLE IN WATER BUT READILY SOLUBLE IN ORGANIC SOLVENTS SUCH AS CHLOROFORM AND BENZENE
5. THE BOILING POINTS OF ETHERS ARE LOWER THAN THE BOILING POINTS OFISOMERIC ALCHOLS
6. CHEMICAL PROPERTIES
7. ETHERS ARE CHEMICALLY LESS REACTIVE BECAUSE OF THEIR STRUCTURE

SOME CHEMICAL REACTIONS OF ETHERS INCLUDE:

1. REACTION OF THE ALKYL GROUP (substitution)
2. HALOGENATION- ETHERS UNDERGO HALOGENATION OF ALKYL RADICAL WHEN REACTED WITH CHLORINE OR BROMINEINTHE PRESENCE OF SUNLIGHT TO YEILD HALOGEN SUBSTITUTED ETHERS.
3. COMBUSTION- ETHERS ARE VOLATILE AND HIGHLY INFLAMMABLE

C2H5OC2H5 + 4O2 4 CO2 +5H2O

1. REACTION OF ETHEREAL OXYGEN
2. FORMATION OF PEROXIDES – ETHERS FORM PEROXIDES BY THE PROLONGED ACTION OF ATMOSPHERIC OXYGEN OR OZONIZED OXYGEN.

R-O-R1 + O R-O-R1

O

1. FORMATION OF OXONIUM SALTS – ETHERS FORM OXONIUM SALTS WITH STRONG MINERAL ACIDS IN HIGH CONCENTRATION AND ONCE FORMED REMAINS IN SOLUTION.

R-O-R1 + HX R-O-R1X- (DIALKYL OXONIUM HALIDE)

© REACTION INVOLVING CLEAVAGE OF CARBON- OXYGEN BOND

1. HYDROLYSIS- ETHERS WHEN BOILED WITH WATER OR WHEN WITH STEAM ARE HYDROLYZED TO FORM ALCHOLS
2. ACTION OF SULPHIRIC ACID – ETHERS FORN OXONIUM SALTS WHEN HEATED WITH HOT SULPHURIC ACID.
3. ACTION OF HYDROBROMIC OR HYDROIODIDE ACID- ETHERS REACT WITH HYDROBROMIC OR HYDROIODIDE ACID TO FORM ALCHOL AND ALKYLHALIDES

( reaction with hydroiodide)- (i) R-O-R + HI R-OH + RI

(ii) CH3OC2CH5  + HI CH3I + C2CH5OH

(methyl iodide) (ethanol)

QUESTION 3 – DISCUSS EXPLICITLY TWO MWTHODS OF PREPARING ETHERS AND SHOW EQUATIONS OF REACTIONS

1. WILLIAMSON SYNTHESIS –THIS IS KNOWN AS THE MOST IMPORTANT METHOD OF PREPARING ETHERS IN THE LABORATORY. IT INVOLVES HEATING ALKYL HALIDES WITHWITH SODIUM OR POTASSIUM ALKOXIDES.

R-ONa + XR1  R.O.R1 + NaX

(sodium alkoxide) (alkyl halide) (ether)

C2H5Oa + Cl.C2H5 C2H5O.C2H5

(sodium ethoxide) (ethyl chloride)  (ethoxy ethane)

CH3O.K + Br.C2H5  CH3.O.C2H5 + KBr

(potassium ethoxide) (ethyl bromide) (ethoxy methane)

note- (THE REACTION ABOVE IS MOST SUITABLE FOR PREPARING MIXED OR UNSYMETRICAL ETHERS . PRIMARY ALKYL HALIDES GIVE FAIRLY GOOD ETHERS WHILE SECONDARY AND TERTIARY ALKYL HALIDE GIVES ALKENES PREDOMINANTLY.

1. DEHYDRATION OF ALCHOLS – SIMPLE / SYMETRICAL ETHERS ARE OBTAINED WHEN EXCESS OF ALCHOL IS HEATED WITH CONC SULPHURIC OR PHOSPHURIC ACID . TWO MOLECULES OF ALCHOL LOOSE IN WATER MOLECULE AMONGST THEMSELVES TO YEILD ETHERS.

R.OH + HO.R H2SO4  R.O.R + H2O

( 2moles of alchol) (ether)

C2CH5OH + HO.C2CH5  H2SO4 C2CH5.O.C2CH5 +H2O

(2molecule of ethanol) 100°c (ethoxy ethane)

note- THIS METHOD IS USED MAINLY IN THE DEHYDRATION OF PRIMARY ALCHOLSAS SECONDARY ACID AND TERTIARY ALCHOL UNDER THE CONDITION OF REACTION MAY FORM ALKENES PREDOMINALLY.

QUESTION 4 – STATE 3 USES OF ETHYLENE OXIDE

ETHYLENE OR ETHOXYETHANE CAN BE USED AS:  
(i) AS A FUMIGANT AND INSECTICIDE FOR GRAIN , TOBACCO AND DRIED FRUITS.

(ii) IN PREPARATION OF GLYCOL ETHERS WHICH ARE USED AS INDUSTRIAL SOLVENTS

(iii) IN THE MANUFACTURE OF NON-IONIC SURFACE ACTIVE AGENTS AND POLY-ETHYLENE GLYCOLS WHICH ARE USED AS INDUSRIAL SOLVENTS.