ETHERS

⊛ Nomenclature of Ethers :-

↳ Acyclic Ether :-

General formula : $R-O-R'$ where, R & R' → alkyl groups

when R & R' same e.g. CH_3-O-CH_3

$C_2H_5-O-C_2H_5$

When R & R' different e.g.

$CH_3-O-C_2H_5$

$C_2H_5-O-C_3H_7$

Common Name :-

The two alkyl or aryl groups bonded to the functional group (-O-) are written alphabetically followed by the word.

CH_3-O-CH_3 Dimethyl ether

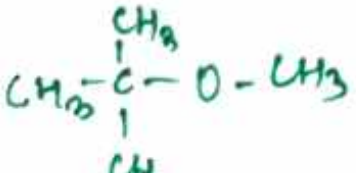
$C_2H_5-O-C_2H_5$ Diethyl ether

$CH_3-O-C_2H_5$ Ethyl methyl ether.

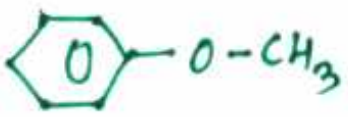
$C_6H_5-O-C_6H_5$ Diphenyl ether

$C_2H_5-O-C_6H_5$ Ethyl phenyl ether

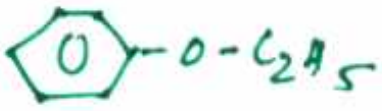
$C_6H_5-O-CH_3$ Methyl phenyl ether



* t-butyl methyl ether



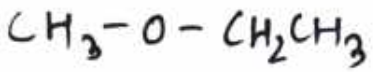
Diphenyl ether (Anisole)



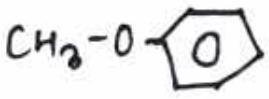
Ethyl phenyl ether (Phenetole)

IUPAC NAME OF ETHERS

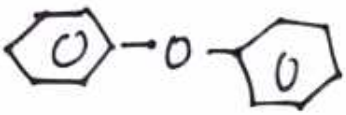
⊗ Named as alkoxy alkanes. Alkyl having less number of carbon atoms forms the part of the alkoxy group while the larger alkyl group forms the parent chain.



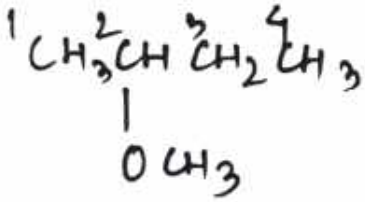
Methoxyethane



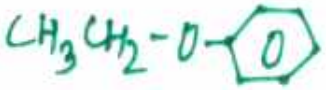
Methoxybenzene



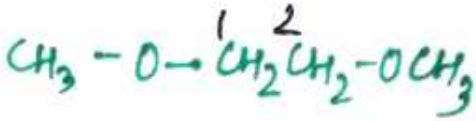
Phenoxybenzene



2-Methoxybutane

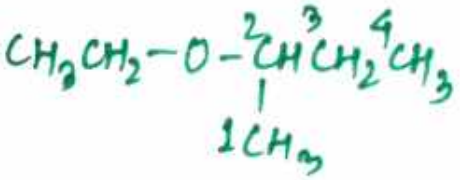


Ethoxybenzene

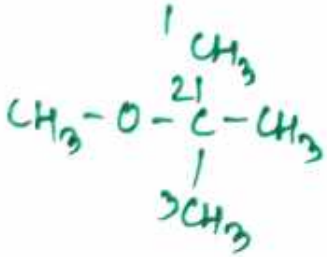


1,2-Dimethoxy ethane.

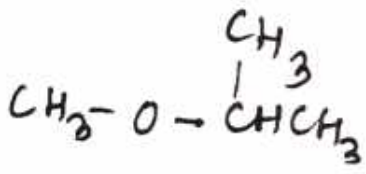
1,1-Dimethoxybutane



2-Ethoxybutane

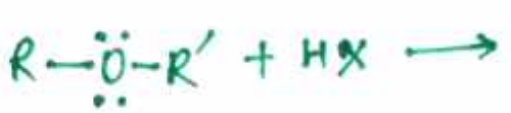


2-Methoxy-2-Methyl propane



Cleavage of Ethers with HI

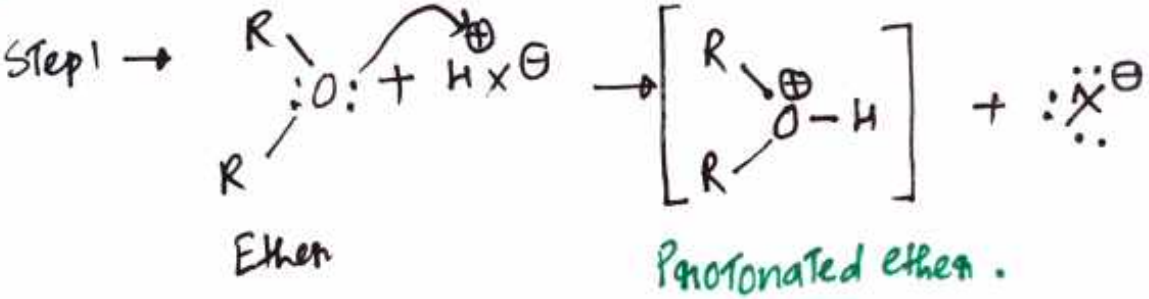
When an ether is heated with concentrated acid (HI), the ether linkage is cleaved. It results in the formation of an alcohol or phenol and an alkyl halide.



e.g. $R-O-R' + HI \longrightarrow R-I + R'OH$

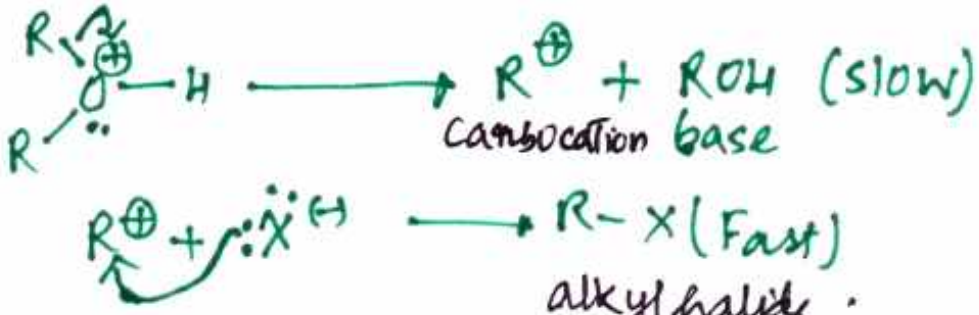
$R-O-Ar + HI \longrightarrow R-X + ArOH$

Mechanism :-

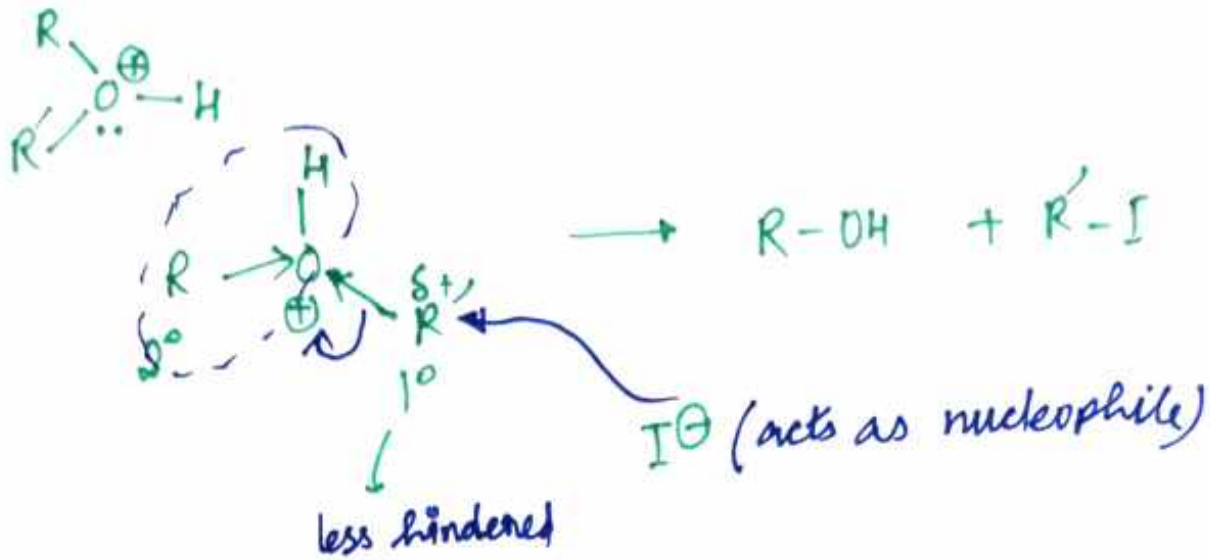


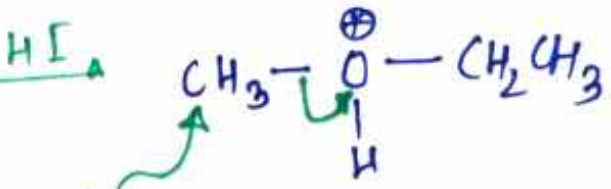
Then the protonated ether is attacked by nucleophile (X^-) by S_N1 or S_N2 mechanism depending upon the structure of ether and the reaction conditions. The primary alkyl group undergoes S_N2 displacement whereas 1-alkyl group by S_N1 displacement.

S_N1 Mechanism –



S_N^2 Mechanism:-



e.g. $CH_3-O-C_2H_5 \xrightarrow{HI}$ 

$CH_3-I + H_2O$