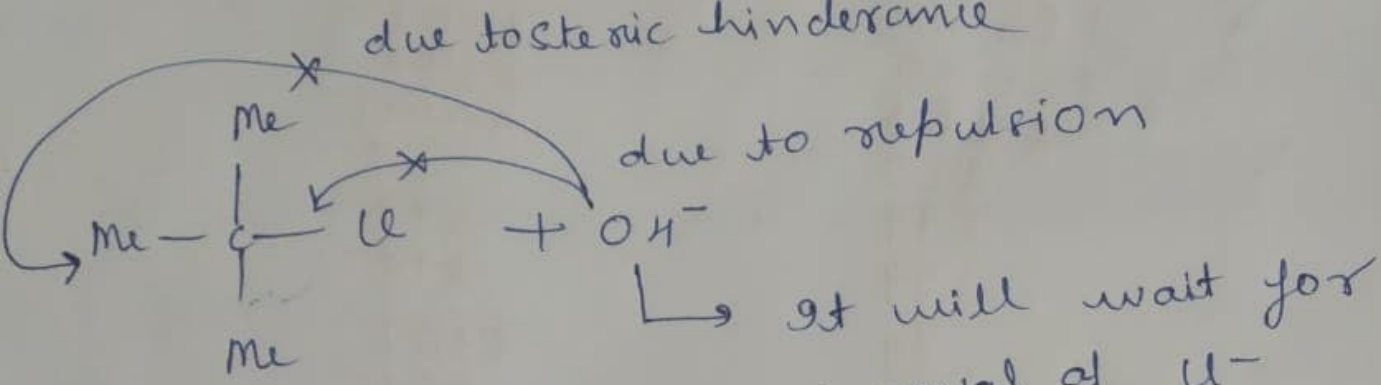
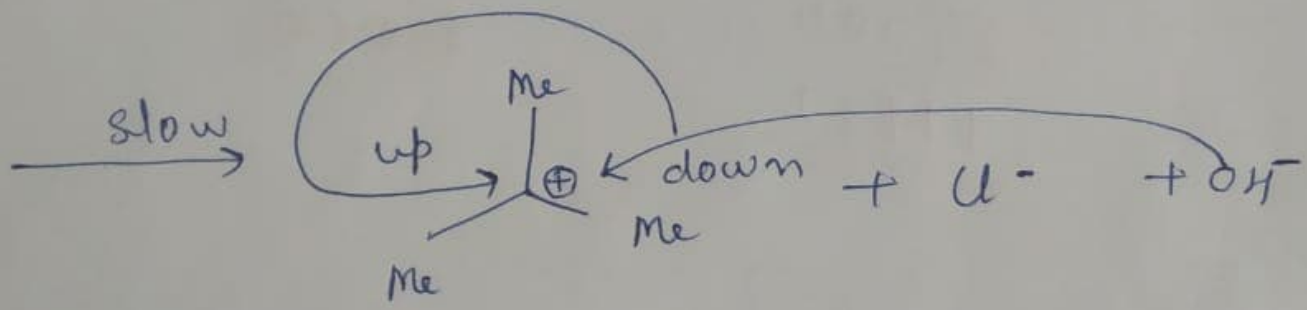
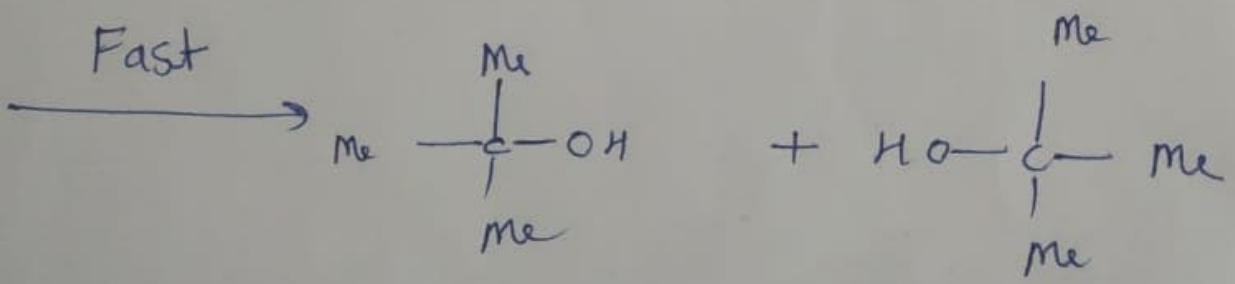
SN¹ Reaction

Unimolecular Nucleophilic Substitution

When tertiary alkyl halide is treated with aq KOH to give tertiary alcohol.







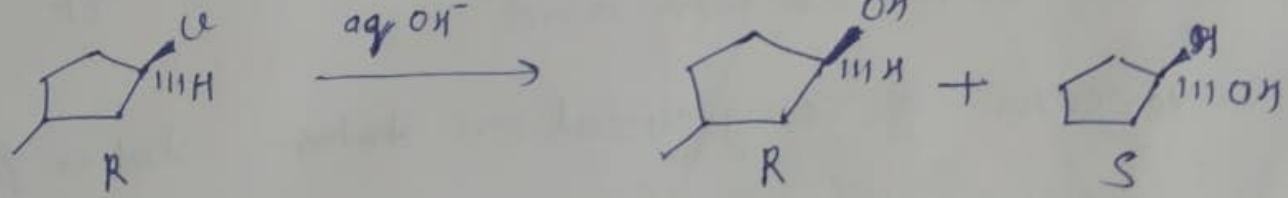
$$R = K[Me_3C{-}Cl]^1 [OH^-]^0$$

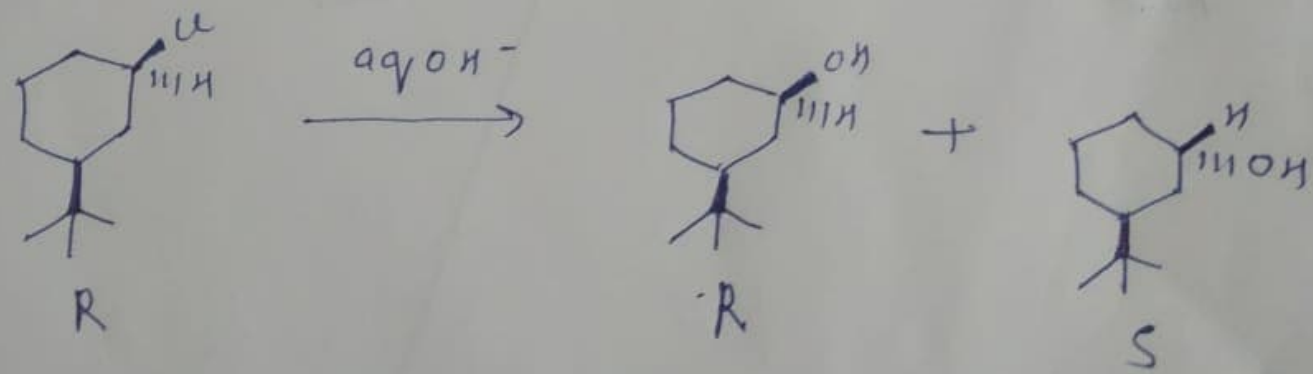
F.O.R

Examples:

1) 

In SN', Retension and inversion both takes place

2) 

3) 

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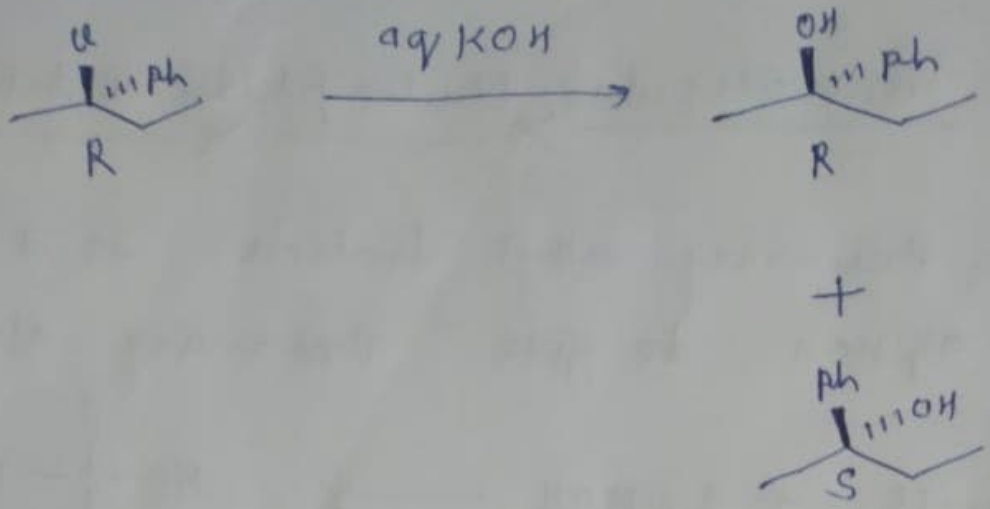

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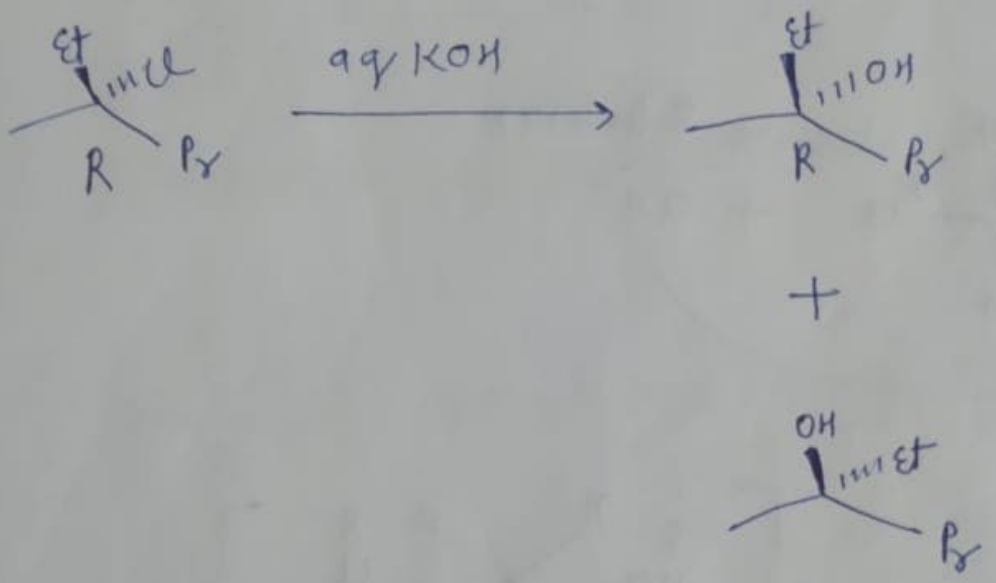
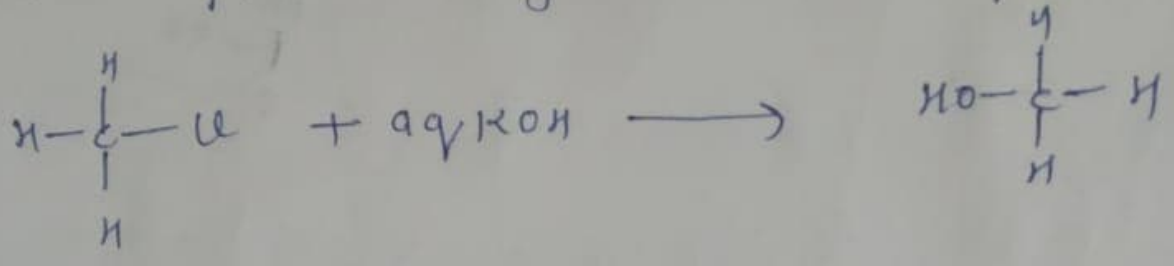
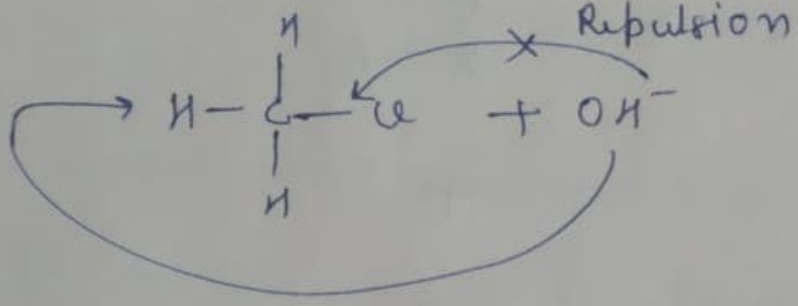
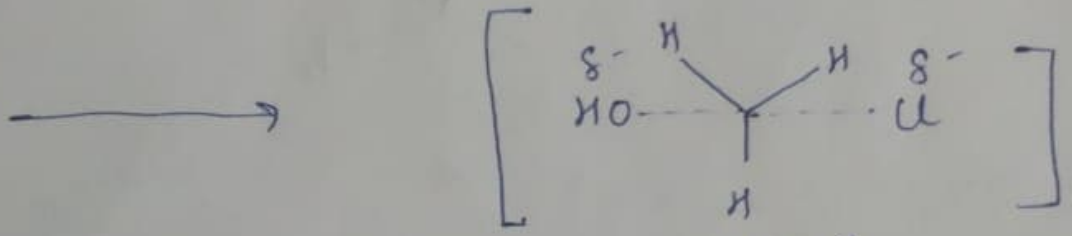


SN^2 : Bimolecular Nucleophilic Substitution

When Primary alkyl halide is treated with aq KOH to give Primary alcohol.



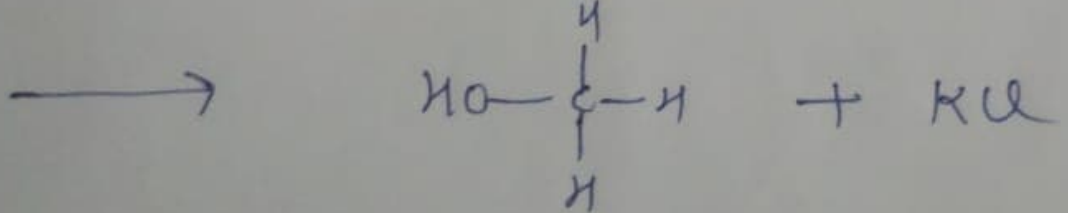




T. S

Sp^2

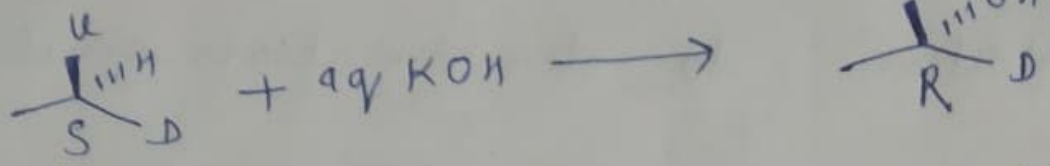
Trigonal bipyramidal



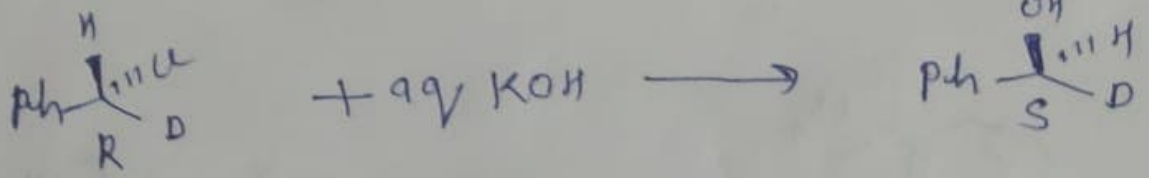
$$R = [CH_3Cl]^1\ [OH^-]^1$$

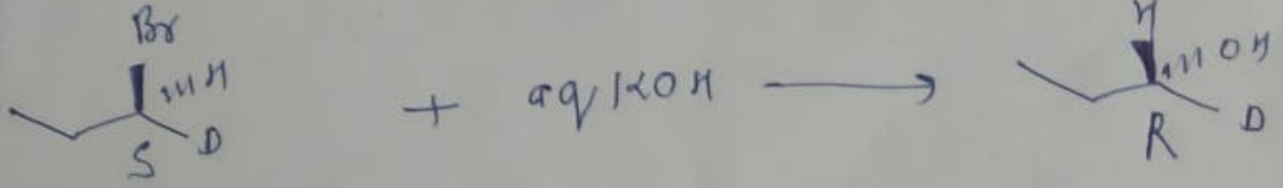
S.O.R

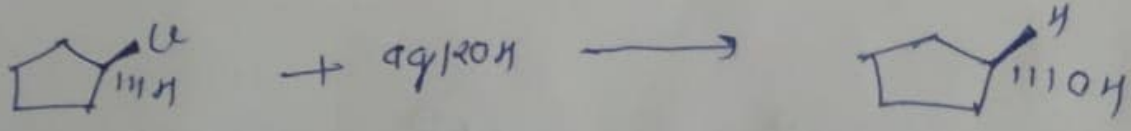
Examples :-

1) 

Inversion of configuration takes place

2) 

3) 

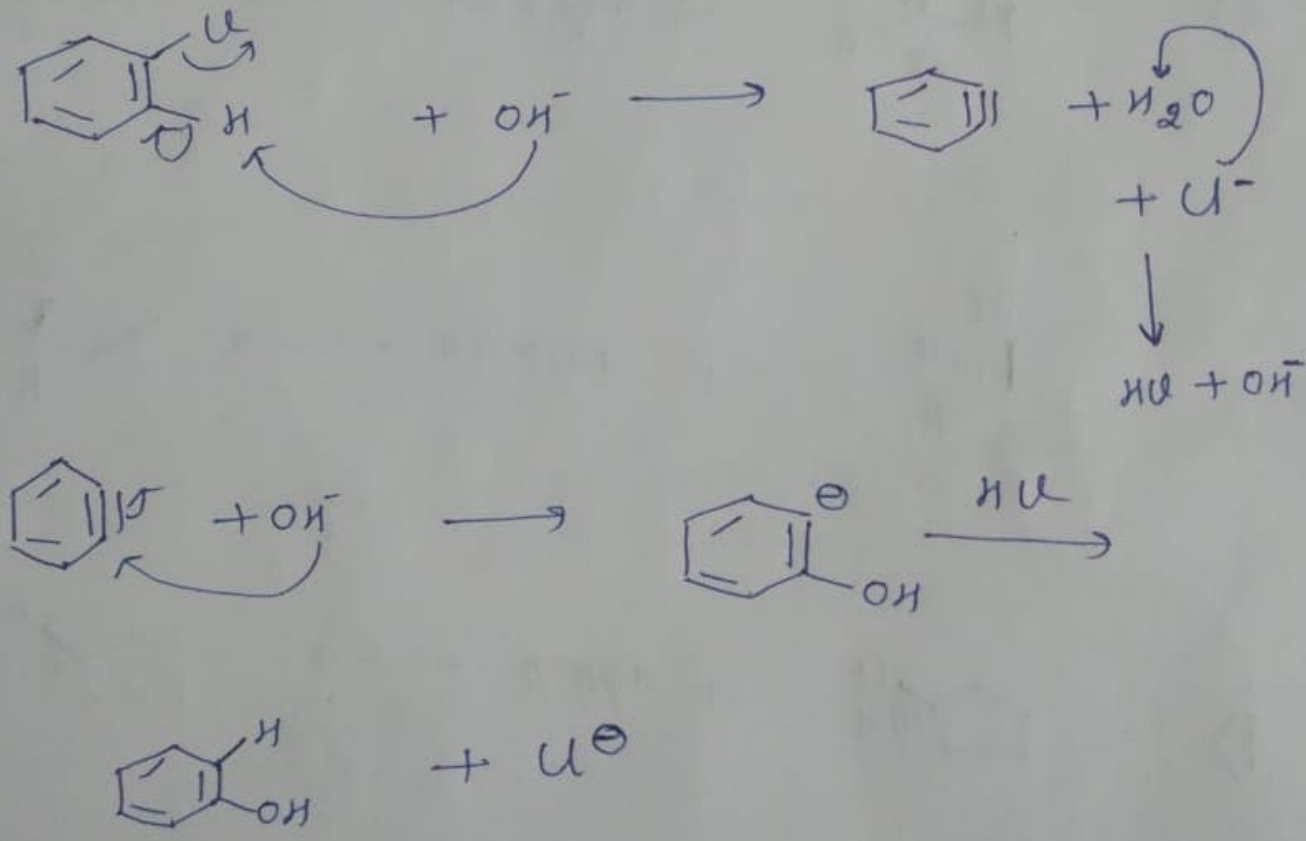
4) 

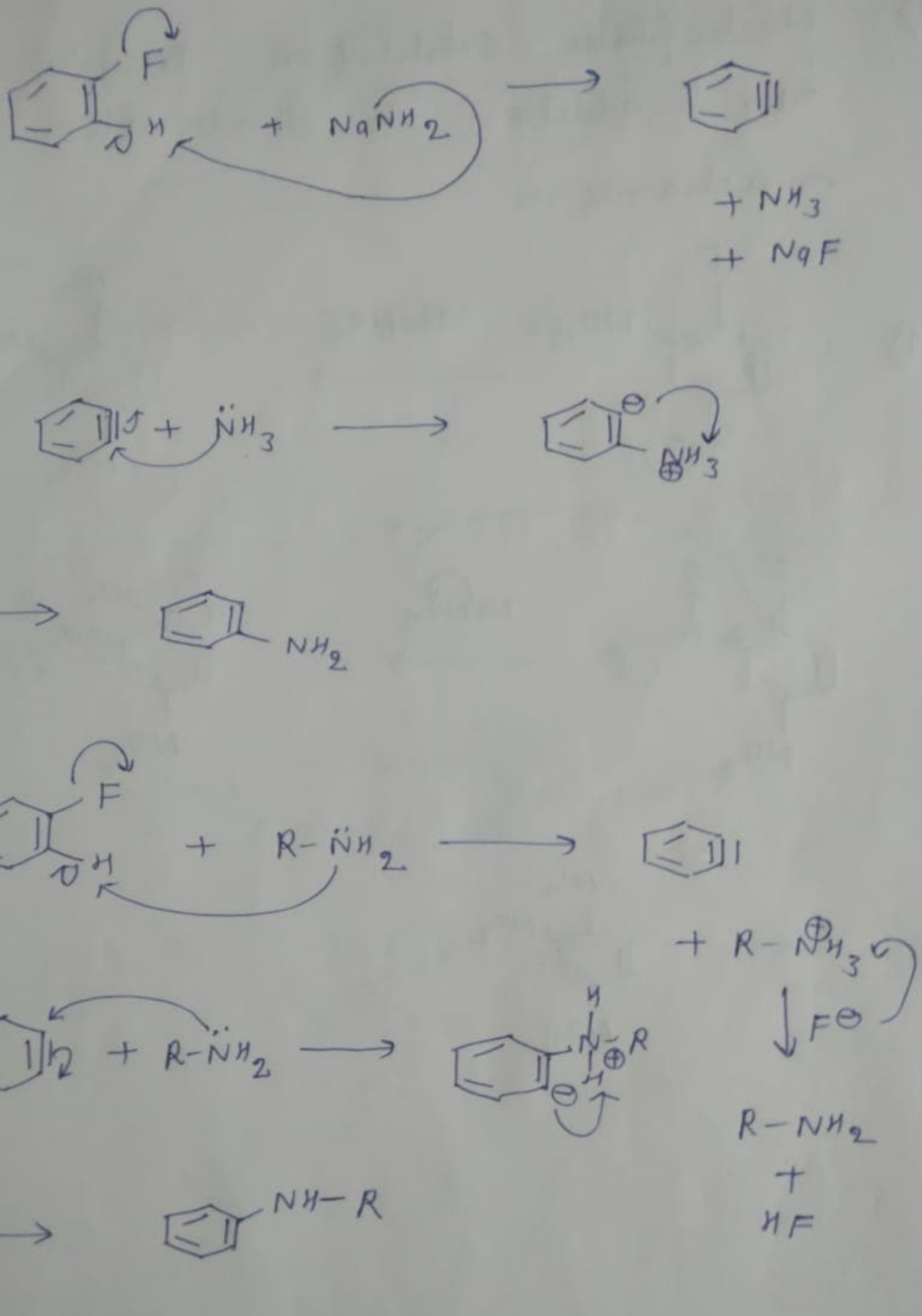
Aromatic Nucleophilic Substitution

1) Nucleophilic Substitution Proceeded via elimination to addition mechanism

2) Nucleophic substitution praceded via addition to elimination mechanism

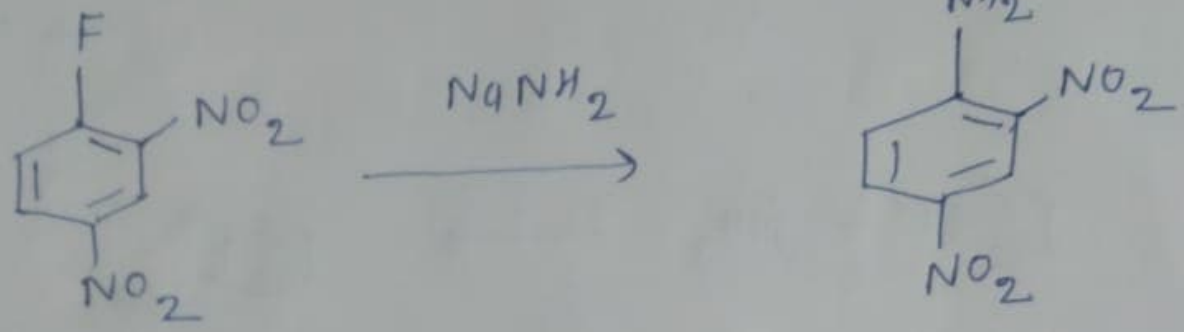
1) Nucleophilic substitution proceeded via elimination to addition mechanism

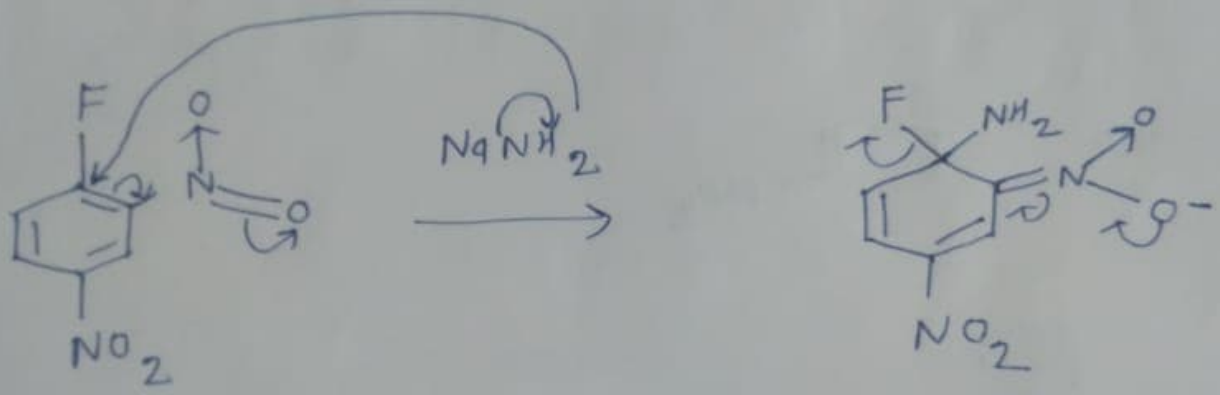


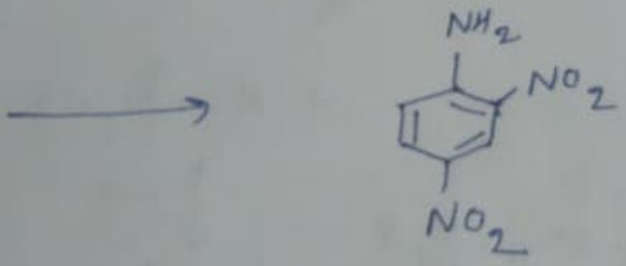

F
H
+ NaNH2
+ NH3
+ NaF
NH3
NH2
R-NH2
+ R-NH3
F⊖
R-NH2
+
HF
NH-R

2) Nucleophilic Substitution Proceeded via addition to elimination mechanism.

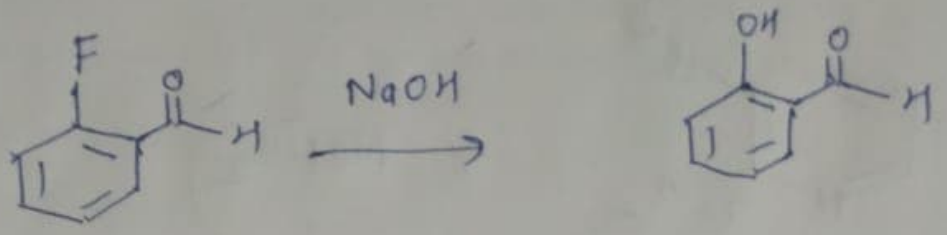
1)

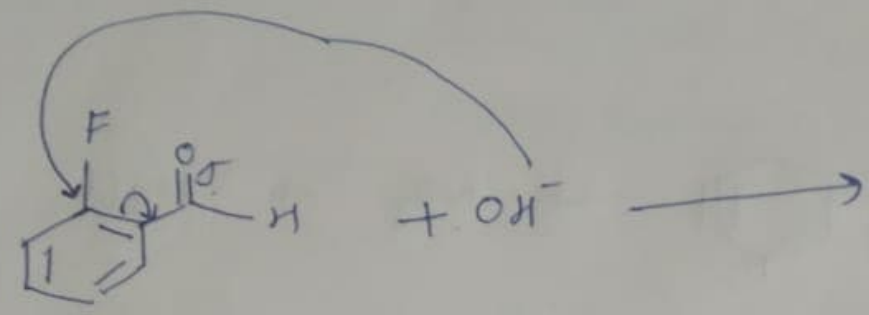




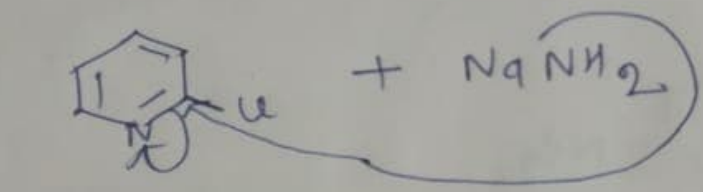


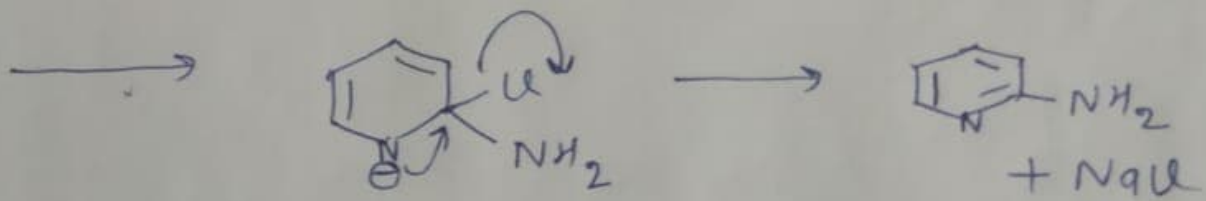
2)

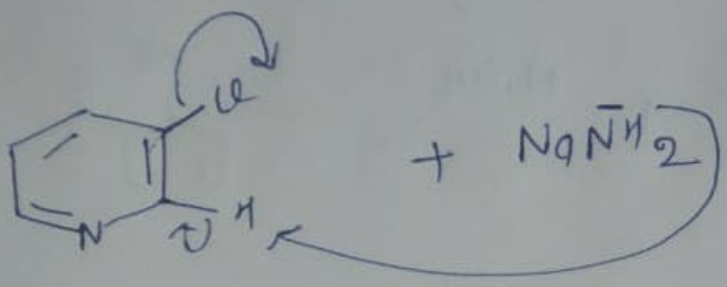


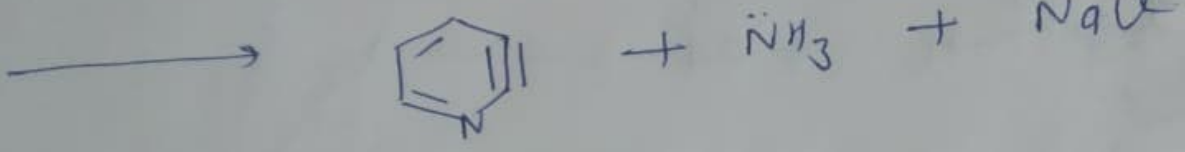


3)






+ NaNH2

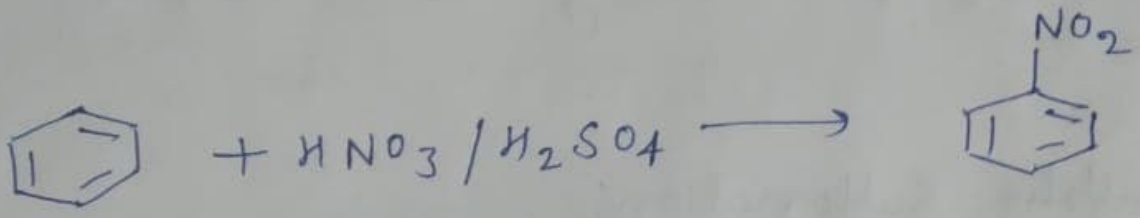

+ NH3 + NaCl


NH3

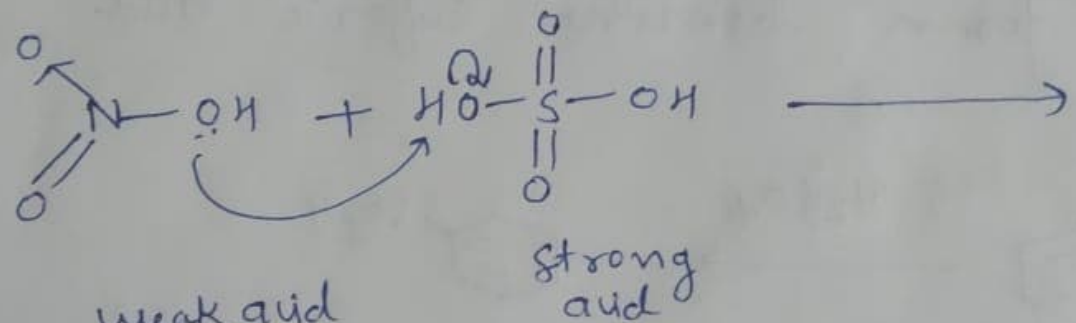

NH2

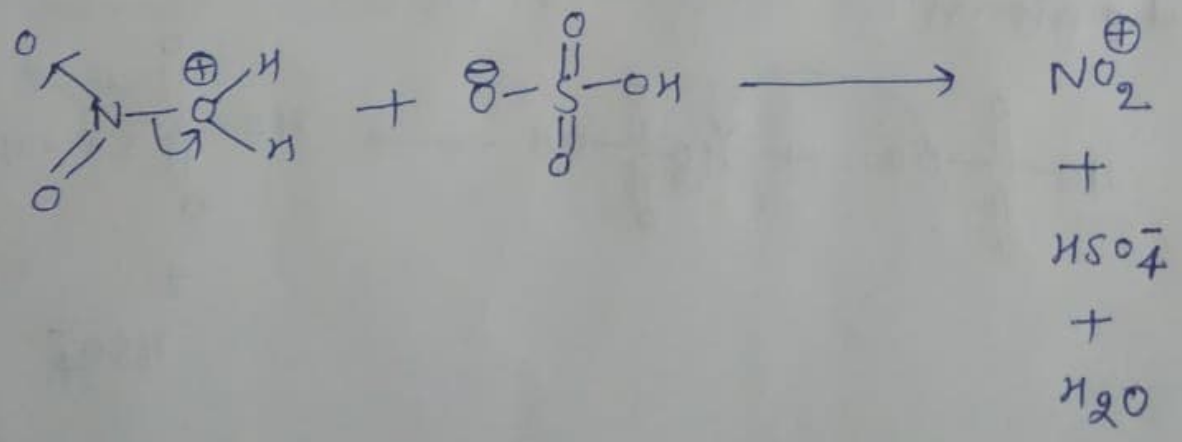
Aromatic electrophilic Substitution

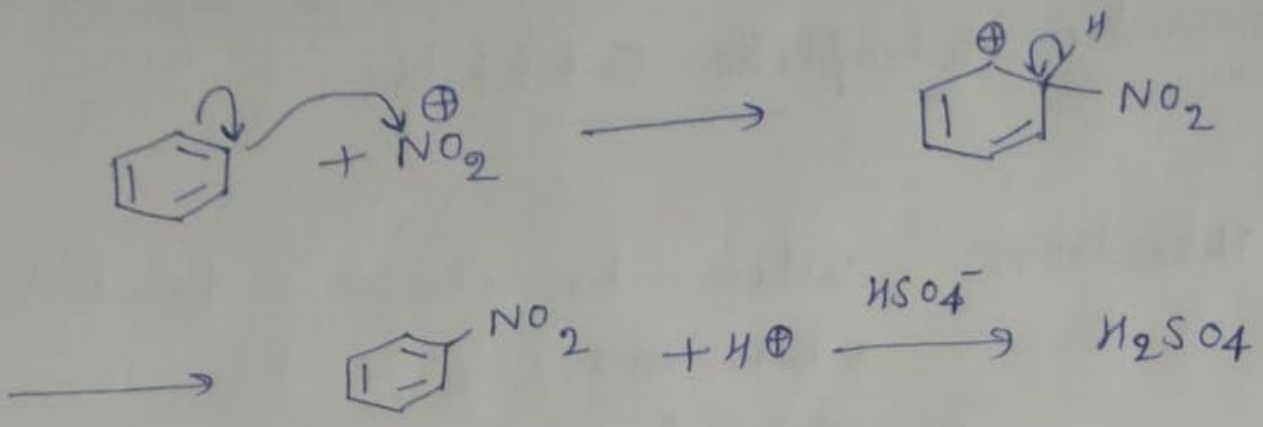
1) Nitration: When benzene is treated with HNO_3 / H_2SO_4 to give nitrobenzene.



Mechanism:



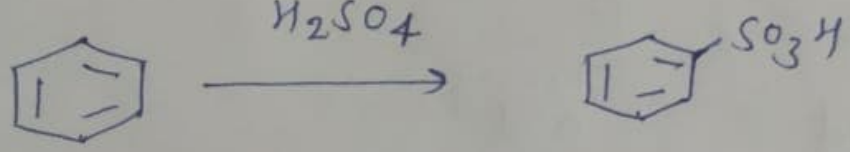




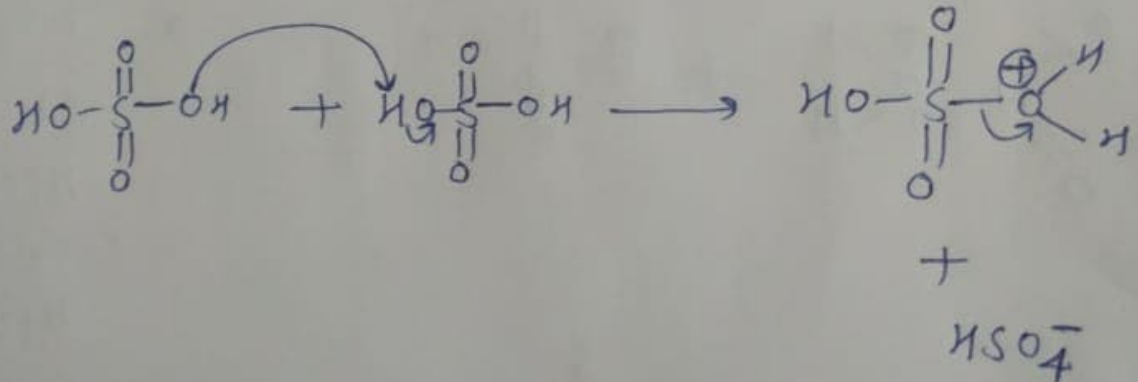
Here H_2SO_4 working as a catalyst.

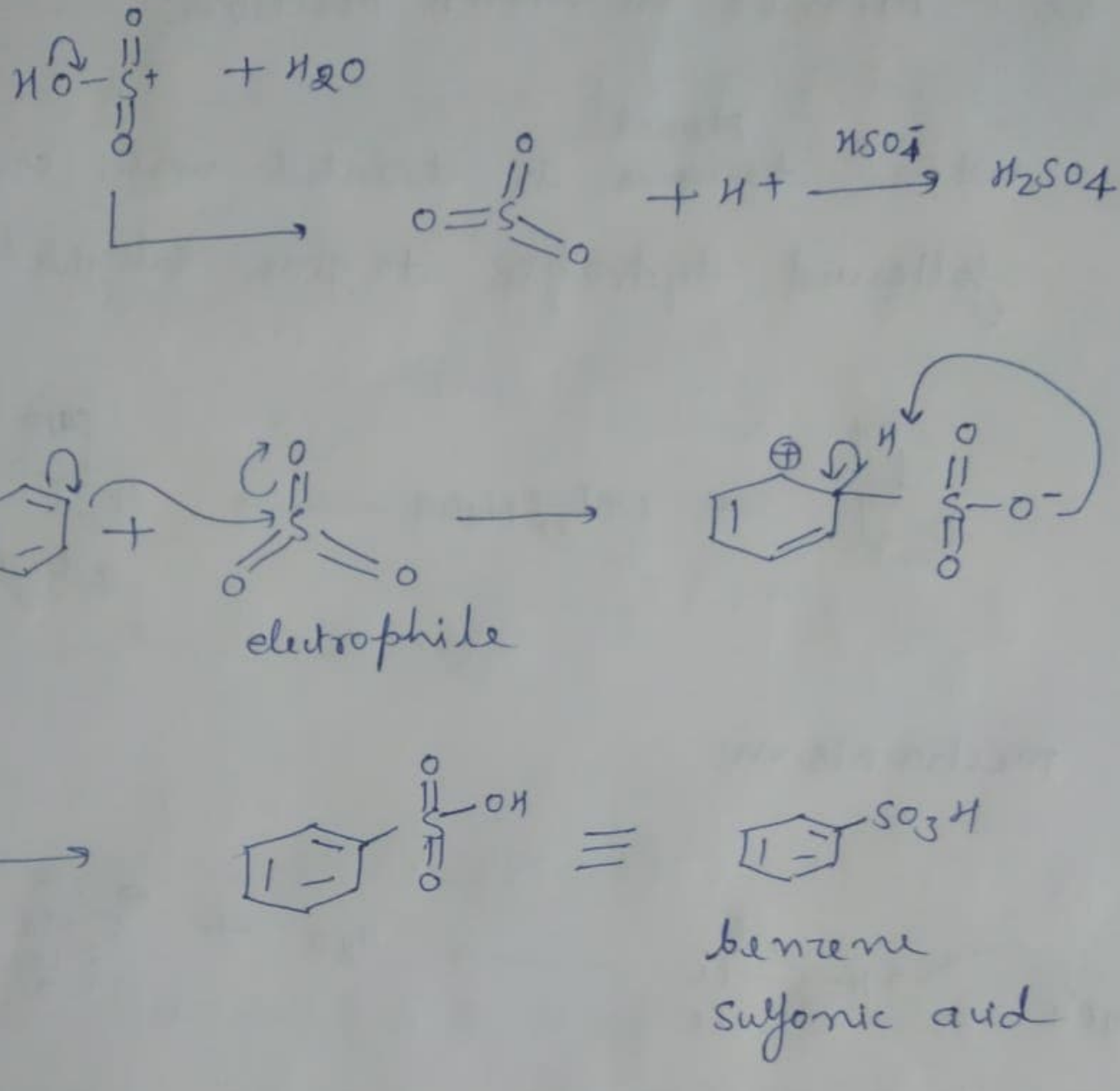
2) ~~Sulpho~~ Sulfonation:

When benzene is treated with H_2SO_4 to form benzene sulfonic acid.



Mechanism:

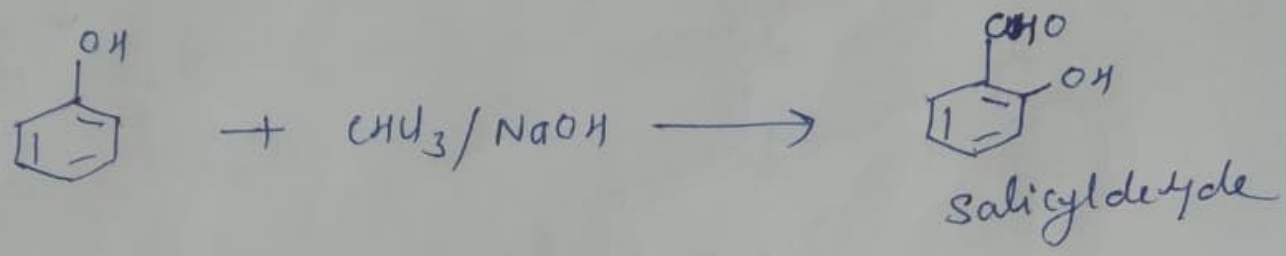




B) Reimer ~~Reimer~~ Tiemann Reaction:-

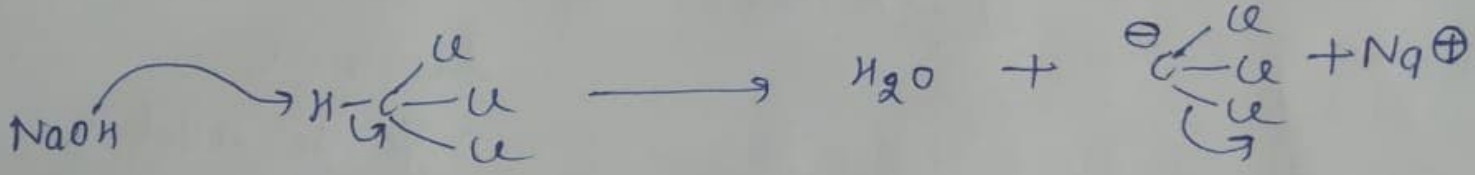
3) Reimer Tiemann Reaction:

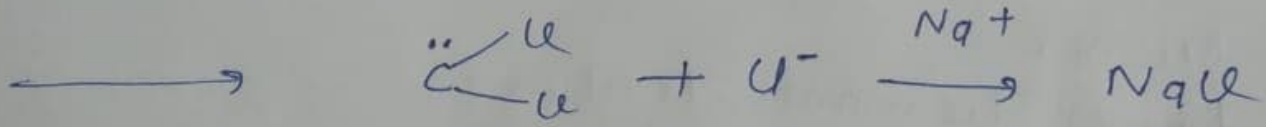
When ~~benzene~~ phenol is treated with $CHCl_3/NaOH$ followed hydrolysis to give salicylaldehyde.



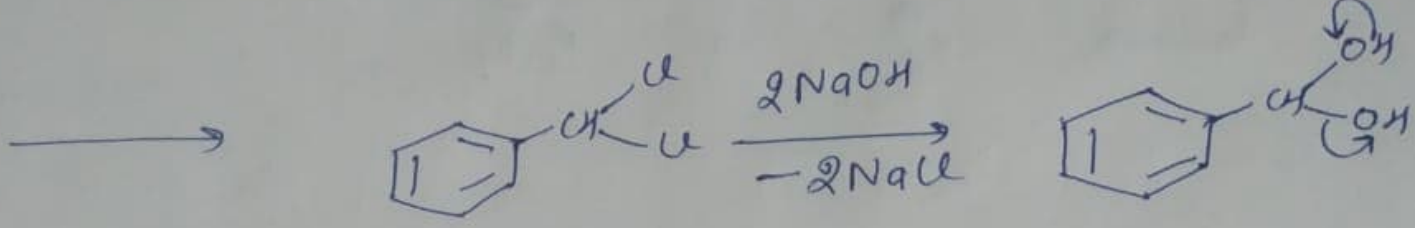
salicylaldehyde

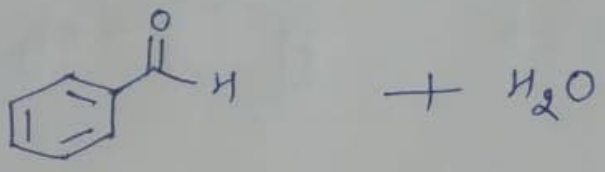
Mechanism:





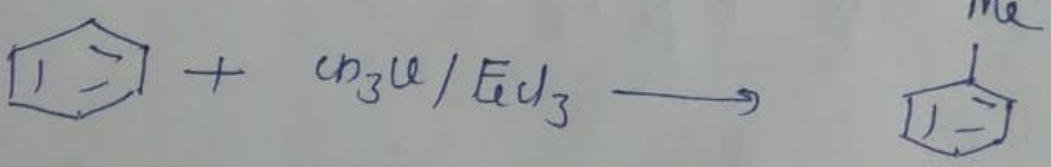
dichloro carbene
electrophile

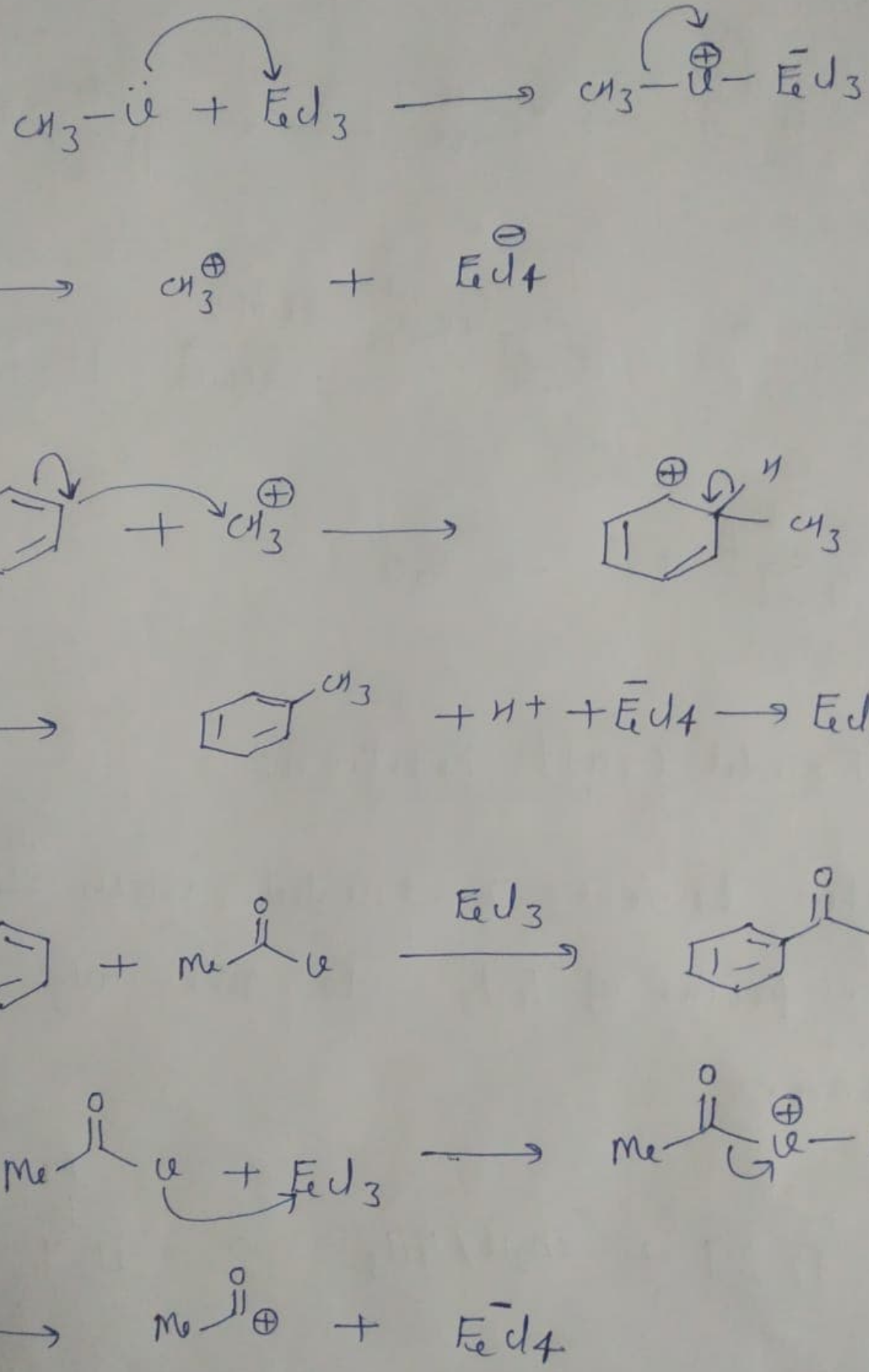


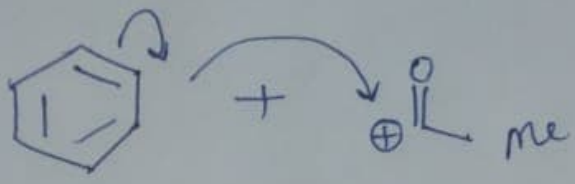


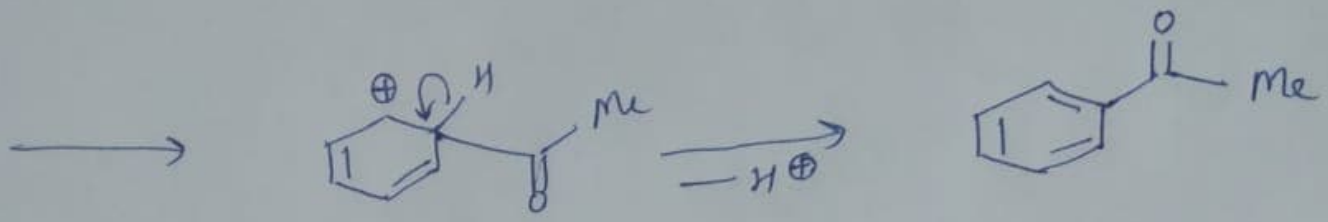
4) Friedel Crayt Reaction:

when benzene is treated with alkyl halide ~~Cl_2~~ in presence of $FeCl_3$ to give alkyl benzene









$$FeCl_4^- + H^{\oplus} \longrightarrow FeCl_3 + HCl$$