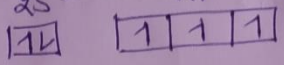
Nitrene:

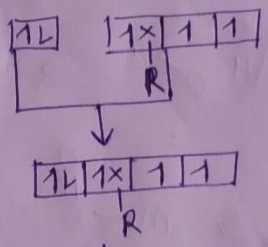
It is electron efficient and has 6 e^- in octet. Nitrene is formed as intermediate in many reactions.

R-N: K L
2 5

$1s^2\ 2s^2\ 2p^3$

$2s^2$ $2p^3$

g.s 

E.S 

Sp

12P + 1BP + 2 unpaired e^-

Linear (shape)

180^0 (Angle)

Formation: ~~When chloroform is treated with NaOH/KOH,~~

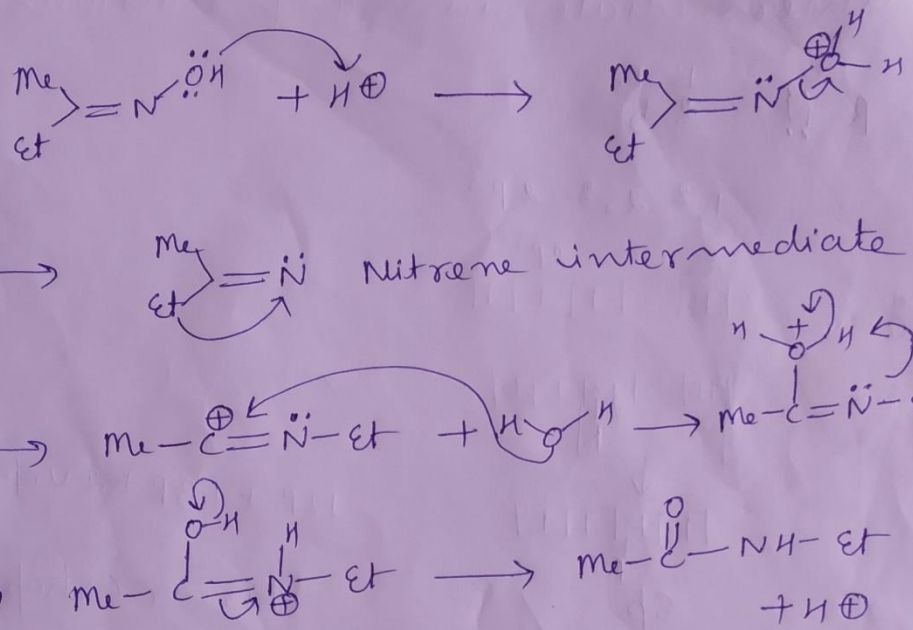
~~Nitr~~

When di

Formation of Nitrene :-

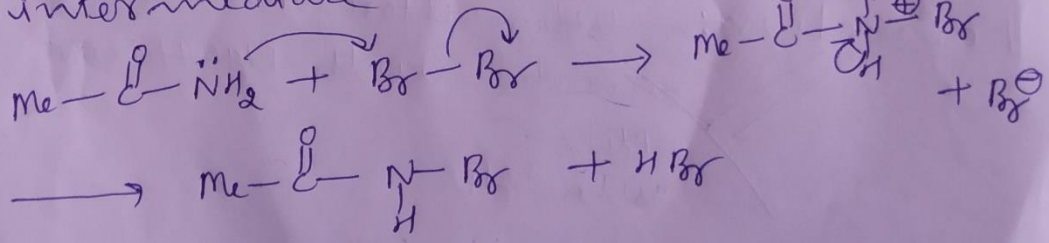
! Beckmann Rearrangement:

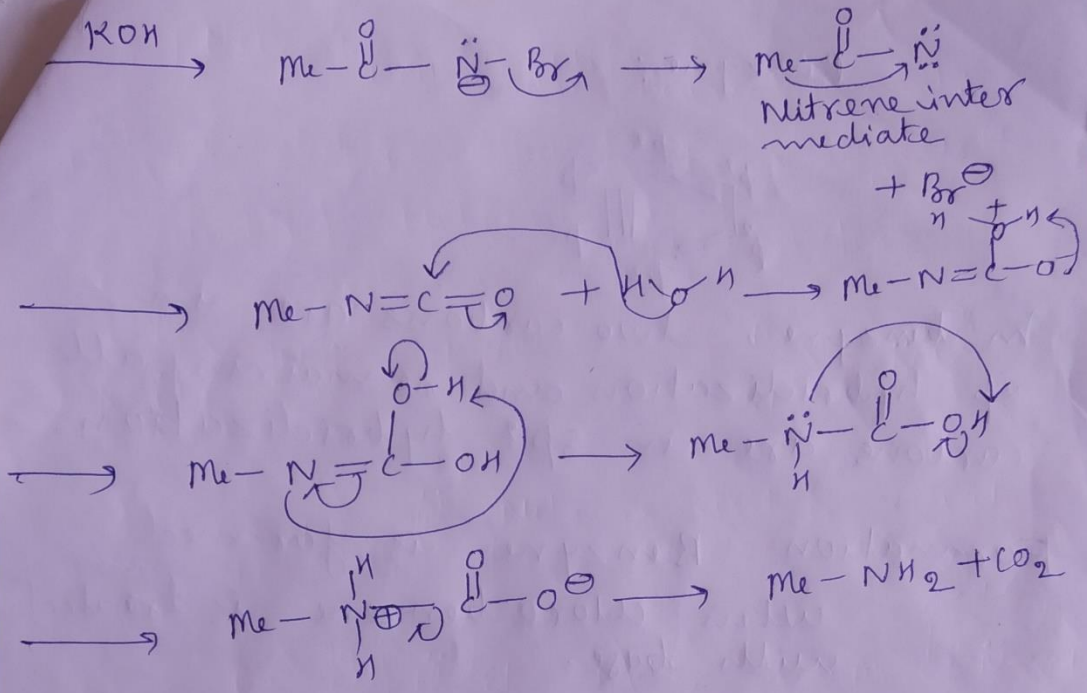
1) When ketoxime is treated with acid to give nitrene intermediate



2) Hofmann Rearrangement :-

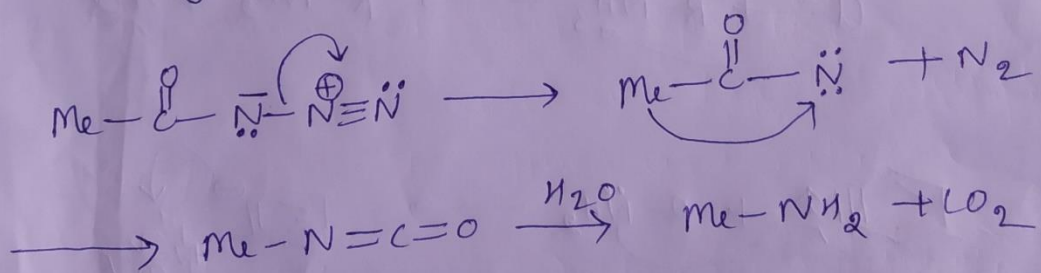
When acetamide is treated with Br_2/KOH to give ~~iso~~ nitrene intermediate





3) Curtius Rearrangement :-

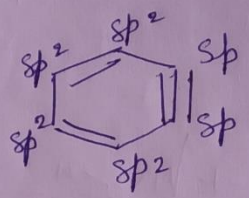
When acid azide is ~~treated~~ heated to form nitrene intermediate.



Examples of Nitrene intermediate

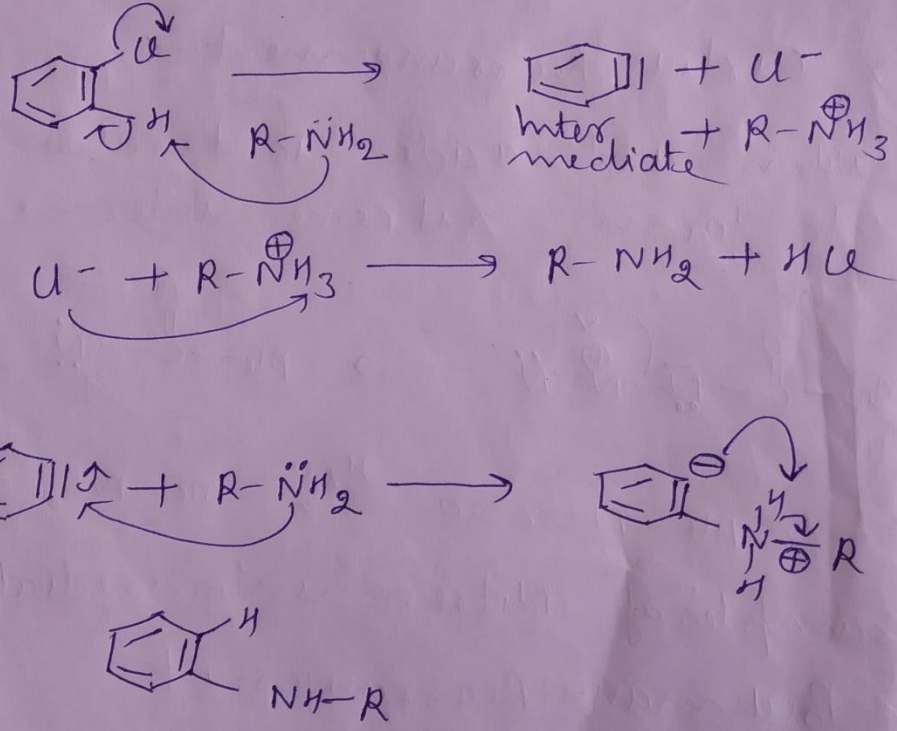
1) Beckmann Rearrangement
2) Hofmann "
3) Curtius "
4) Schmidt "

Benzyne:



In benzyne, two carbons are in sp hybridization and remaining all carbons are in sp^2 hybridization.

Formation: Benzyne is formed when chlorobenzene is treated with base.



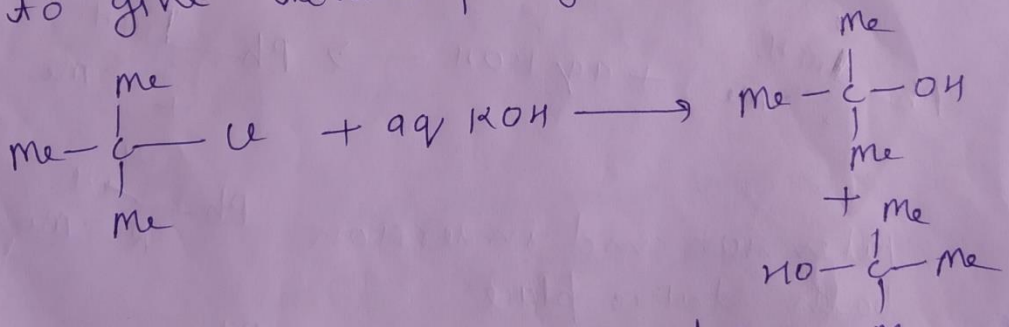
Nucleophilic Substitution

Replacement of group or atom by nucleophile is known as nucleophilic substitution. It is of two types.

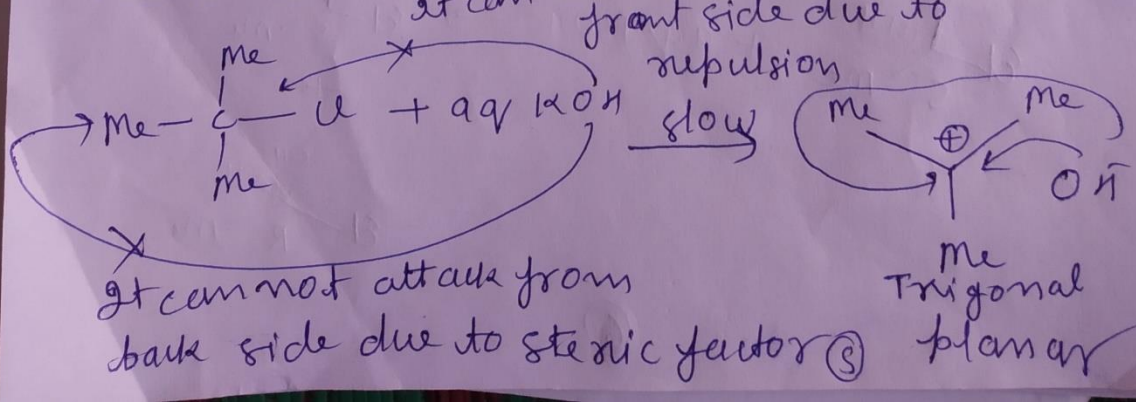
1) S_N1 and 2) S_N2

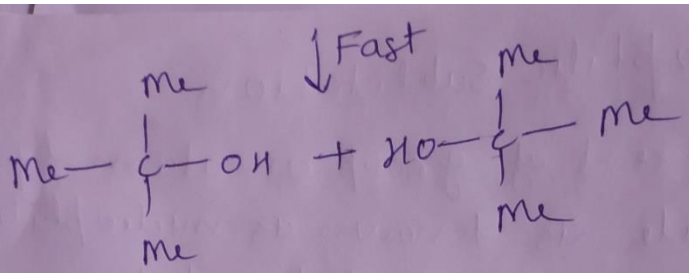
1) S_N1 (Unimolecular nucleophilic substitution)

When tertiary alkyl halide is treated with aq KOH or aq NaOH to give tertiary alkyl ~~alc~~ alcohol.



Mechanism:-



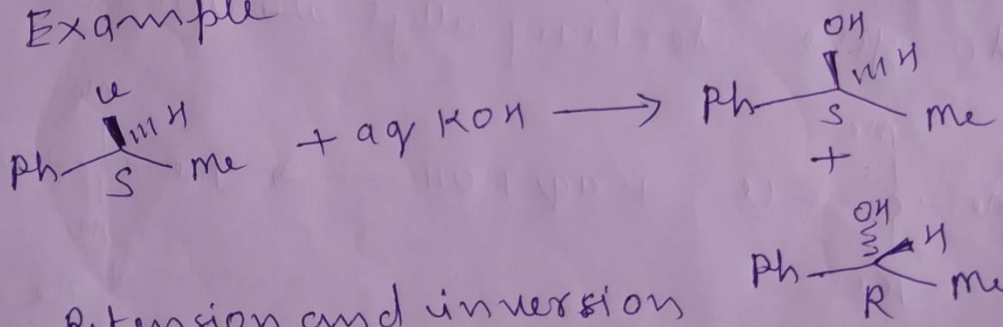


Slow step is rate determine step as only conc of alkyl halide participate in reaction. ~~This step~~ This is first order reaction.

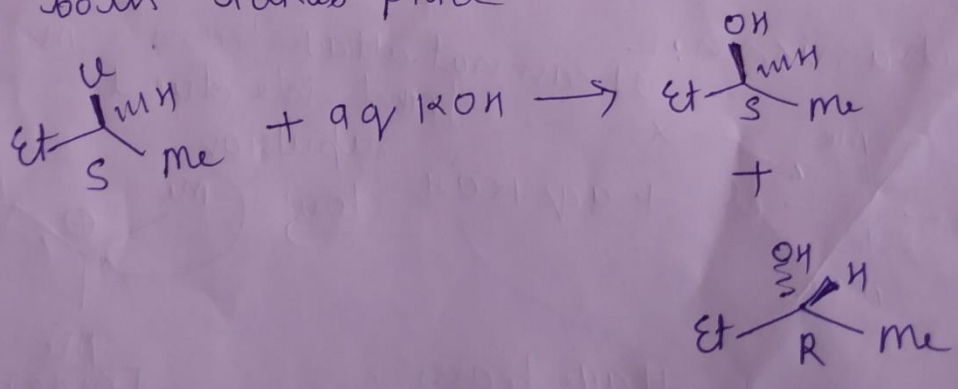
$$\text{Rate} = [Me_3C{-}Cl]^1 [OH^-]^0$$

F.O.R

Example



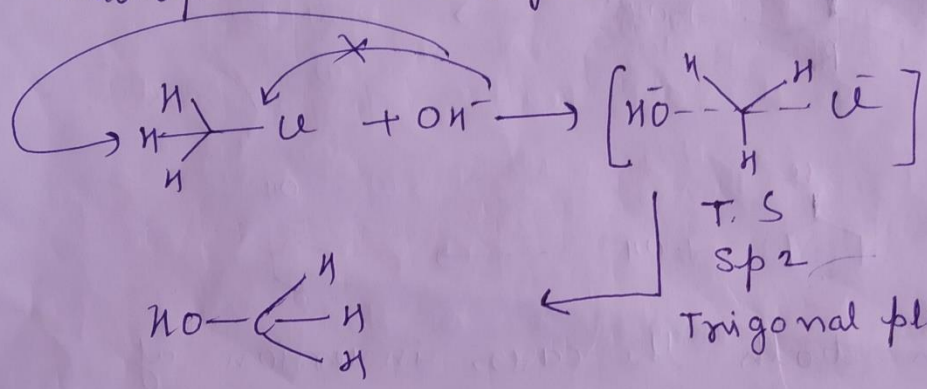
Retension and inversion both takes place



SN^2 (Bimolecular nucleophilic Substitution reaction)

Generaly Primary alkyl halide gives SN^2 reaction.

Nucleophile attacks from back side

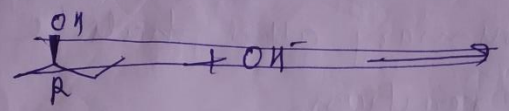


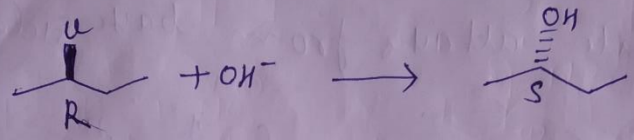
Inversion of configuration takes place.

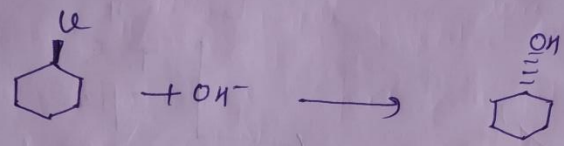
Rate of Reaction depends upon conc of both reactant and product

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

S.O.R



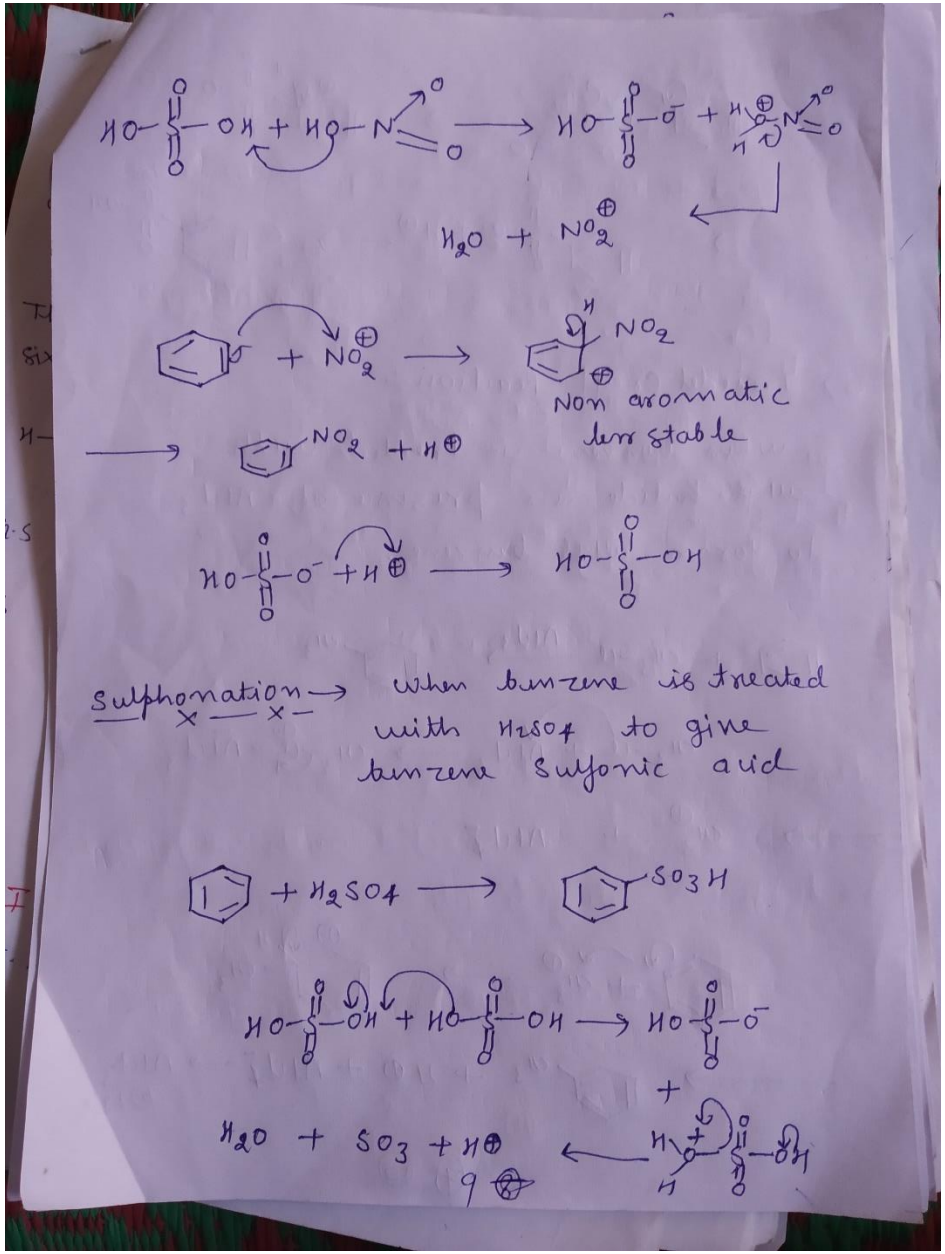


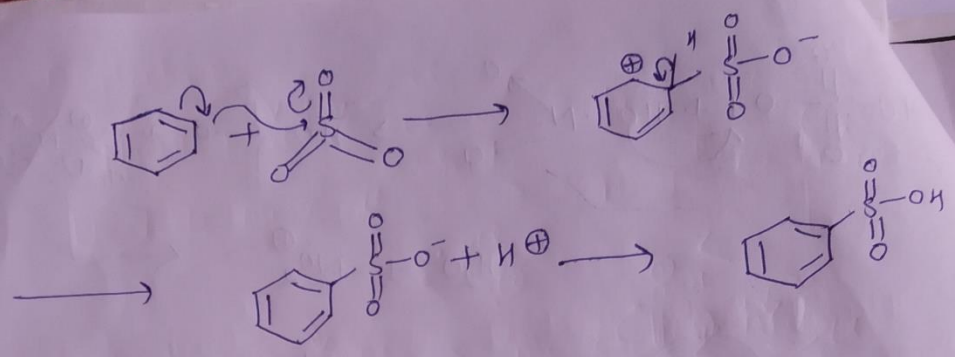


In both the cases, inversion of configuration takes place.

Aromatic electrophilic Substitution Reaction :-
The replacement of H hydrogen atoms by electrophile is knows as electrophilic substitution reaction.

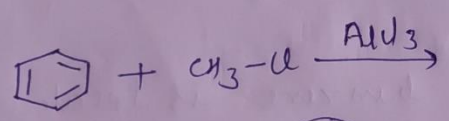
1) Nitration :- when benzene is treated with HNO_3 / H_2SO_4 to give nitro benzene.

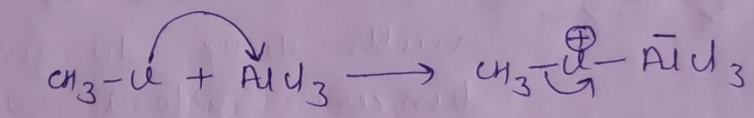

Non aromatic
less stable
Sulphonation → When benzene is treated with H_2SO_4 to give benzene sulfonic acid

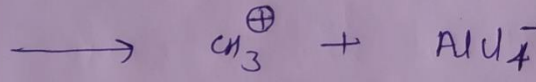


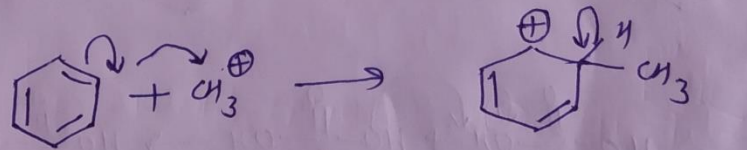
3) Friedel Craft Reaction :-

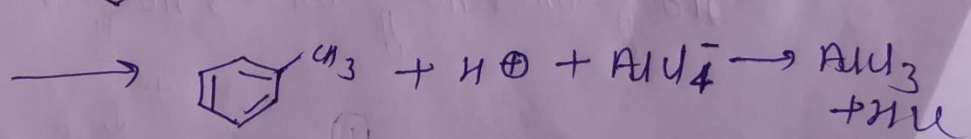
when benzene is treated with alkyl halide in presence of $AlCl_3$ to form alkyl benzene.

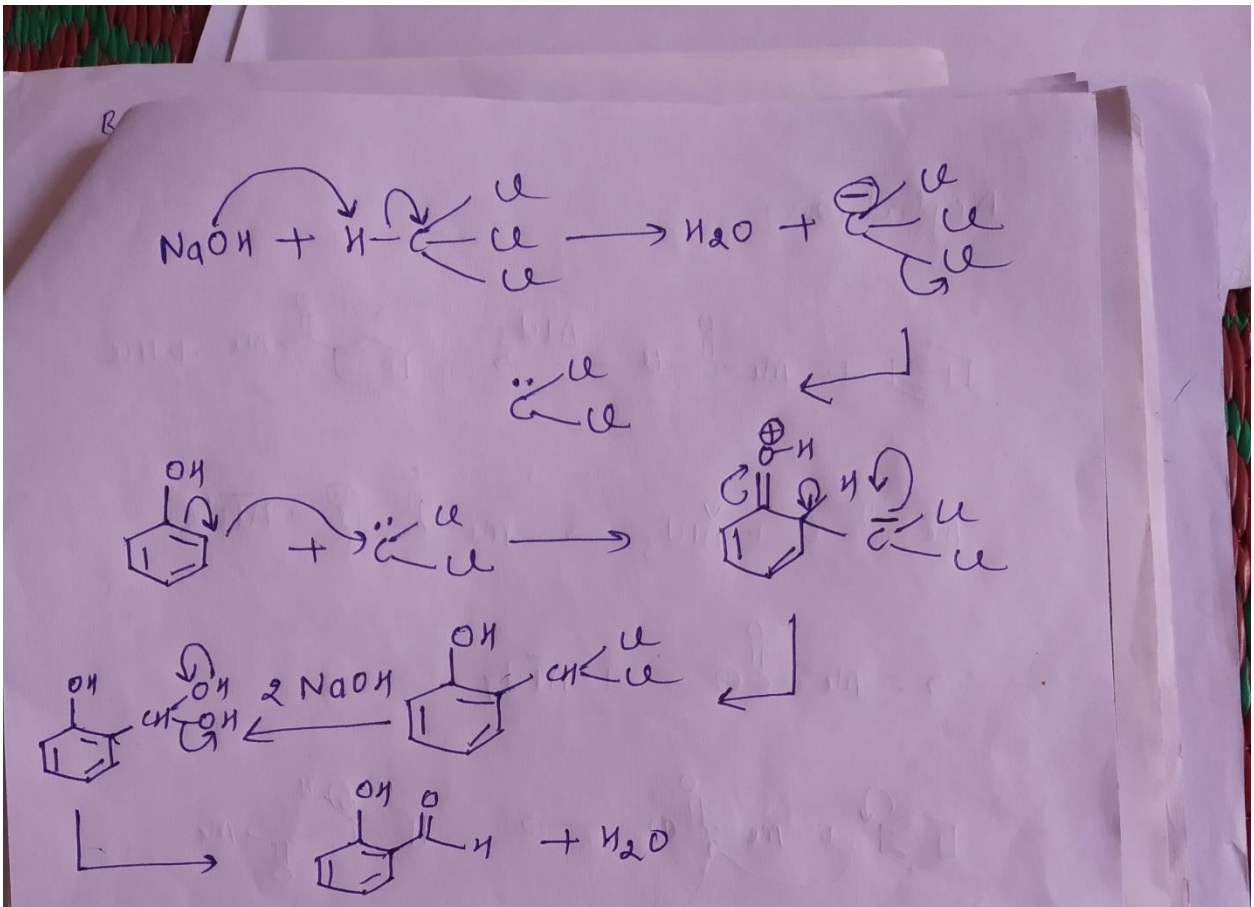




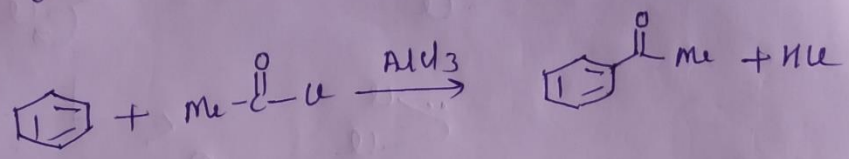


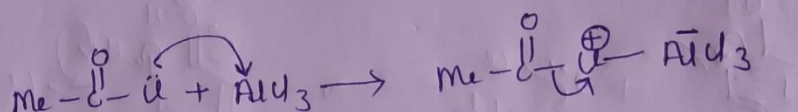


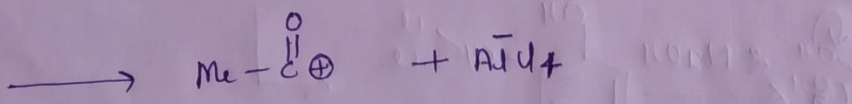


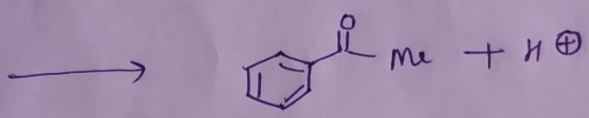

NaOH + H
H2O +
OH
+
OH
CH
2 NaOH
OH
H
+ H2O

Acylation :-



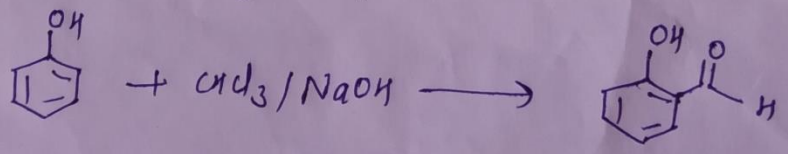






Remer Tiemann Reaction :-

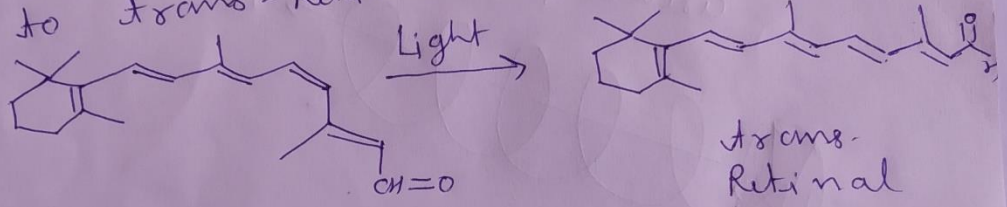
When ~~benzene~~ phenol is treated with $CHCl_3$ / NaOH to give Salicyldehyde.



Tech

Chemistry of Vision

Light strikes the eye and does some thing in the eye, and the brain receives a signal that something is there, The vision is possible because light strikes and carries out direct and uncomplicated purely chemical transformation. In this reaction, cis-Retinal is converted in to trans-Retinal.



Circular Dichroism

Circular ~~Dicr~~ dichroism an absorption spectroscopy, uses circularly polarised light to investigate structural aspects of optically active chiral media. It is mostly used to study biological molecules, their structure and interactions with metals and other ~~molecule~~ molecule