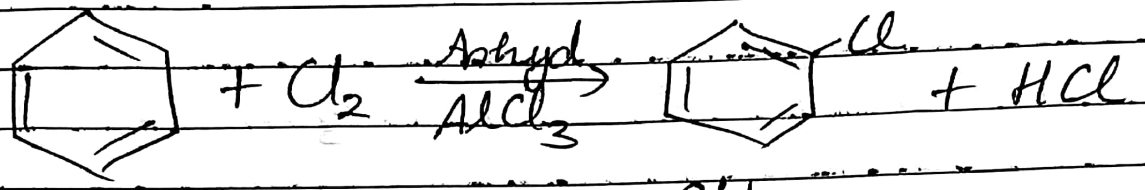
# Preparation of Haloarenes-1

(i) From hydrocarbons :- Halogenation by Electrophilic Substitution




Chloro benzene

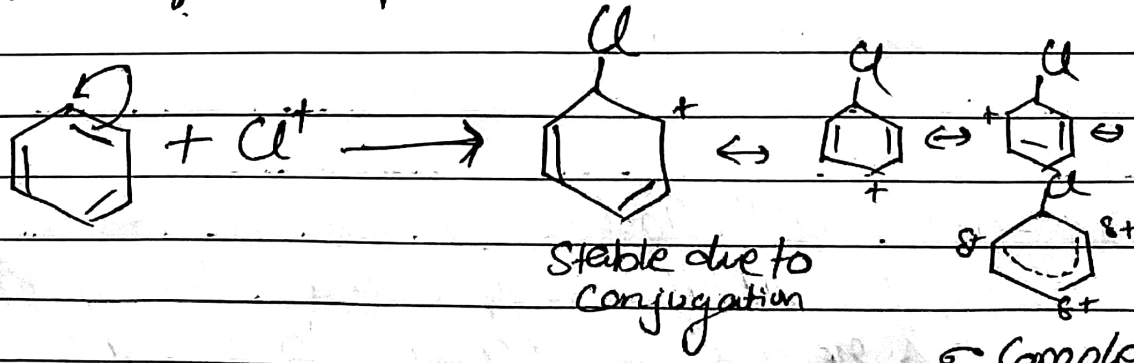
Mechanism:

① Generation of Electrophile

$Cl_2 + AlCl_3 \longrightarrow AlCl_4^{\ominus} + Cl^{+}$

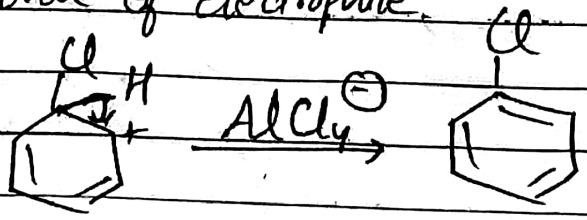
($AlCl_3$: Anhyd, Lewis Acid, e⁻ deficient; $Cl^{+}$: Electrophile, Chloronium ion)

② Attack of Electrophile

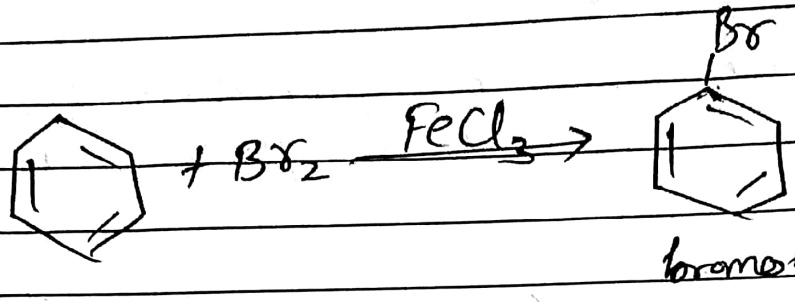



Complex Reaction Intermediate

③ Removal of Electrophile



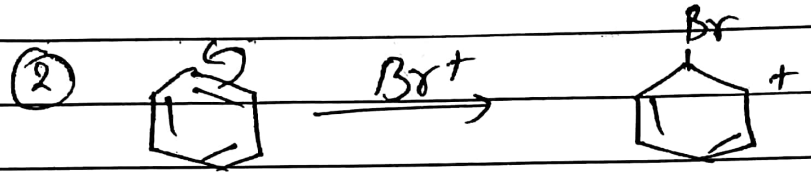
Lewis Acid: $AlCl_3 | AlBr_3 | FeCl_3 | ZnCl_2 | BF_3 | Fe$

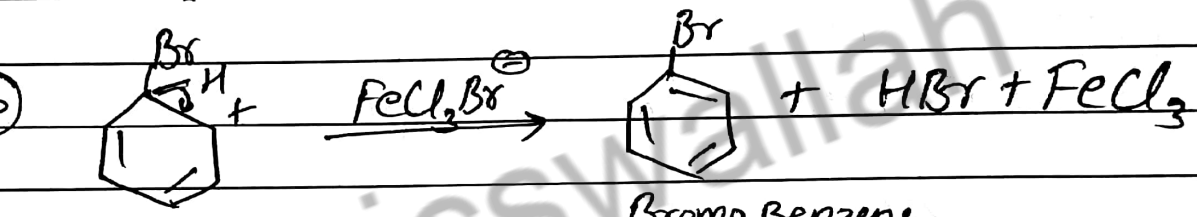



bromobenzene

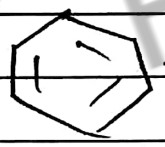
Mechanism

① $Br_2 + FeCl_3 \longrightarrow FeCl_3Br^{\ominus} + Br^{+}$



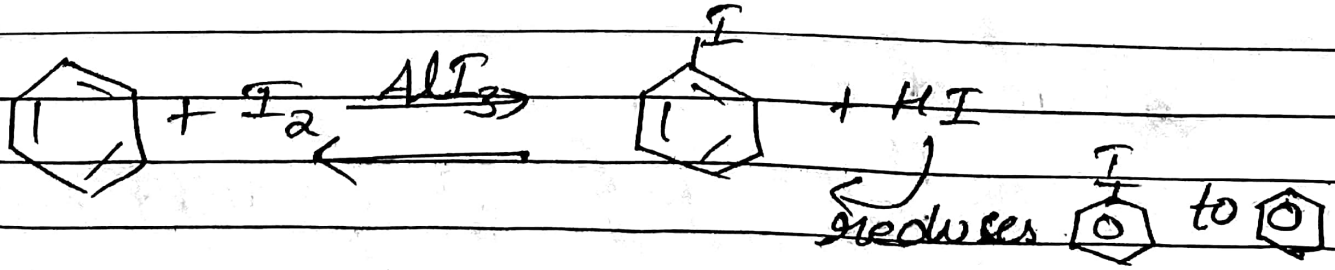




Bromo Benzene

Q)  $+ Br_2 \xrightarrow{AlCl_3}$ ??

Answer: 

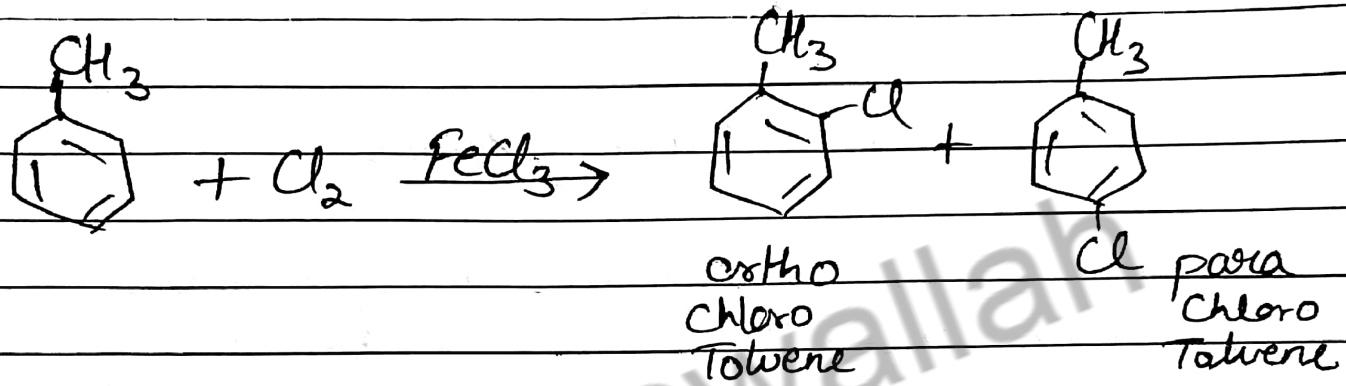

⇒ Reaction with Iodine is reversible due to formation of HI, which is very strong Reducing Agent & reduce Iodobenzene to benzene



So we use Strong oxidising Agents such as conc $HNO_3$ or $HIO_4$ which oxidises HI to $I_2$

$$2HI \xrightarrow[\text{or } HNO_3]{HIO_4} I_2 + H_2O$$

$$[O]$$

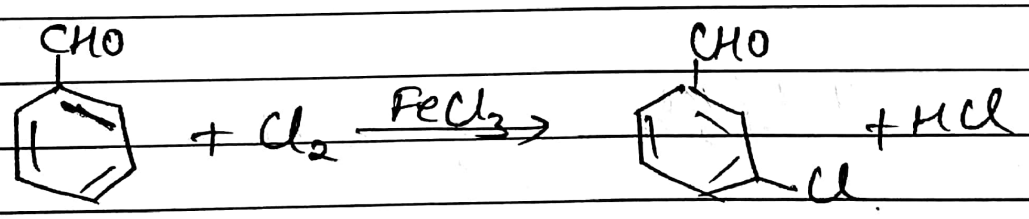
Q) 


ortho Chloro Toluene

para Chloro Toluene

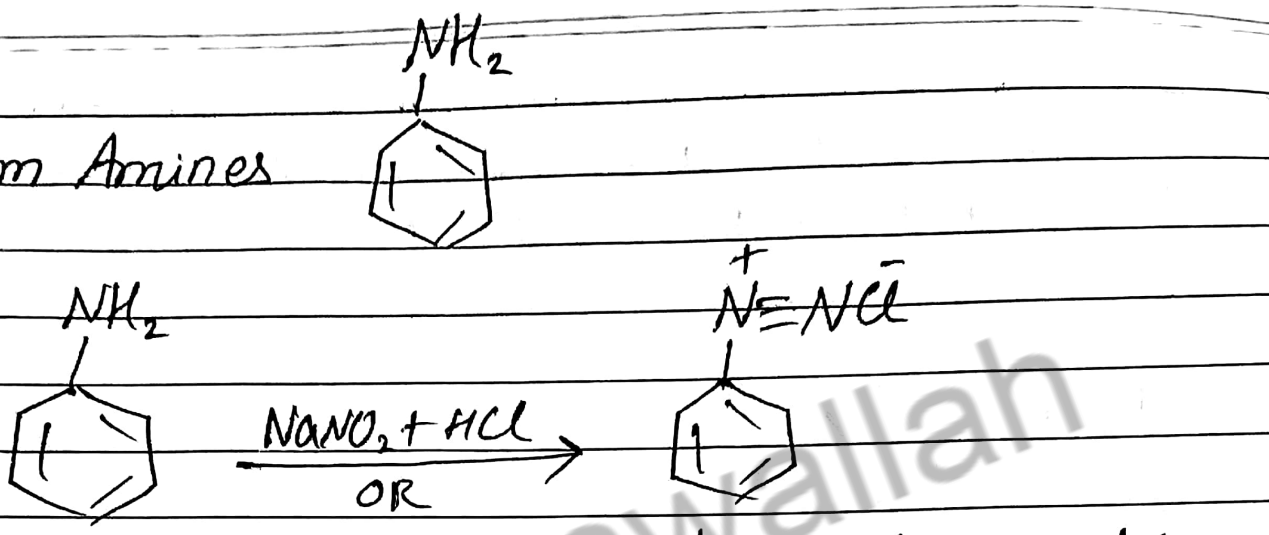
(as $CH_3$ is +I group & hence O-P directing)

(detail video → Reaction Mechanism of physicswallah O-P & meta directing groups)

Q) 


meta chloro benzaldehyde

(ii) From Amines

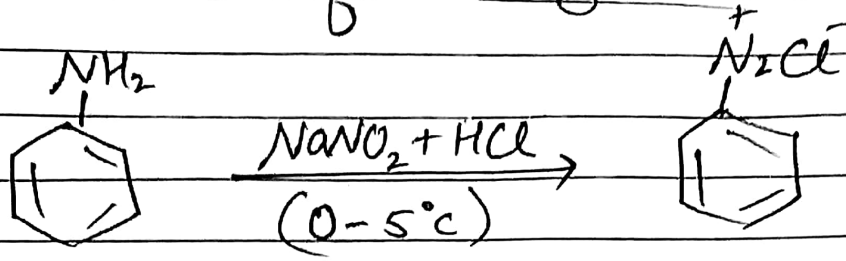



Diazotisation of Amine

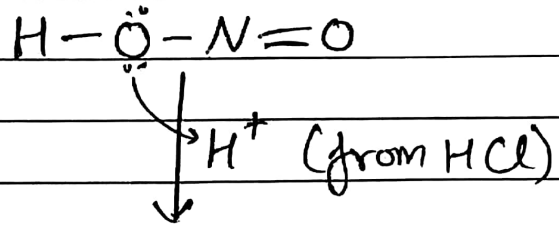
When primary (1°) Aromatic Amine reacts with $NaNO_2$ and HCl at (0-5°C), formation of diazonium salt of benzene takes place, this is known as diazotisation of benzene.

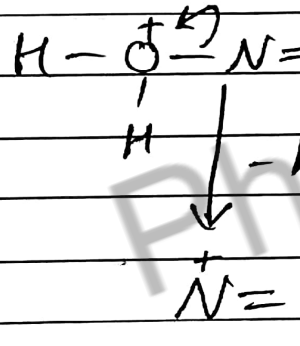
(detail mechanism in chapter 13 - Amines)

# Mechanism of Diazotization.

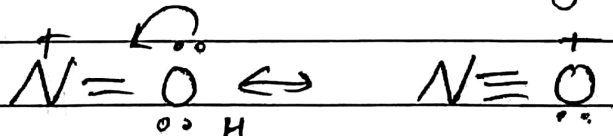


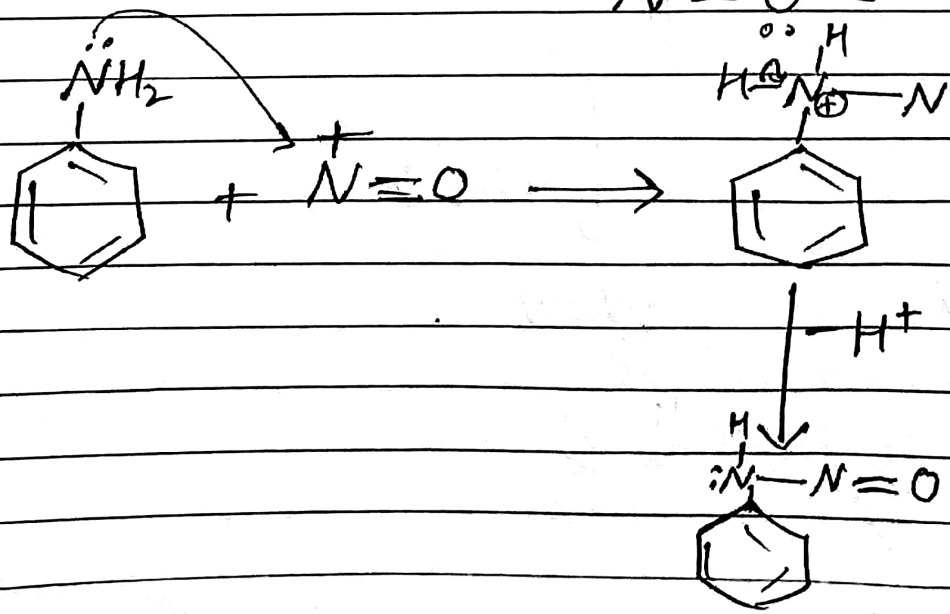

$$NaNO_2 + HCl \longrightarrow NaCl + HNO_2$$

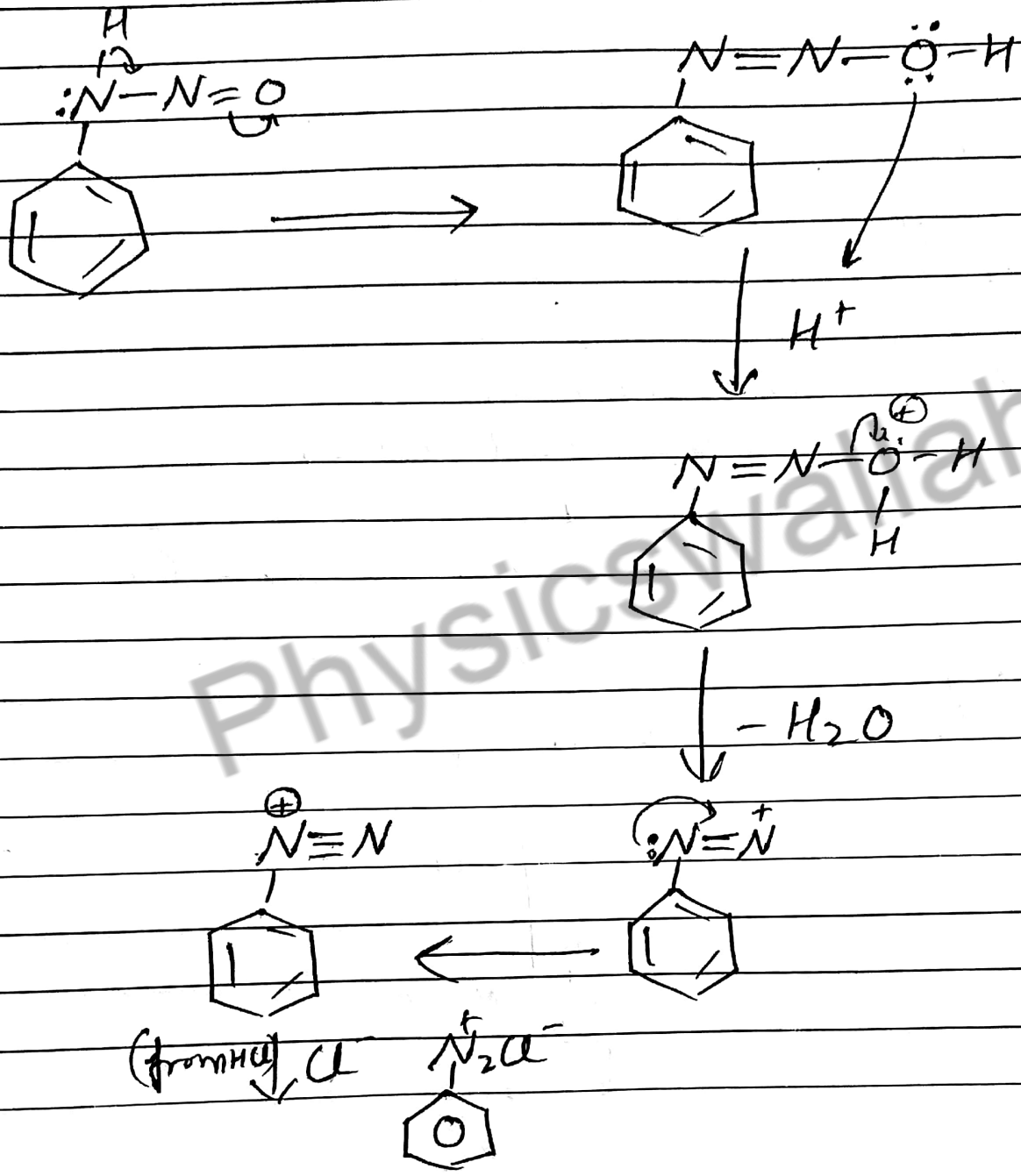


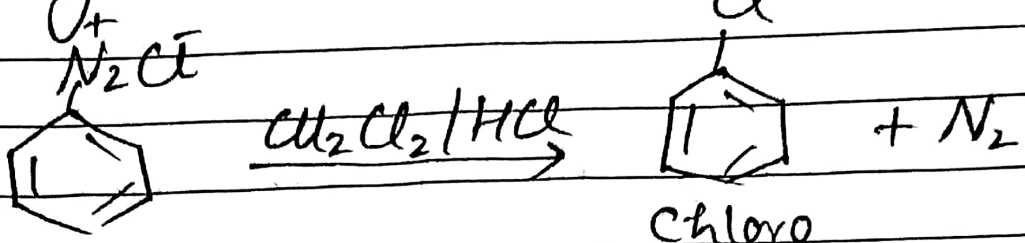

Nitrosonium ion
Stable due to back bonding



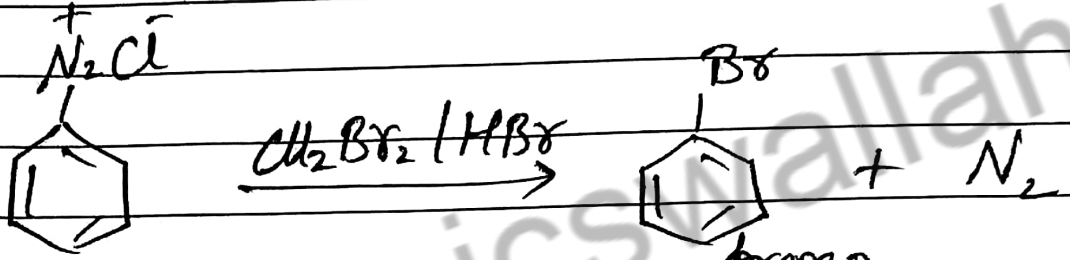





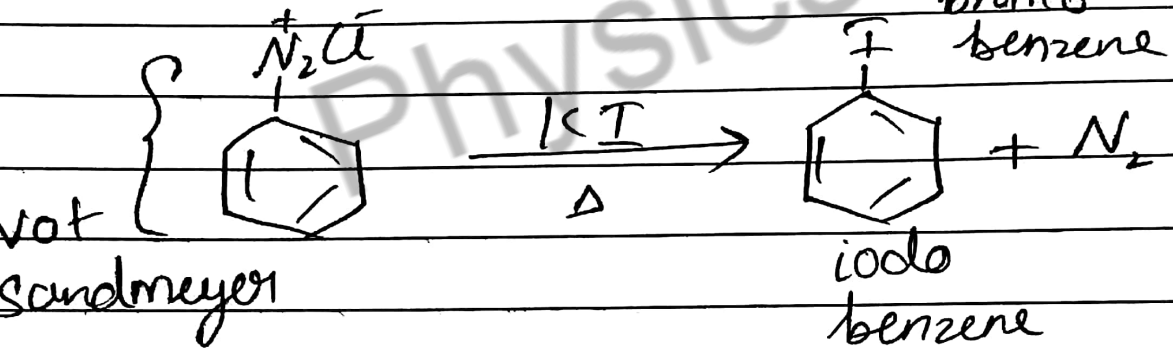
Sandmeyer Reaction




Chloro benzene



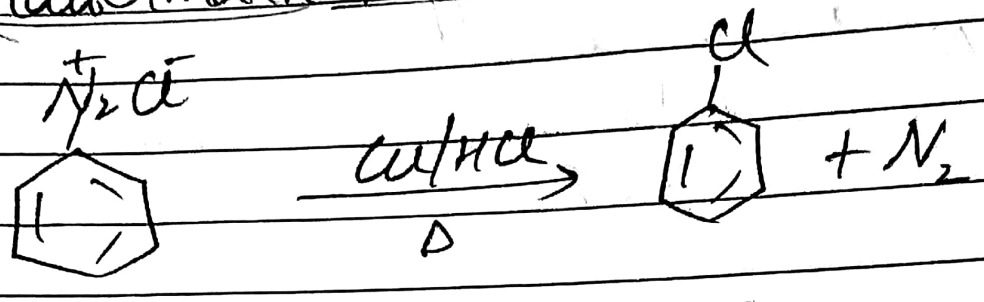

bromo benzene

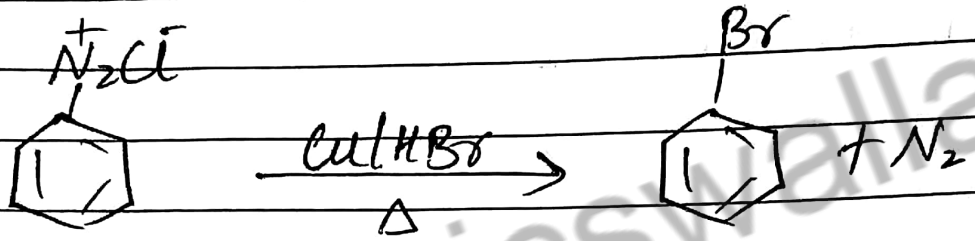



Not sandmeyer

iodo benzene

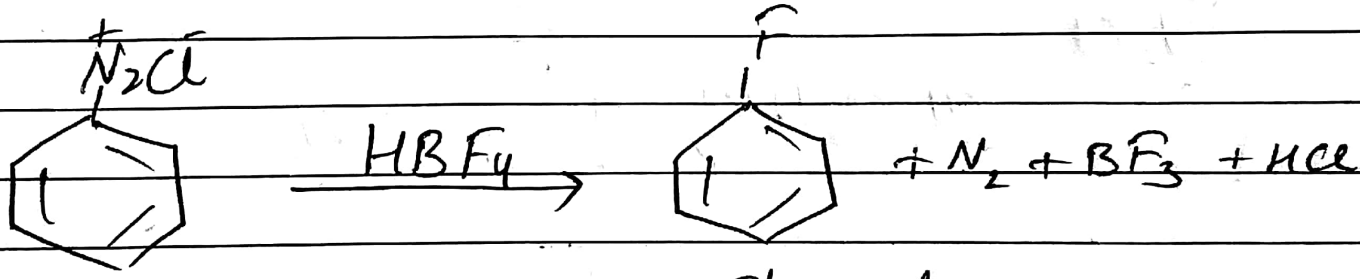
## Gattermann Reaction






## Balz-Schiemann Reaction




Fluoro Benzene