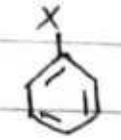
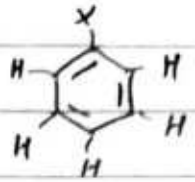
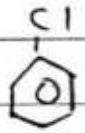
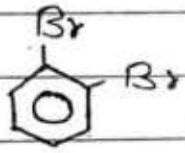
Unit:- Haloarene.

Haloarene:-  or  or  or C_6H_5X or $Ar-X$

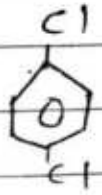
The organic compound in which halogen atom is directly attach to carbon atom of aeromatic ring is called ~~Aromal~~ Halbarene.



Chlorobenzene



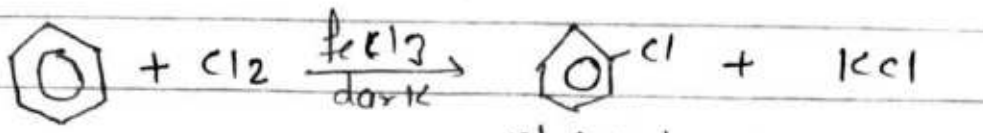
1,2-Di Bromobenzene. 1,3-Di-Iodobenzene.
O-DiBromobenzene. m-Di " "



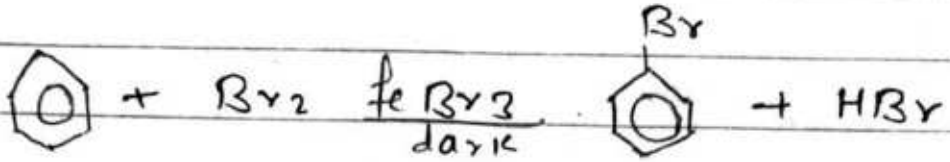
1,4-Dichlorobenzene.
p- " " "

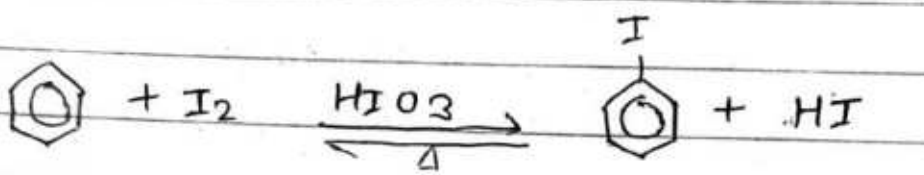
* General method of preparation of haloarene

(i) From benzene.



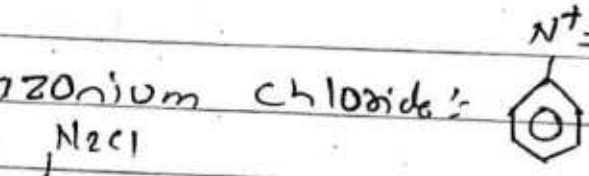
Chlorobenzene.



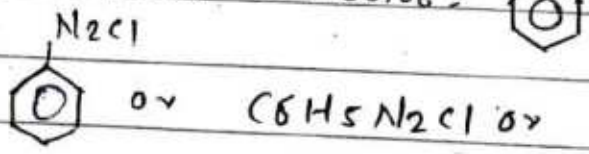


vvi

(2) From benzenediazonium chloride :

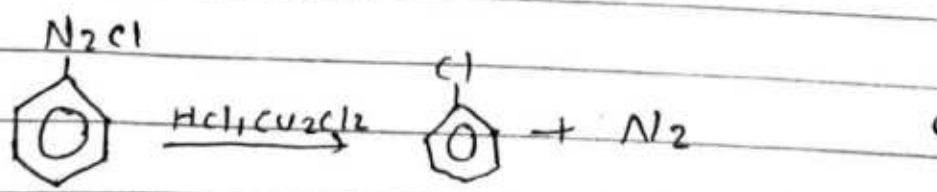


or

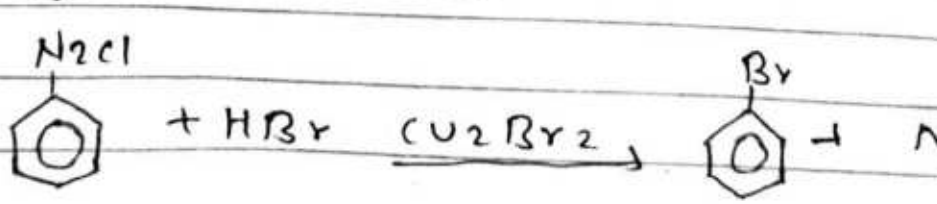


or $C_6H_5N_2Cl$ or ArN_2Cl

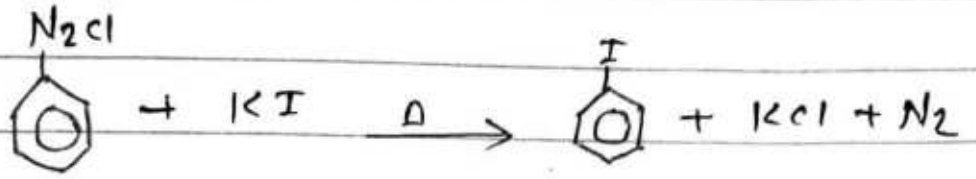
When Benzenediazonium chloride is heated with cuprous chloride or cuprous bromide in presence of respective halogen acid chlorobenzene or bromobenzene is formed this reaction is called sandmayer's reaction.



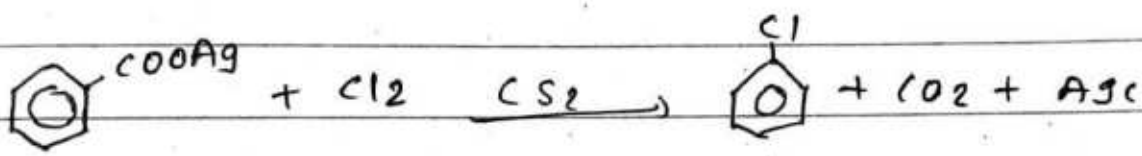
Sand mayer's reaction.

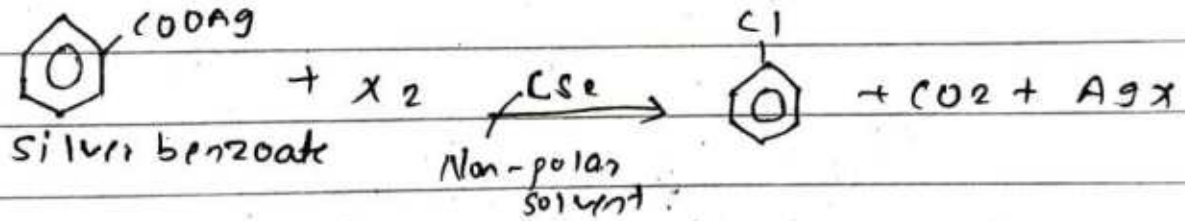


When Benzendiazonium chloride is heated with potassium iodide, iodobenzene is formed.



③ From silver salt of benzoic acid





* Chemical properties of haloarene.

① physical state:-
Haloarenes are colourless liquid with characteristics smell

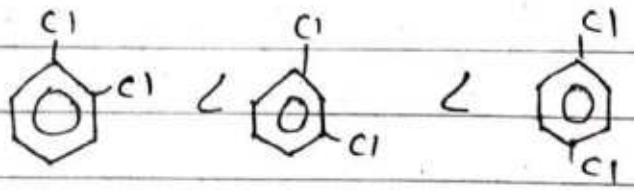
ii Boiling point:-
Haloarene shows following order of their boiling point

$Ar-Cl < Ar-Br < Ar-I$

B.P Increasing

It is because as mass and size of Halogen atom increases, vander waal's force of attraction also increases.

In case of Isomeric dihaloarene, have almost same boiling point but para dihaloarene has high melting point than ortho and meta dihaloarene because para dihaloarene has symmetric structure and fit compactly and perfectly in its crystal lattice.



(iii) Solubility:-

Haloarenes are insoluble in water because they cannot form intermolecular hydrogen bond with water.

* Chemical properties of Haloarene.

hybrid
no. of lone p⁻ =
no. of sigma bond =
total =

(1) Nucleophilic substitution reaction :-

⇒ In haloarene nucleophilic substitution reaction is different than haloalkane because the bond between carbon and halogen in halo arene posses partial double bond character due to resonance since double bond is shorter and stronger than single bond, breaking of C-X bond is difficult in haloarene than haloalkane.

And also the carbon in haloarene is sp^2 hybrised which can hold the share pair of electron more strongly than sp^3 hybrised carbon.

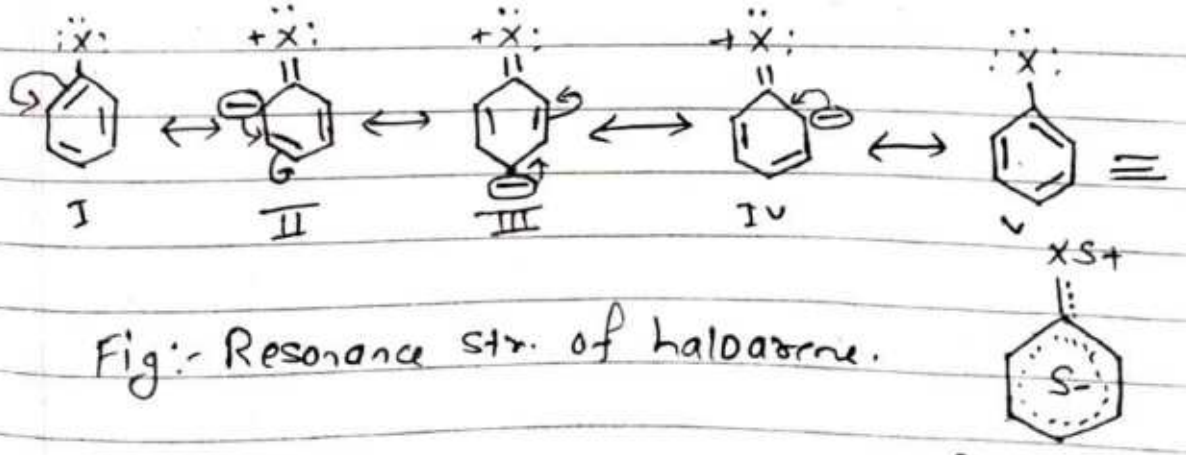
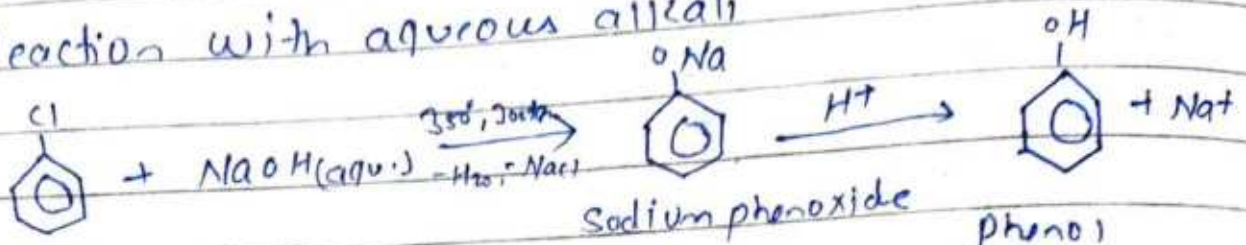
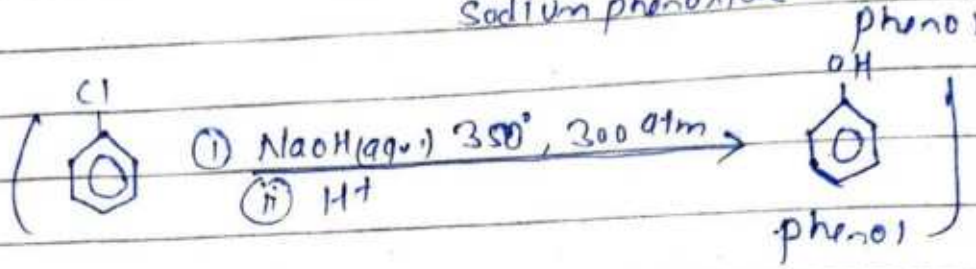


Fig :- Resonance str. of haloarene.

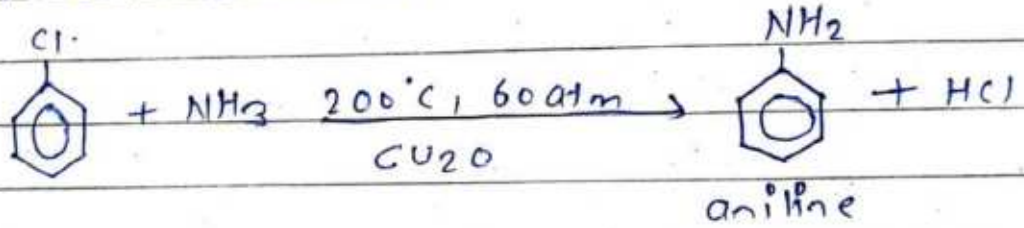
(i) Reaction with aqueous alkali



Sodium phenoxide

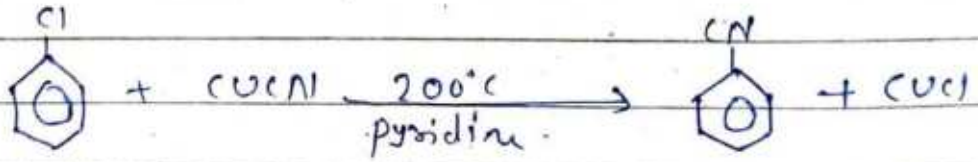


(ii) Reaction with ammonia:-



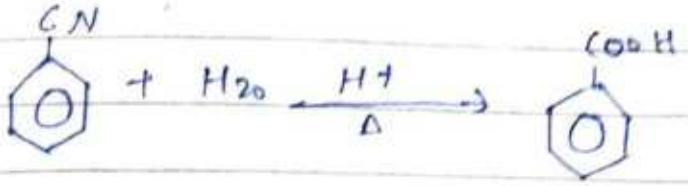
aniline

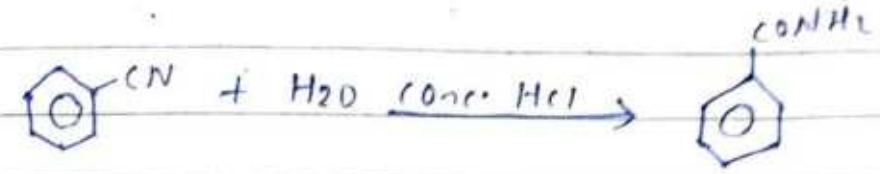
(iii) Reaction with cuprous cyanide (CuCN)

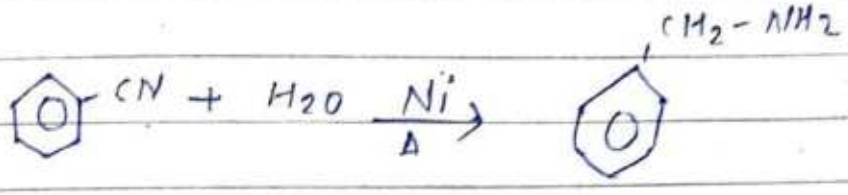


cyanobenzene

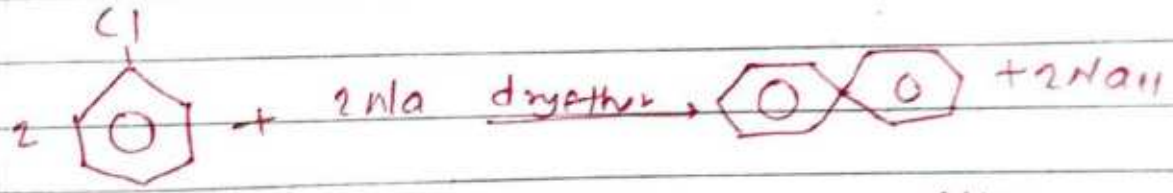
Complete the following reaction.

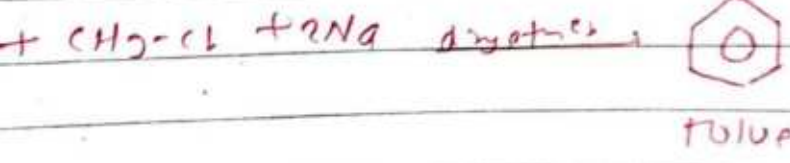
(a) 

(b) 

(c) 

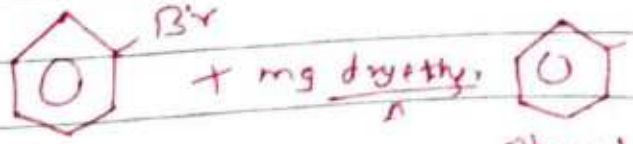
(2) fitting reaction:-



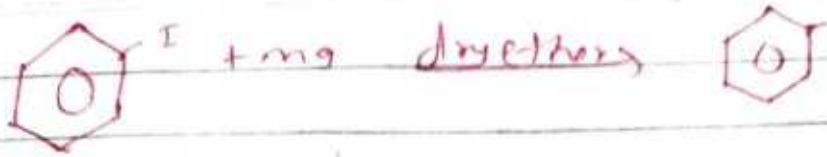
(1) wurtz + CH_3-Cl + 2Na 

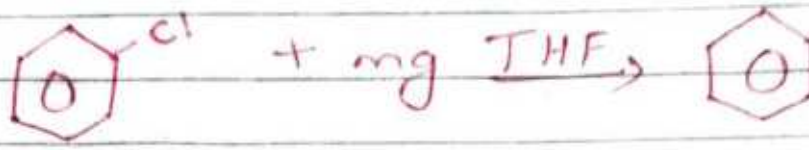
Toluene

(4) Reaction with magnesium

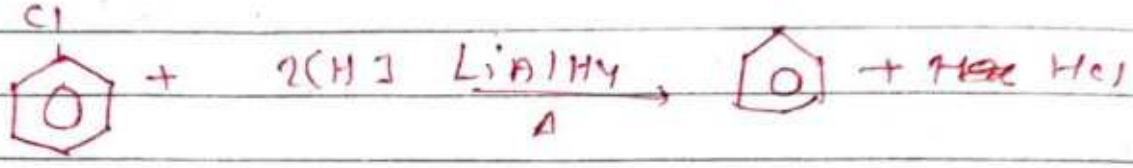


phenyl magnesium bromide

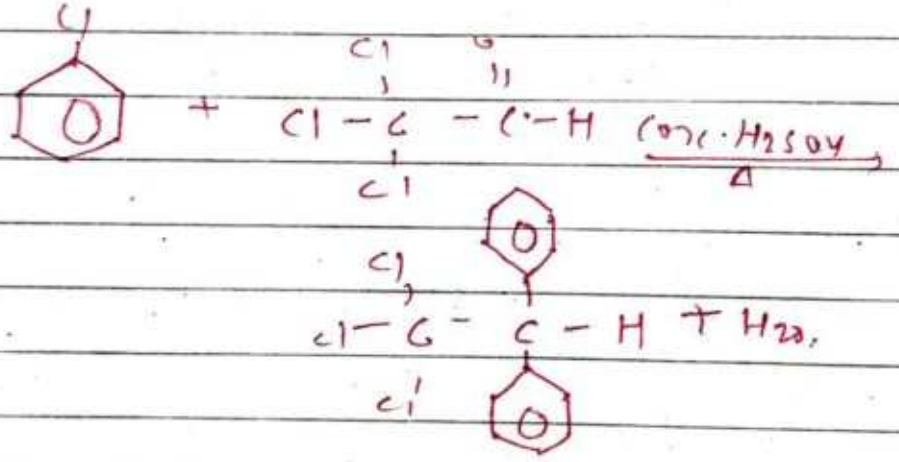




⑤ Reduction:-



⑥ Reaction between chloral and benzene.

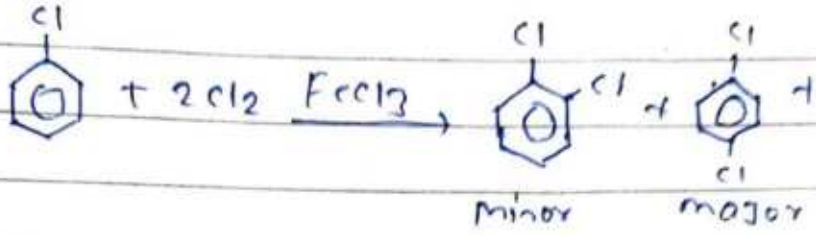


DDT

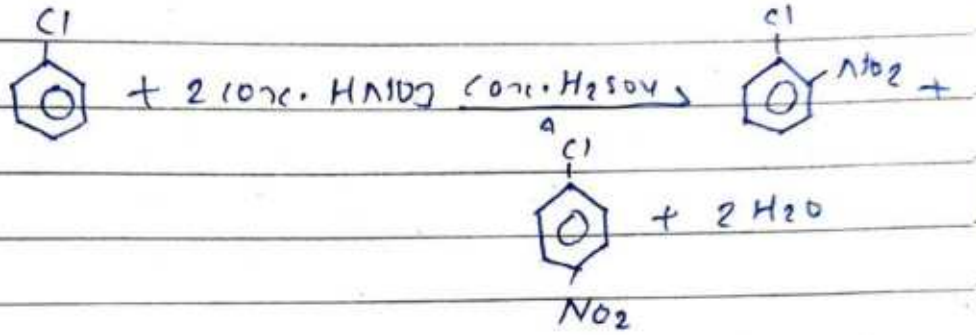
⑦ In haloarene electrophilic substitution reaction takes place at ortho and para position because resonance caused by halogen in haloarene increase electron density at ortho and para position. so, Halogen atom in haloarene is also called ortho-para directing group.

Reaction

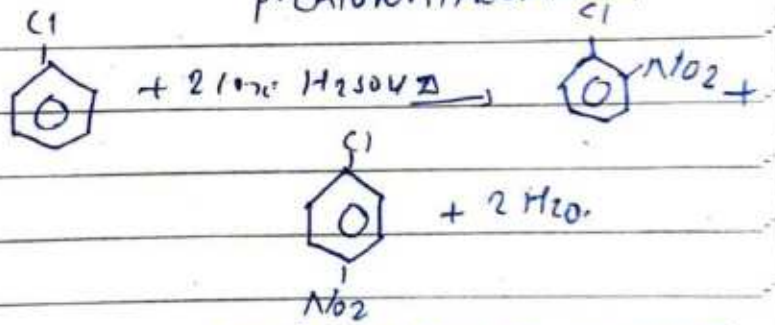
(i) Halogenation :-



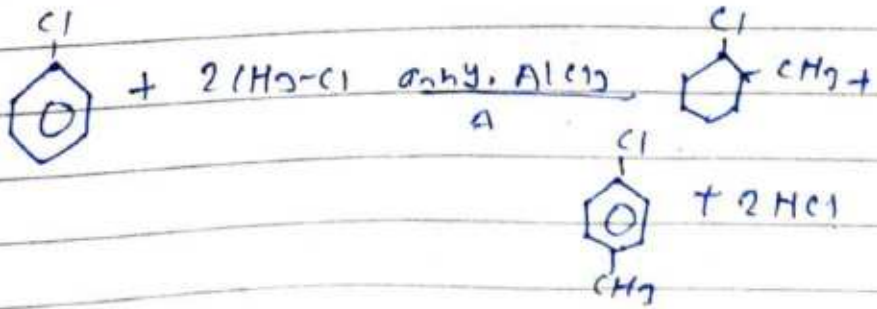
(ii) Nitration :-



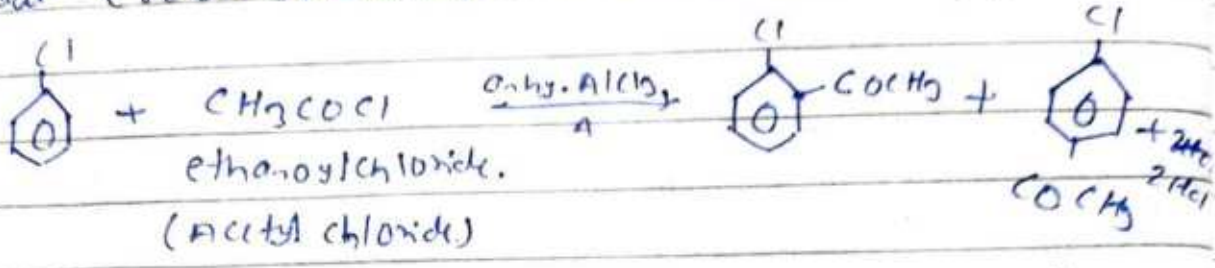
(iii) Sulphonation :-



(iv) Friedal craft alkylation :- Addition of alkyl (-R)



(v) Friedal Craft ~~reaction~~ acylation:-



p-Chloro toluene