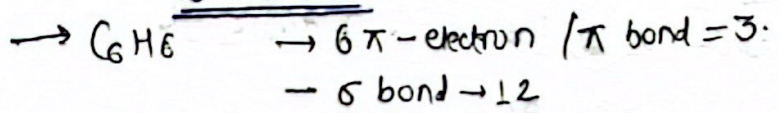
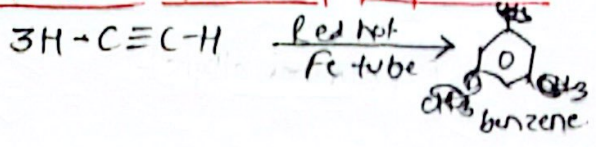


Benzene



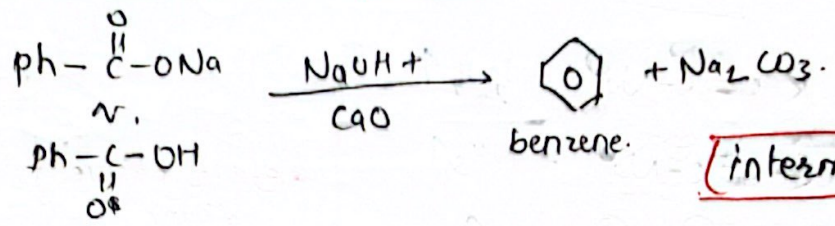
each C $\rightarrow sp^2$
B.A $\rightarrow 120^\circ$

General Method of preparation



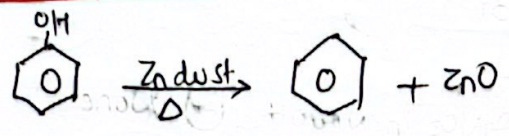
① Polymerization

② Soda-lime decarboxylation

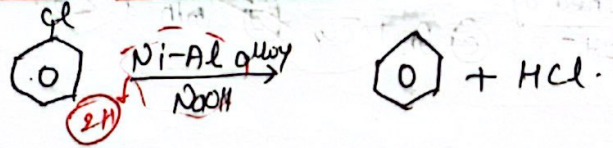


intermediate $\rightarrow$ carbanion

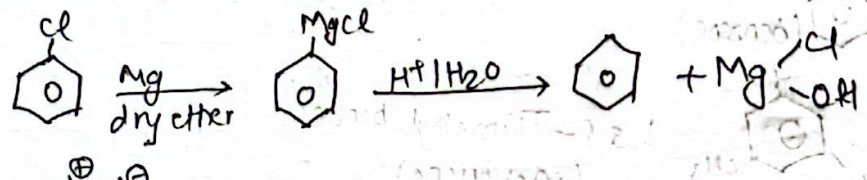
③ From phenol



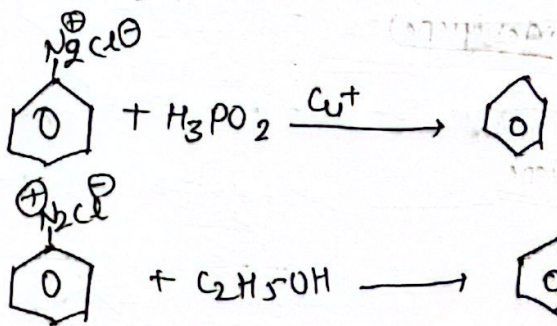
④ From chlorobenzene



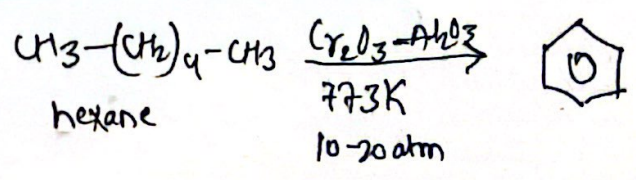
⑤ From Grignard reagent



⑥

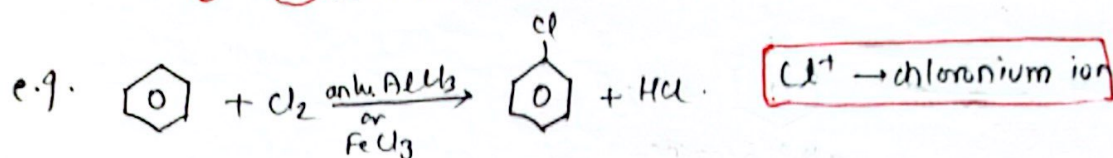
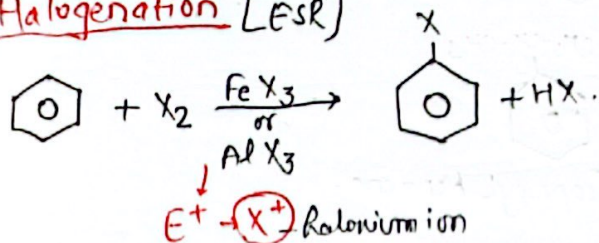


⑦ From alkane (Aromatization)

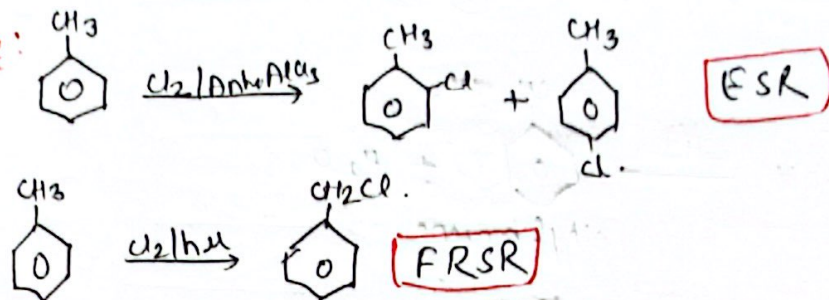


Chemical Properties of Benzene

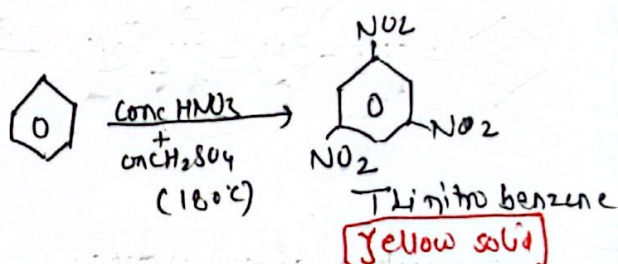
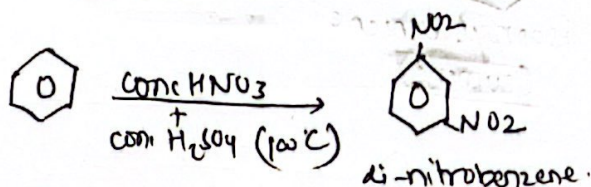
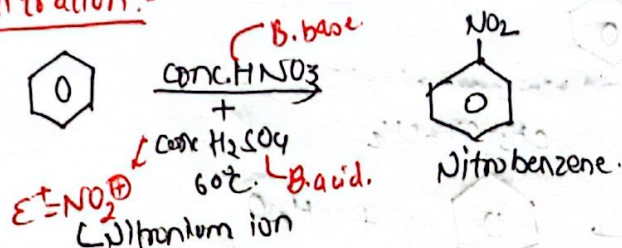
① Halogenation [ESR]



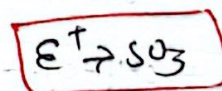
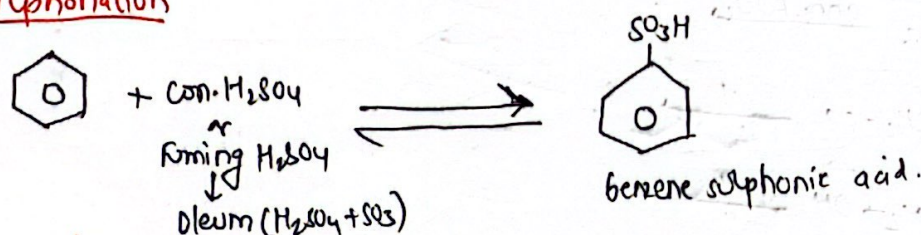
⑧ Note:



② Nitration:-

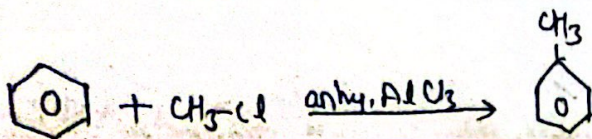
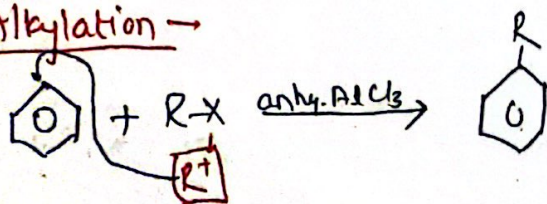


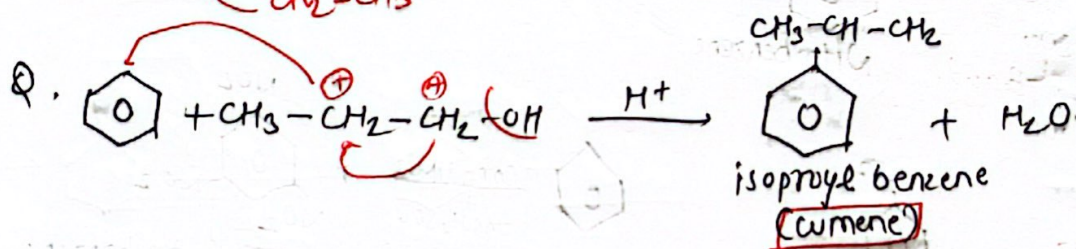
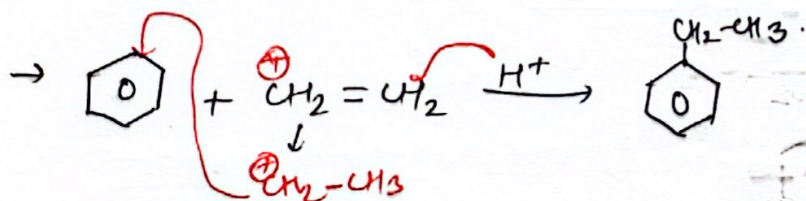
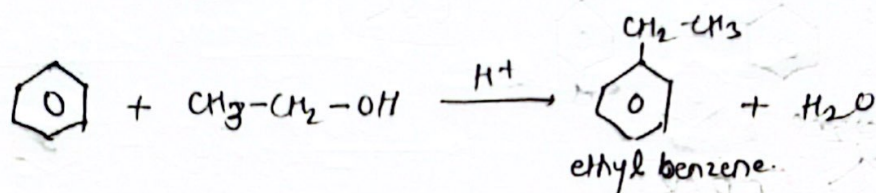
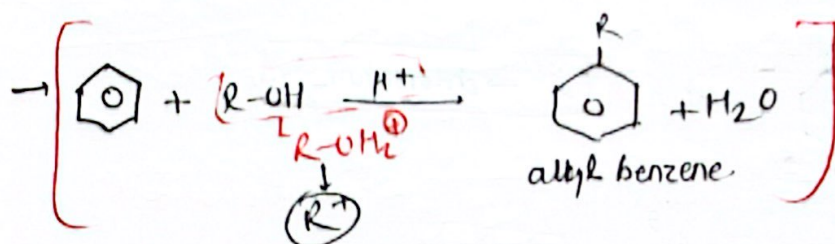
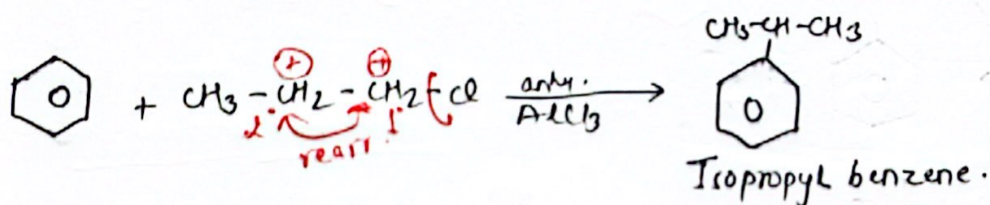
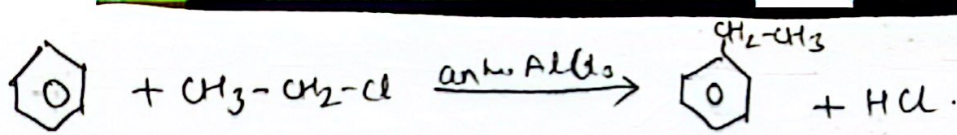
③ Sulphonation



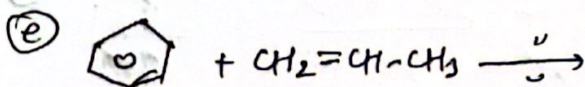
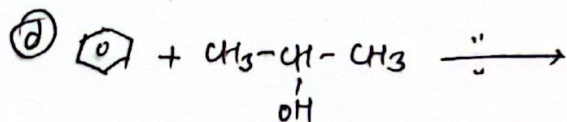
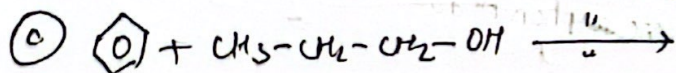
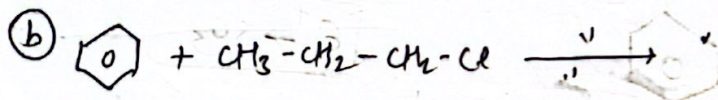
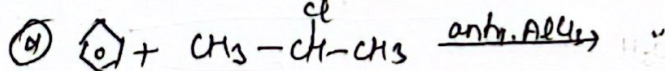
⑦ Friedel craft reaction

① F.C. Alkylation $\rightarrow$

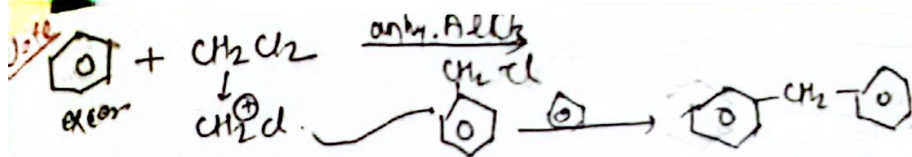




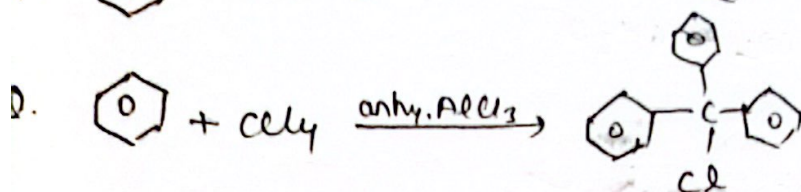
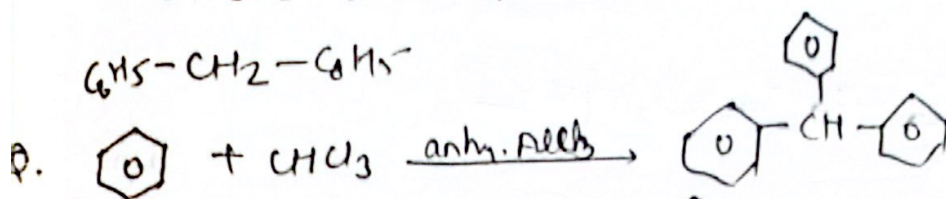
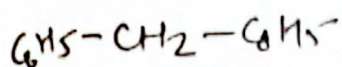
Q. Which reaction gives cumene.



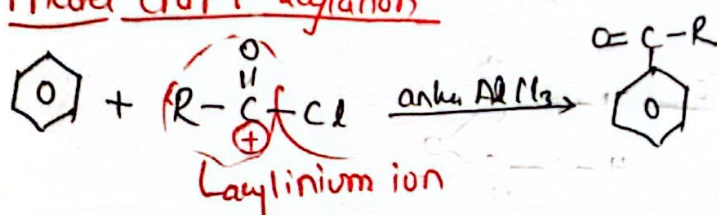
~~(f)~~ All



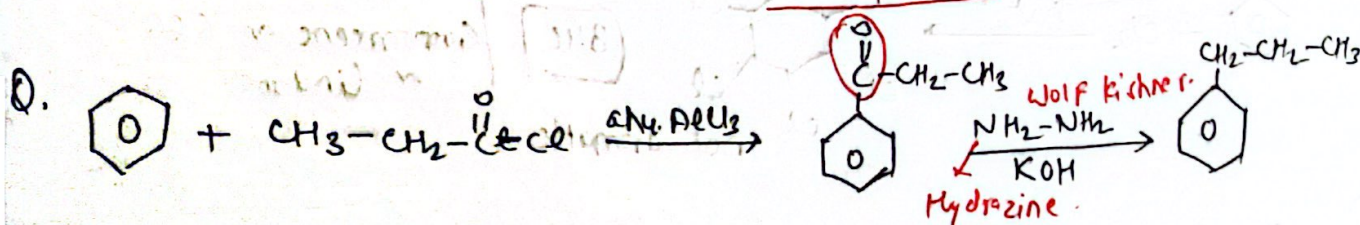
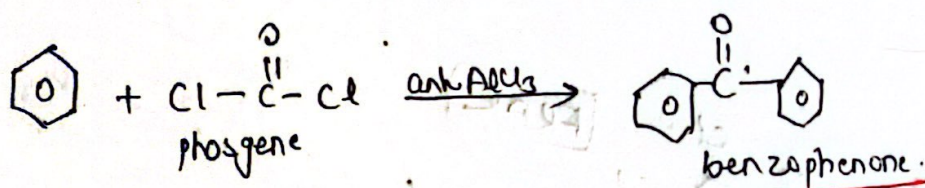
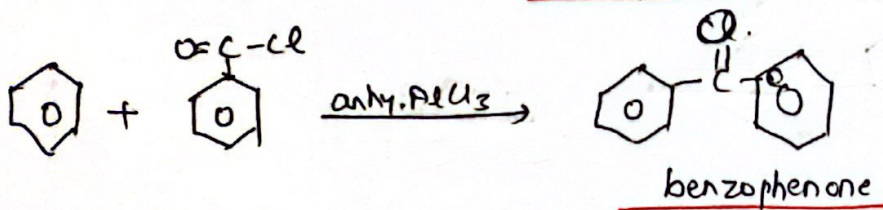
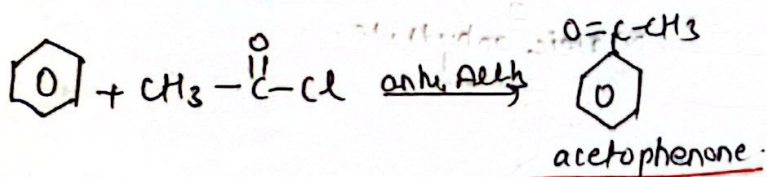
Trick Cl $\overline{\text{E}}\text{E}3$ benzene girat



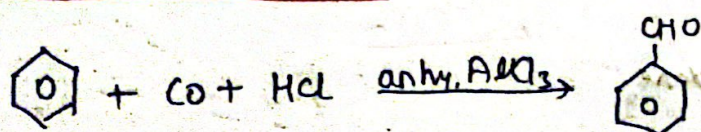
II Friedel craft acylation



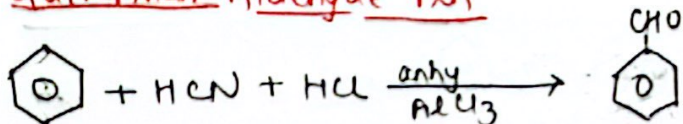
[No rearrangement of C^+].



5 Gatterman Koch rxn

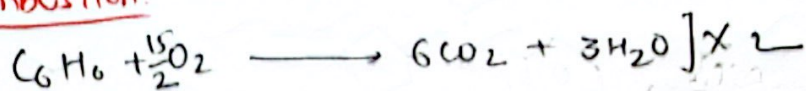


① Gatterman Aldehyde rxn

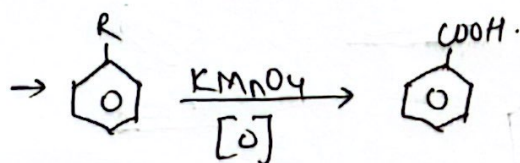
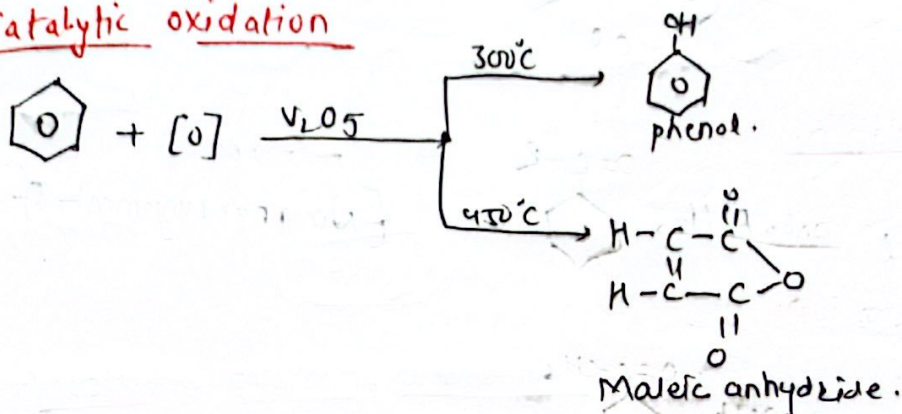


Oxidation reaction

① Combustion -



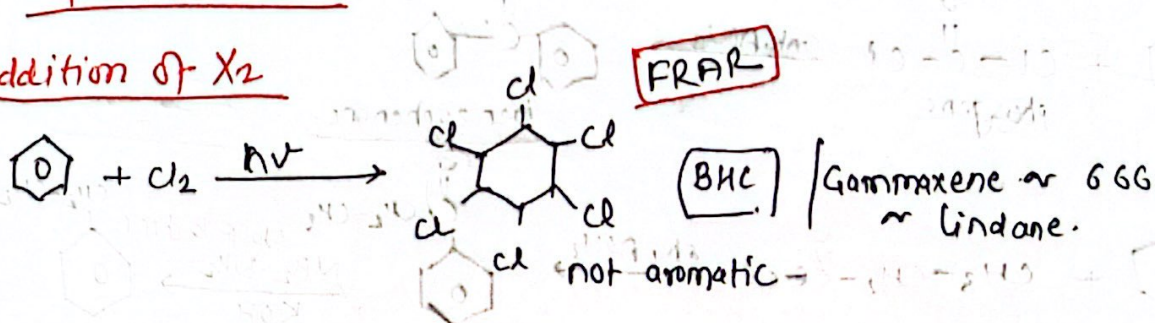
② Catalytic oxidation



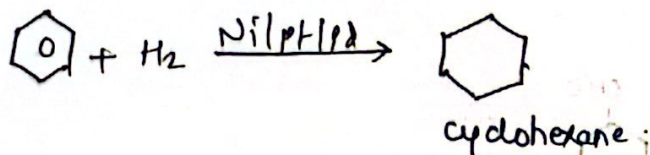
③

C. Addition rxn

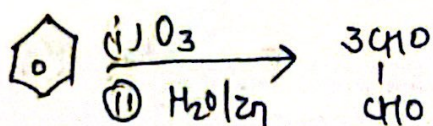
① Addition of X₂



②

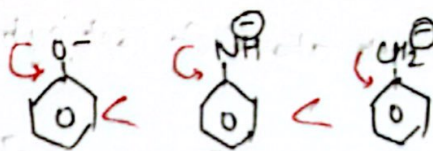


③



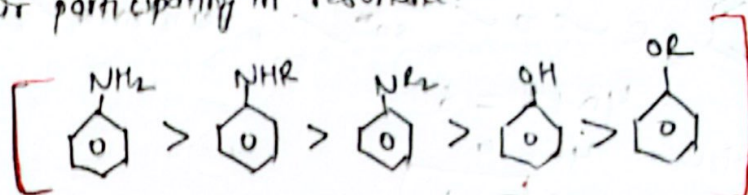
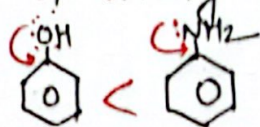


① Highly activator
sps. with -ve charge.

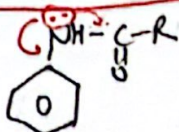


② Activator

sps. having lone pair participating in resonance.



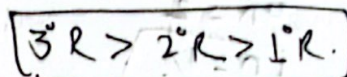
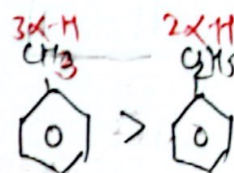
③ Cross Resonance



④ Alkyl group



→ Hyperconjugation.

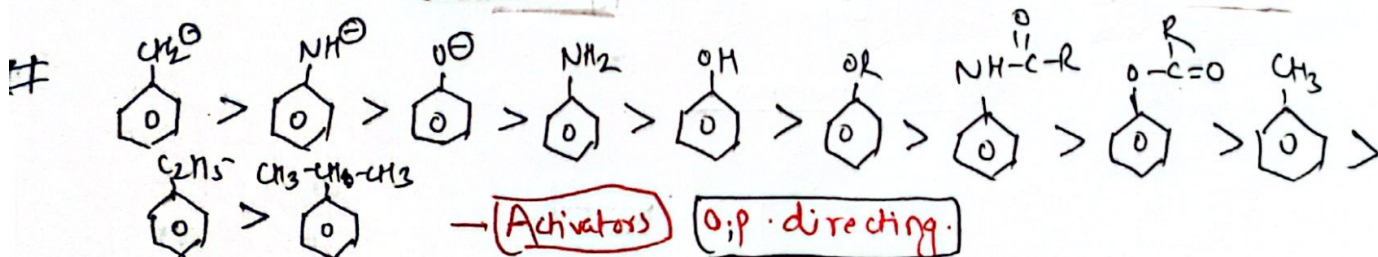


(More no. of α -H, more supply of electron)

Q. ESR fastest in:-

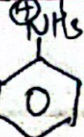
① Toluene ② Aniline ③ Phenol ④ ethyl benzene.

$b > c > a > d$



Deactivator

① Highly deactivator



* All activator are o,p director except halogen.

* All deactivator are meta director no exception

② $\text{NO}_2 > \text{CN} > \text{CHO} > \text{COOH}$.

③ Halogen.
(o,p directing deactivator)

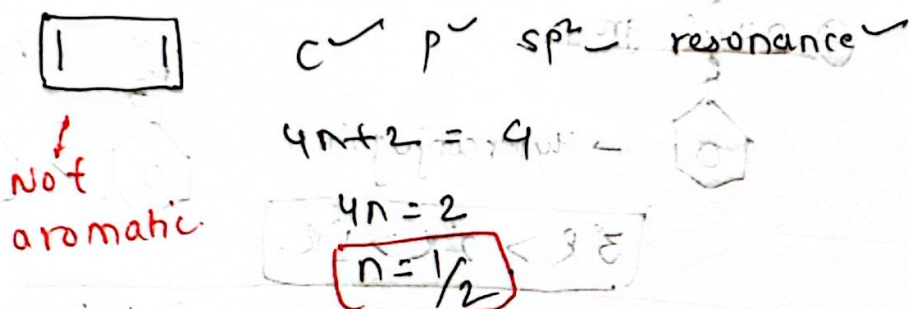
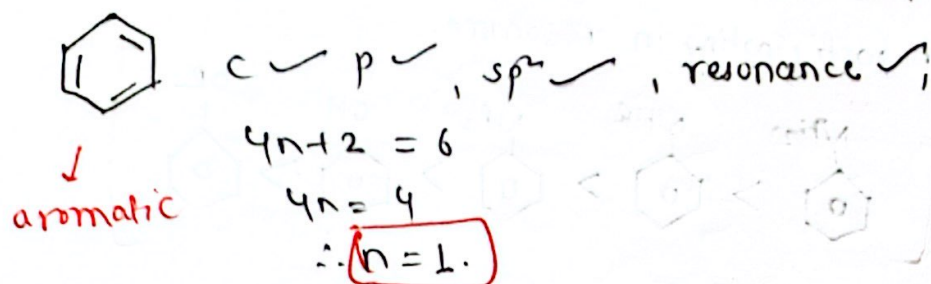
Aromaticity

① Cyclic, planar (each atom of sp^2 hybridized ring).

② Resonance

③ Must follow Huckel's rule. $[4n+2 \pi e^-]$.

$n = 0, 1, 2, 3, 4 \dots$



* Heterocyclic aromatic compound



Furan



Thiophene



pyridine



pyridine.