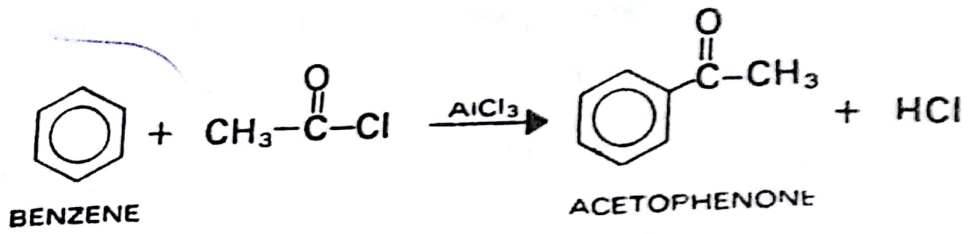
more stable carbonium ion
compound.

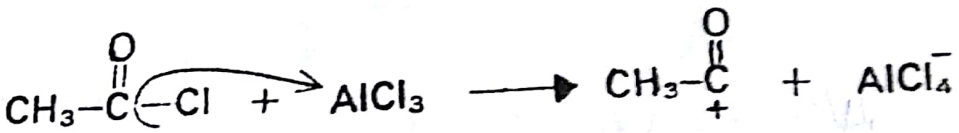
(2) **Friedel-Crafts Acylation.** This involves the treatment of an aromatic compound with acid chlorides (or anhydrides) in the presence of anhydrous aluminium chloride. The products are AROMATIC KETONES. For example,



BENZENE ACETOPHENONE

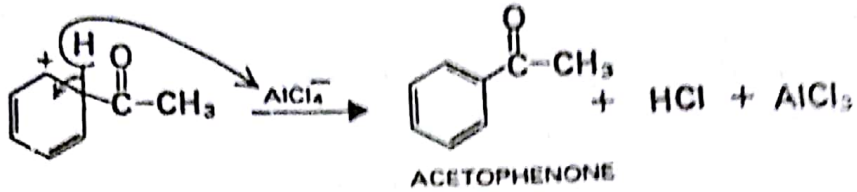
Mechanism. Three steps are involved :

Step 1. Formation of the electrophile ($CH_3—\overset{+}{C}=O$).



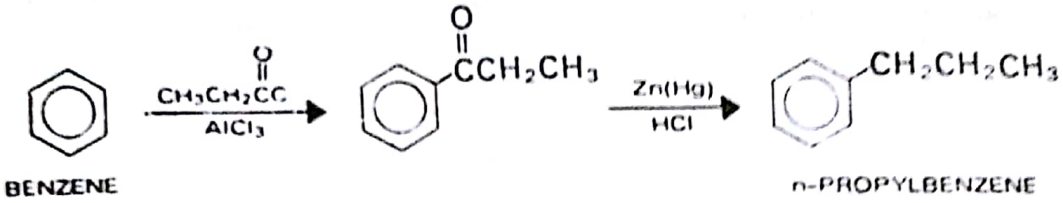
Step 2. The electrophile attacks the benzene ring to give a carbonium ion.

Step 3. Removal of proton gives acetophenone.

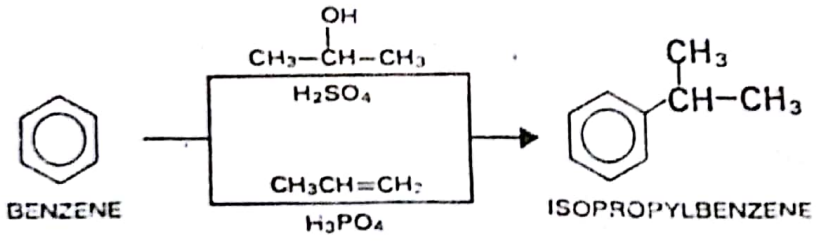


Points to Remember

(1) Since alkylbenzenes other than methyl, ethyl, or *t*-alkyl cannot be prepared from alkyl halides without rearrangement, they are best prepared by the Friedel-Crafts acylation-Clemmensen reduction seqence. For example,

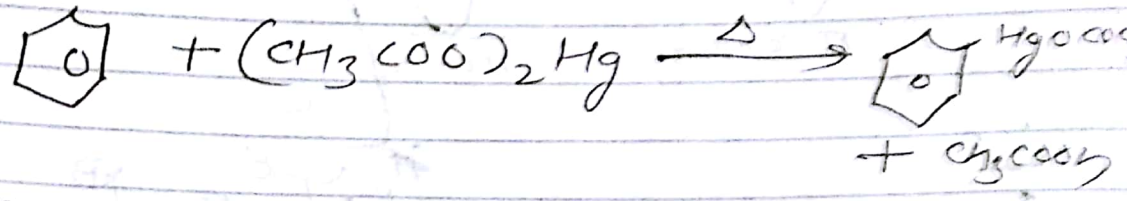


(2) Alkylbenzenes can also be prepared by treatment of benzene with alcohol or an alkene in the presence of an acid catalyst. (In each case the initial step involves the formation of a stable carbonium ion).



Question 20. Give the mechanism of Friedel-Crafts

(A) Mercuration →

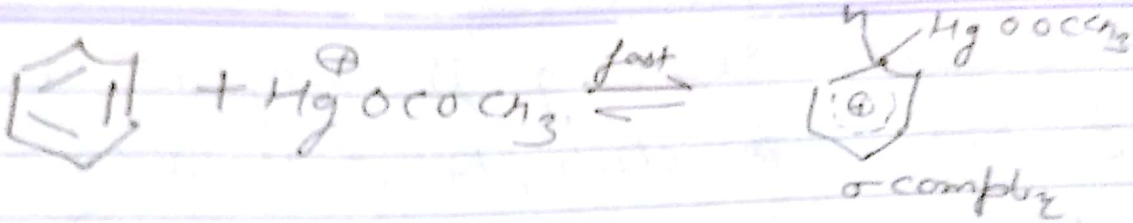


↳ +ve Isotope effect
↳ like to sulphonation the breaking of C–H bond in the rate determining step takes place.

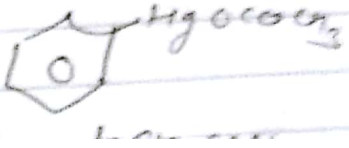
Mech → E^+ ion generation

(1) $Hg(O-\overset{\overset{O}{\|}}{C}-CH_3)_2 \rightleftharpoons CH_3COO^- + {}^{\oplus}HgOCOCH_3$

(II) → formation of σ- complex



(III) σ- complex + CH_3COO^- —slow→



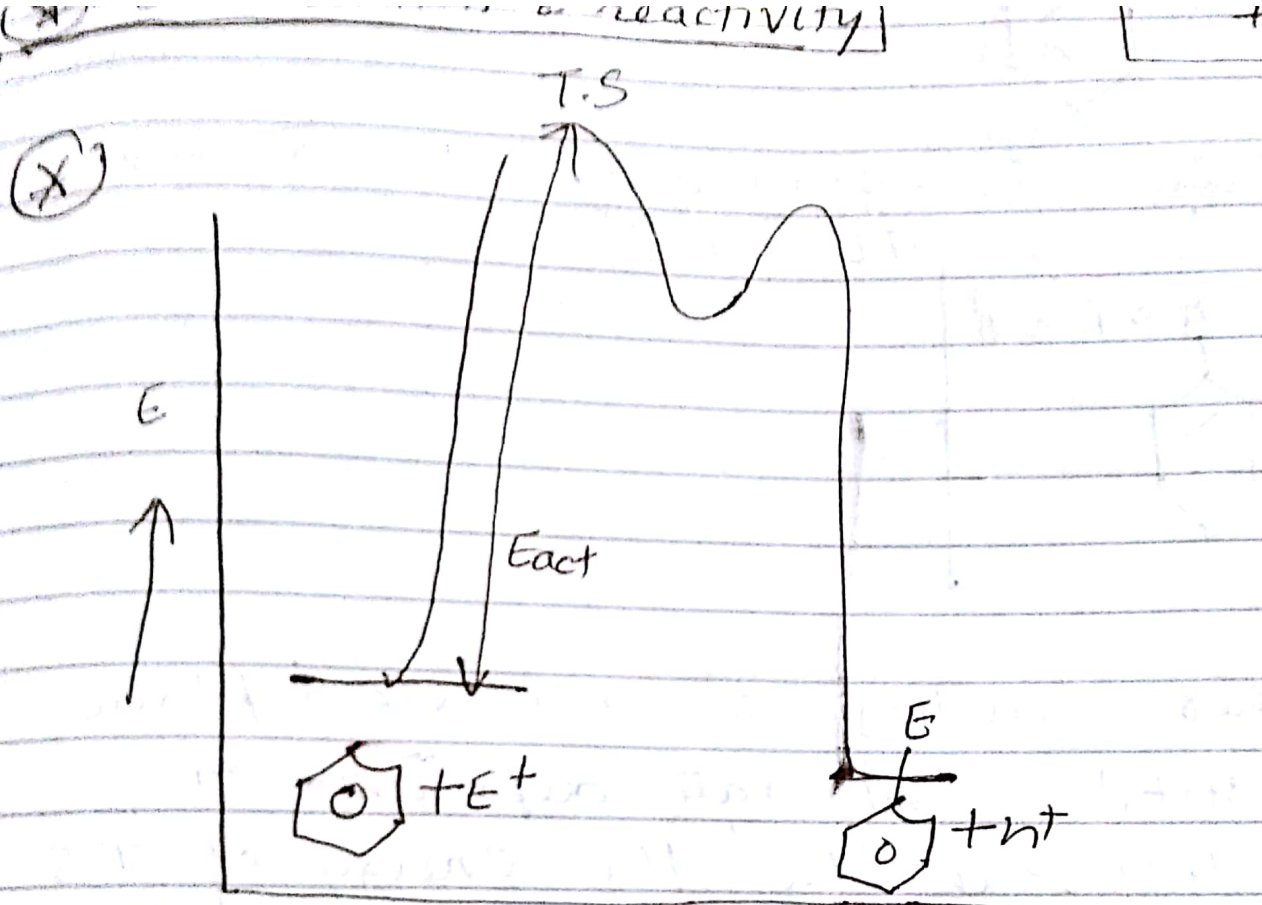


Diagram for a typical E+ aromatic substitution

Role of σ- & π- complexes

→ acc to experimental evidences