# AROMATIC COMPOUNDS

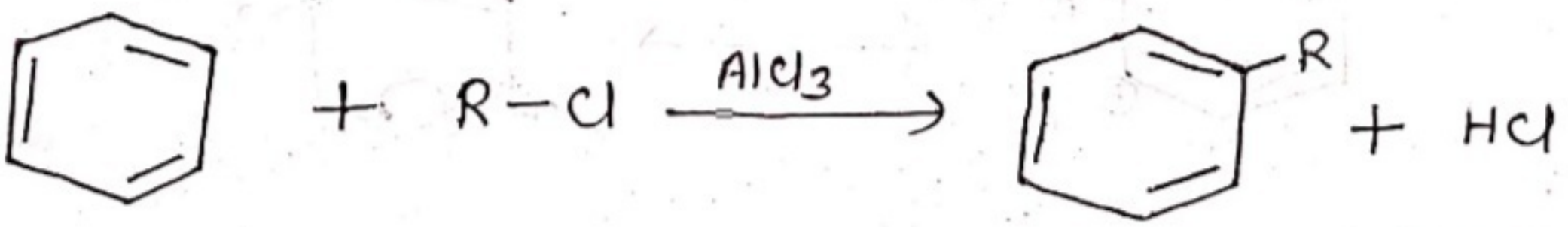
Deg-II (Hons.)
P-IV ,Ch-6 ,G-B

28-04-2020 (Lecture-6)

## Topic - Friedel craft's alkyalation & acylation of benzene.

## Friedel Craft's Alkyalation Of Benzene

"Benzene" reacts with alkyl halides in the presence of anhy. aluminium chloride to form alkyl benzene.




Benzene — Alkyl benzene

* The electrophile required for the reaction is formed from the reaction of an alkyl halide with anhy. $AlCl_3$.

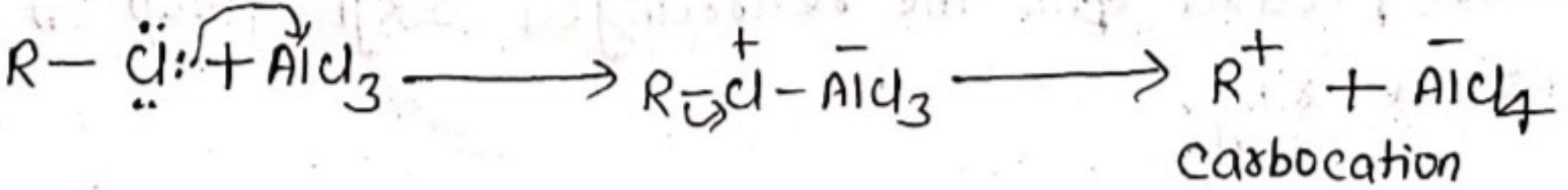
* Alkyl Chlorides, alkyl bromides, and alkyl iodides can all be used.

* Vinylic halides and aryl halides cannot be used because their carbocations are too unstable to be formed.

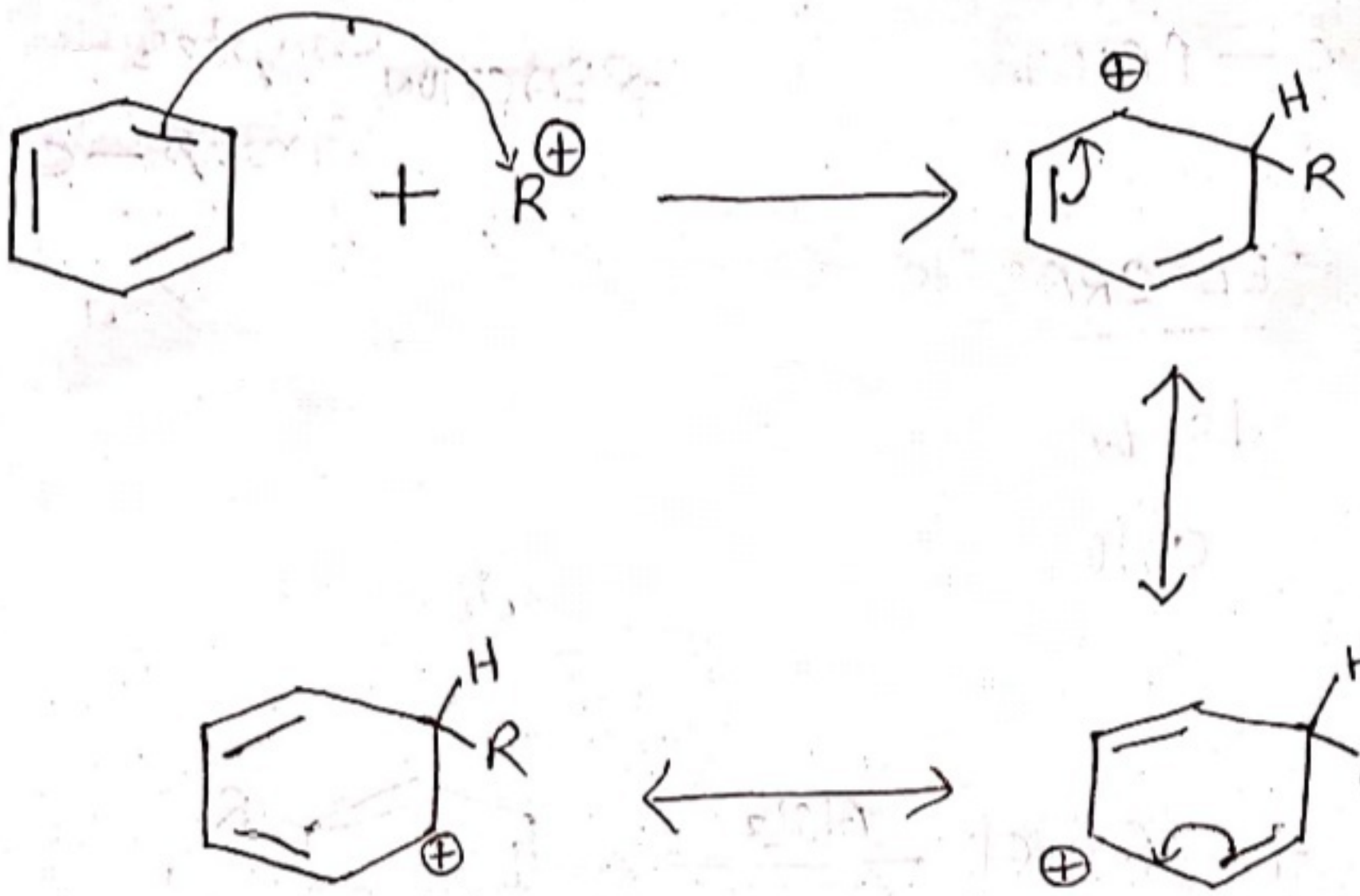
### MECHANISM

Step: 1

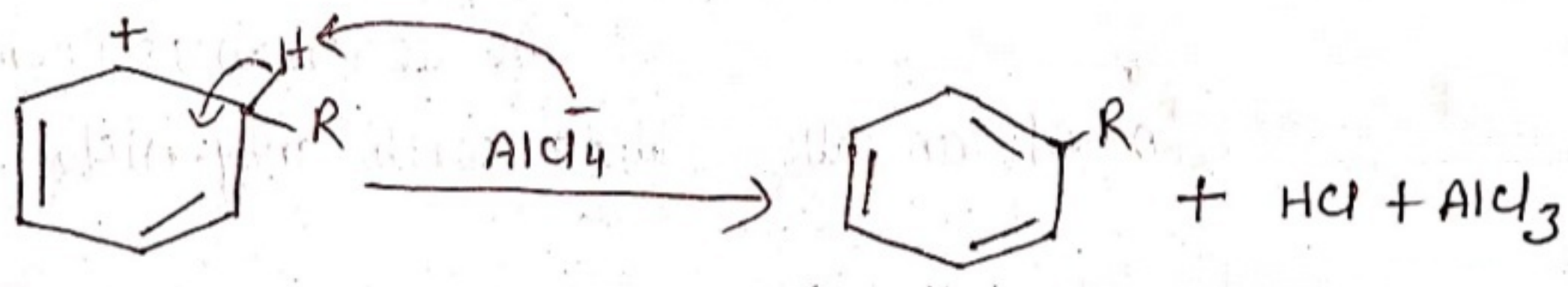
Formation of the electrophile ($R^+$)



Step: 2 The electrophile attacks the benzene ring to give a carbocation.




Step: 3 Loss of proton to give alkyl benzene.

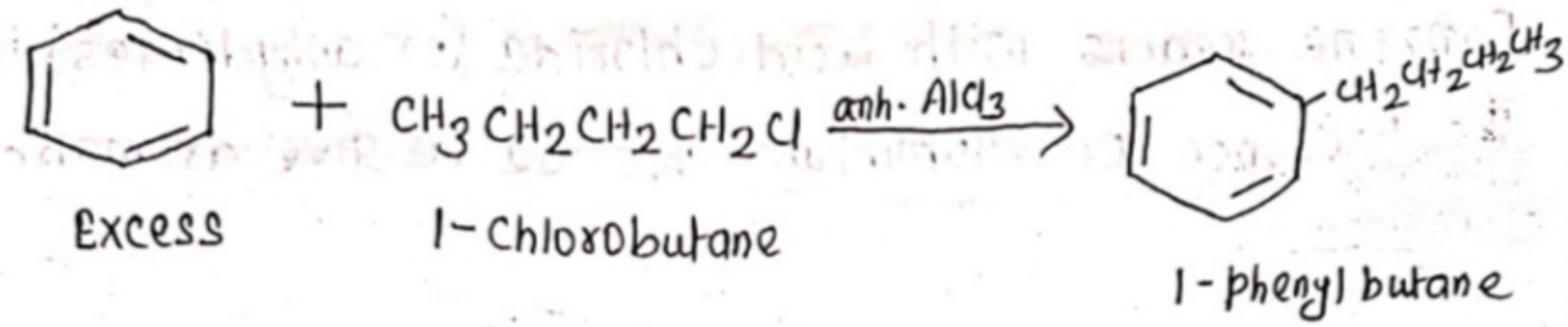



Alkyl benzene

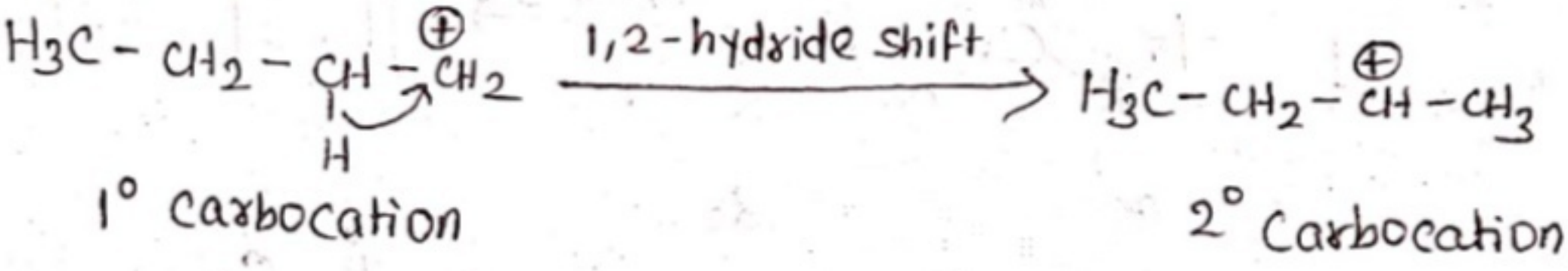
* A carbocation will rearrange if rearrangements leads to a more stable carbocation.

* When the carbocation employed in a Friedel-Craft's alkylation reaction rearranges, the major product will be the product with the rearranged alkyl group on the benzene ring.

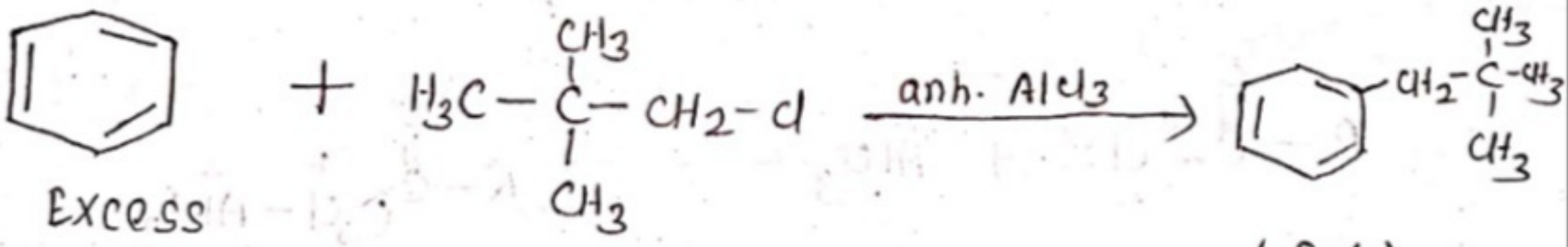
example;



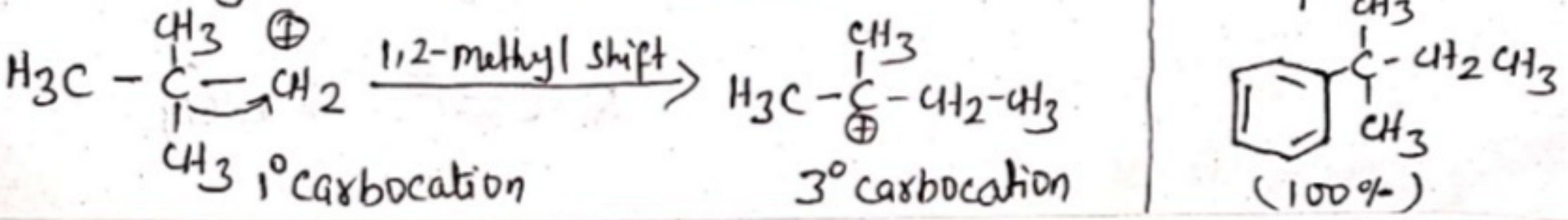

## Rearrangement of the Carbocation




* When benzene reacts with 1-chloro-2,2-dimethyl-propane, the initially formed 1° carbocation rearranges to a tertiary carbocation; in this case 100% of the product has the rearranged alkyl substituent.



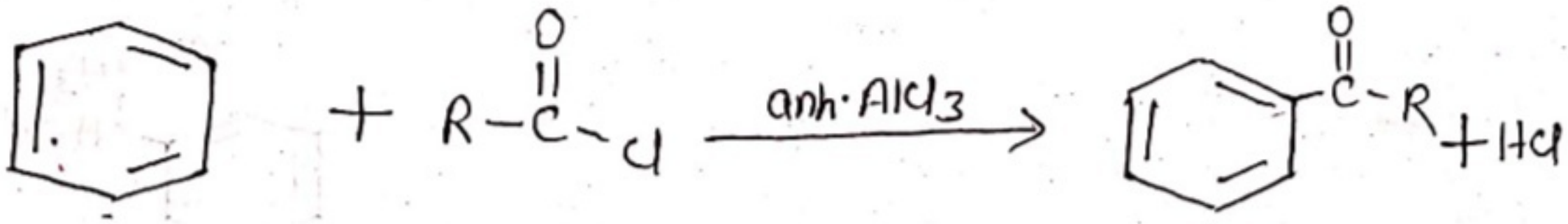

Rearrangement of the carbocation



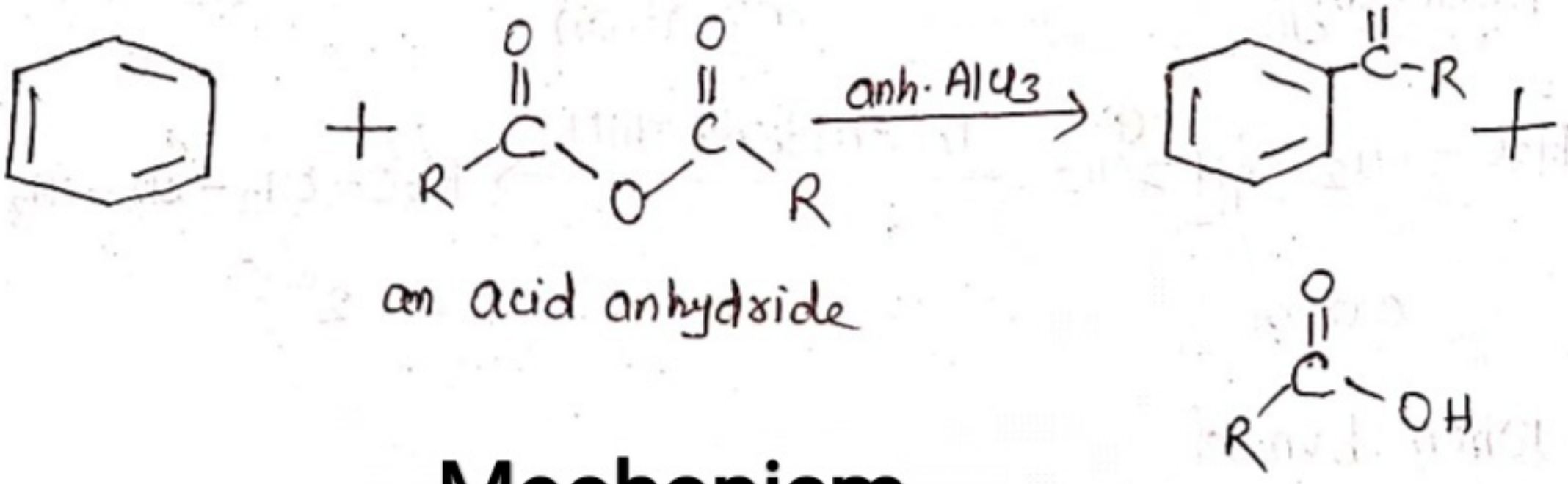
# FRIEDEL CRAFT'S ACYLATION REACTION

4.

Benzene reacts with acid Chloride (or anhydrides) in the presence of aluminium Chloride to give aromatic Ketones.




Benzene an acylchloride



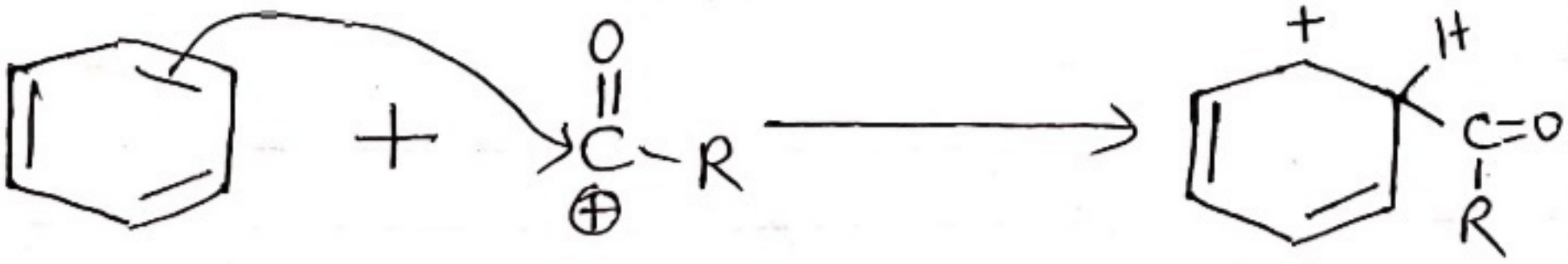

an acid anhydride

## Mechanism

Step 1. Formation of the electrophil (an acylium ion) $R-\overset{+}{C}=\ddot{O}:$

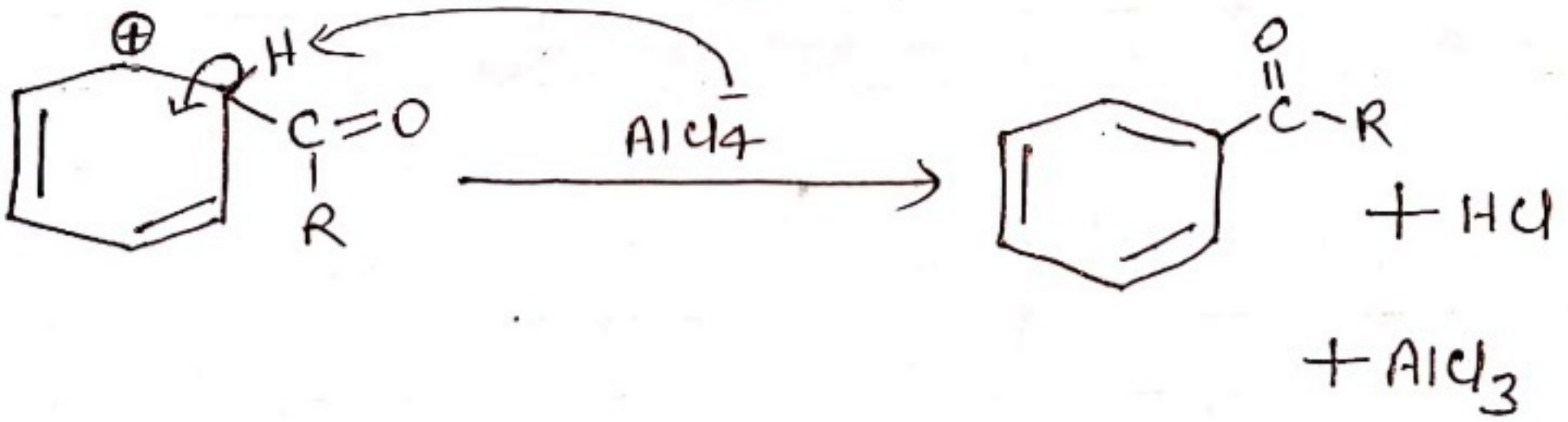
Step 2.

The electrophile attacks the benzene ring to form a carbocation.

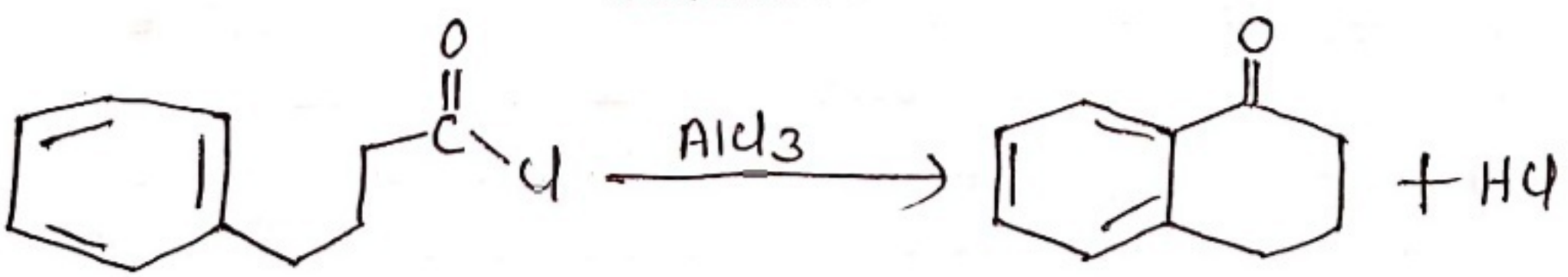


Step 3.

Loss of proton gives an aromatic Ketone.




✡ Example Of Intramolecular Friedel-Craft's Reaction :- - - -




4-phenylbutanoyl Chloride.

α-tetralone

~Completed~

Electrophilic Substitution Reaction Completed