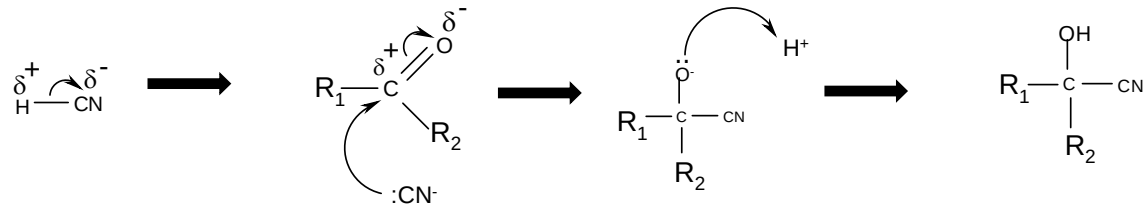
UNIT 4 MECHANISMS

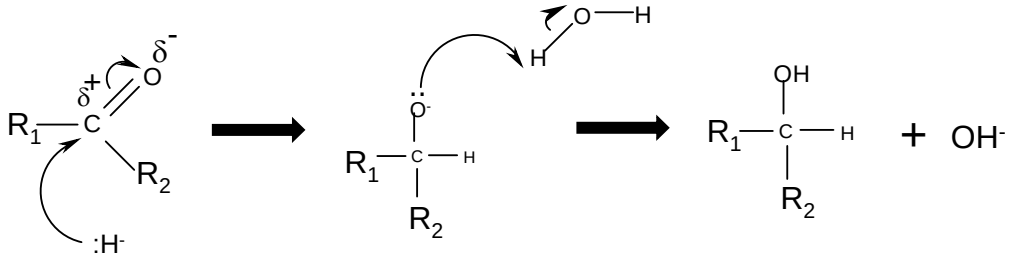
1. Mechanism 1 – Nucleophilic Addition

Carbonyls with HCN and $NaBH_4$ (H^-):

a)



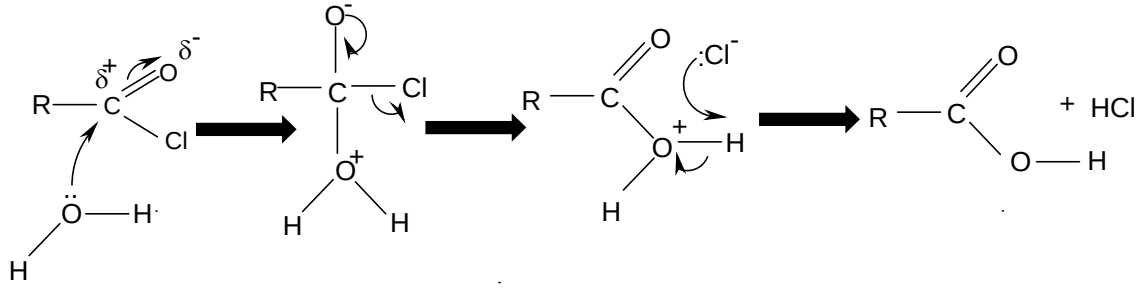
b)



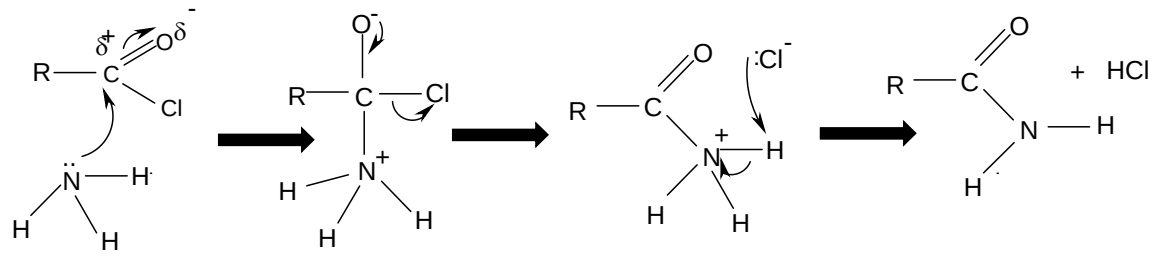
2. Mechanism 2 – Nucleophilic Addition-Elimination

Acyl chlorides with water, ammonia, alcohols and primary amines:

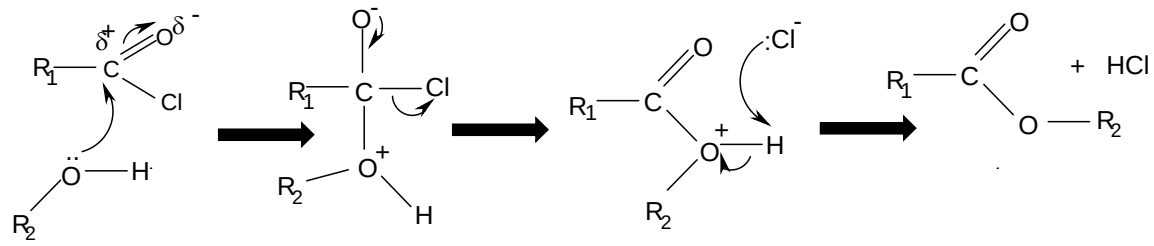
a)



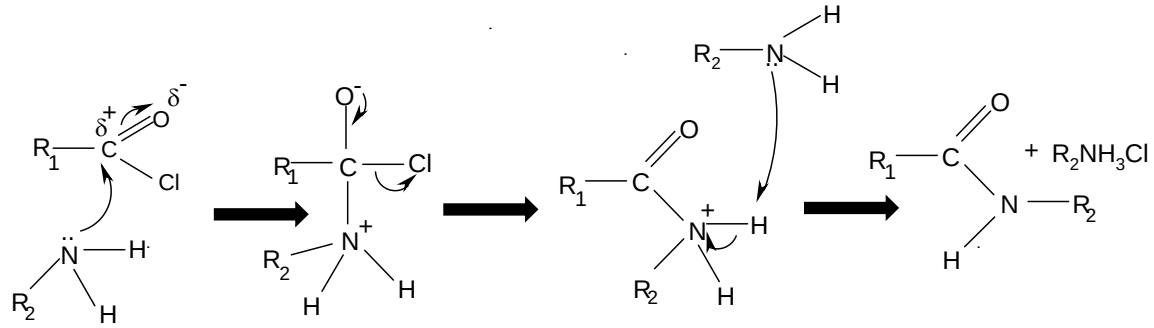
b)



c)



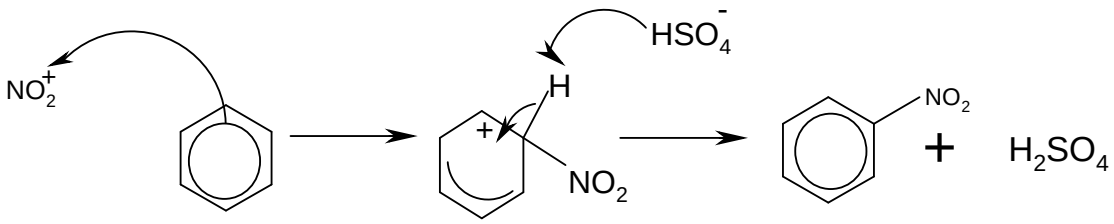
d)



3. Mechanism 3 – Electrophilic Substitution

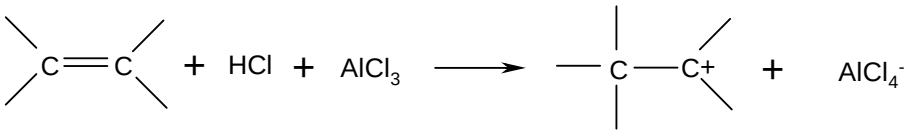
Nitration, alkylation and acylation of benzene rings:

a) $H_2SO_4 + HNO_3 \rightarrow H_2NO_3^+ + HSO_4^-$
$H_2NO_3^+ \rightarrow H_2O + NO_2^+$

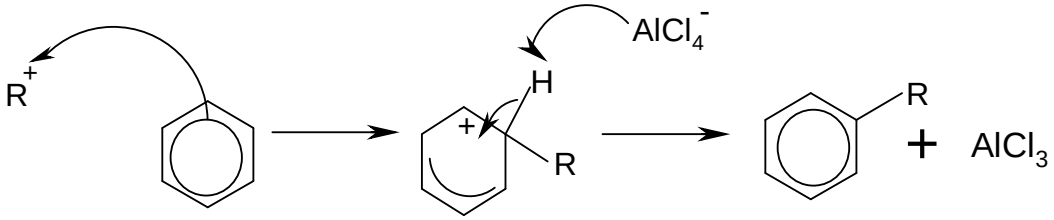


b) $R\text{-}Cl + AlCl_3 \rightarrow R^+ + AlCl_4^-$ (using a haloalkane)

or



(using an alkene and HCl)



c) $R\text{-}COCl + AlCl_3 \rightarrow RCO^+ + AlCl_4^-$