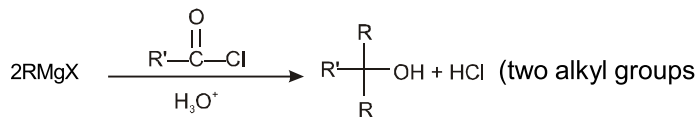
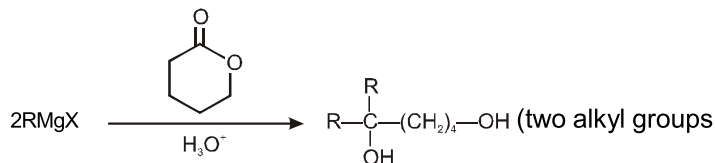


come from Grignard Reagent)



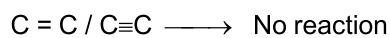
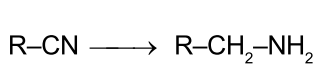
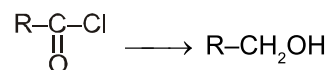
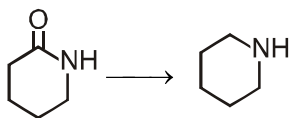
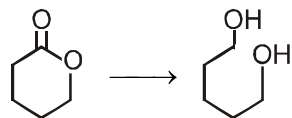
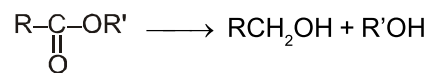
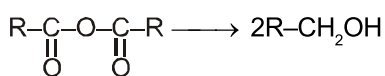
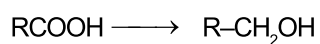
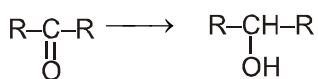
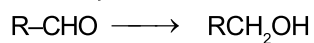
come from Grignard Reagent)



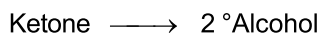
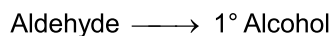
come from Grignard Reagent)

• Points to remember in Reduction

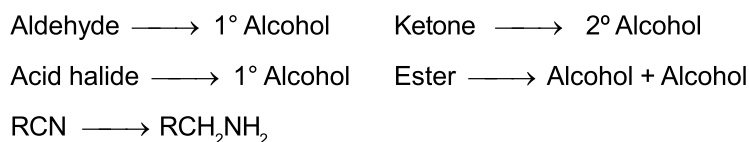
(1) LiAlH_4



(2) NaBH_4 , EtOH



(3) Na/EtOH (Bouveault Blanc reduction)

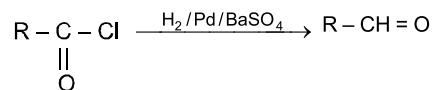


(4) Na-Hg/HCl or

Al[OCHMe₂]₃ (MPV Reduction)

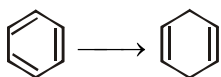
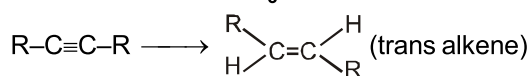


(5) Rosenmund's Reduction



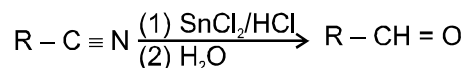
(6) Birch reduction

(Li/Na/K + Liquid NH₃)



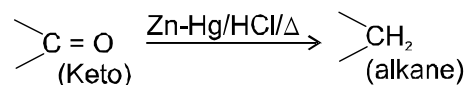
Note : Terminal alkynes not reduced

(7) Stephen's Reduction



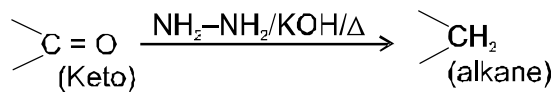
Note : DIBAL-H is also used for same conversion.

(8) Clemmensen Reduction



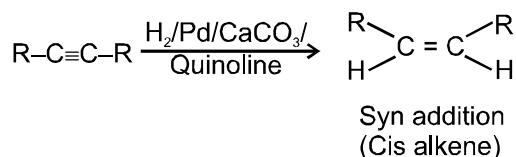
Avoid if acid sensitive groups are present in molecule.
e.g. C=C, C≡C, OH, OR,

(9) Wolff-Kishner Reduction



Avoid if base sensitive groups are present in molecule.
e.g. COOR, COX, CONH₂,
-CO-O-CO-, R-X

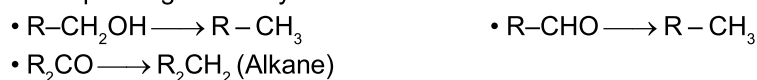
(10) Lindlar Catalyst



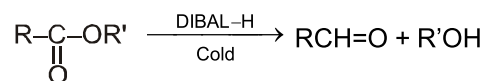
Note : H₂, Pd, BaSO₄ is also used for same conversion.

(11) Red Phosphorus and HI

Almost all functional groups containing compounds convert into corresponding alkane by red P + HI.



(12) DIABAL-H reduction



At ordinary temperature esters reduced to alcohols but at low temperature esters reduced to aldehyde.

• Points to remember in Oxidation Reaction

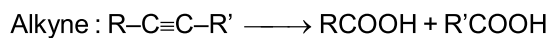
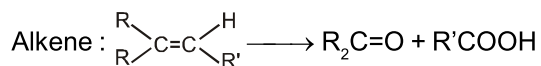
(1) KMnO₄ (in both medium) or K₂Cr₂O₇ (in acidic medium)



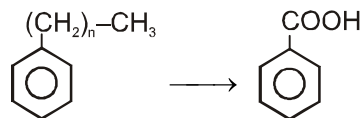
1° Alcohol \longrightarrow Acid

2° Alcohol \longrightarrow Ketone

3° Alcohol \longrightarrow No reaction



Oxidation of aromatic side chain :



(2) PCC (Pyridinium chloro chromate)
CrO₃/HCl/Pyridine

1° ROH \longrightarrow Aldehyde

2° ROH \longrightarrow Ketone

3° ROH \longrightarrow No reaction

(3) Cu/573 K

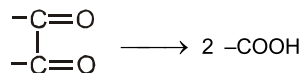
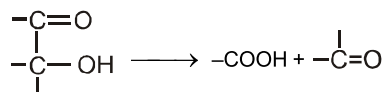
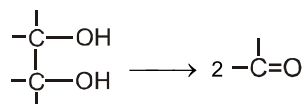
1° Alcohol \longrightarrow Aldehyde

2° Alcohol \longrightarrow Ketone

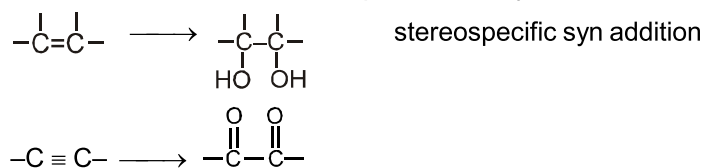
3° Alcohol \longrightarrow Alkene

(4) HIO₄ (Periodic Acid)

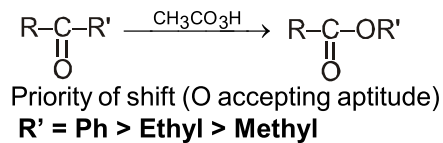
Condition : Vicinal diol, α - Hydroxy ketone & α -diketone can oxidise by HIO₄



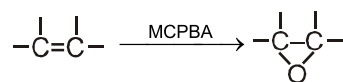
(5) Baeyer's reagent and $\text{OsO}_4 + \text{NaHSO}_3$



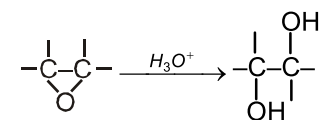
(6) Baeyer–Villiger oxidation (m-CPBA or $\text{CH}_3\text{CO}_3\text{H}$)



(7) Prilezhaev reaction



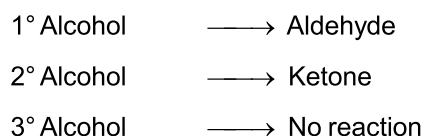
Anti hydroxylation :



(8) oxidation by HNO_3



(9) oxidation by MnO_2

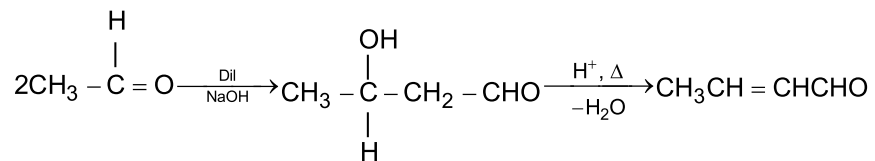


Note : Only allylic and benzylic alcohols are oxidised by MnO_2 .

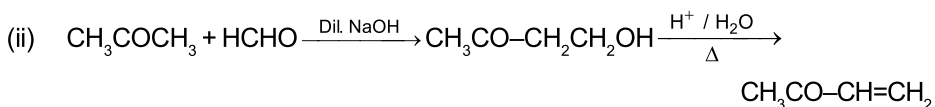
• Points to remember in Aldehyde & ketone

Aldol condensation :

Carbonyl compounds having acidic $\text{sp}^3 \alpha\text{-H}$ shows this reaction in presence of dil. NaOH or dil. acid.

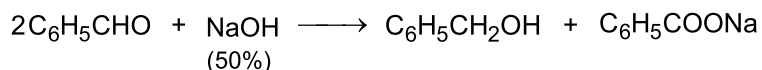
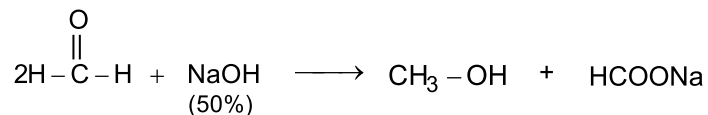


Crossed aldol condensation

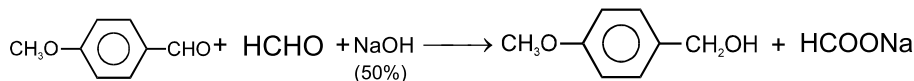


Cannizzaro reaction :

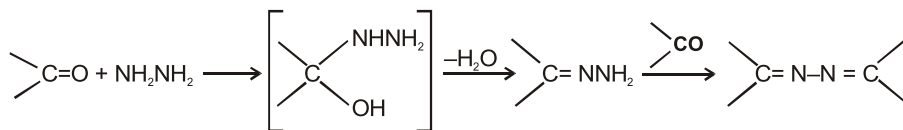
Carbonyl compounds not having $\text{sp}^3 \alpha\text{-H}$ shows following disproportionation reaction



Crossed Cannizzaro reaction :



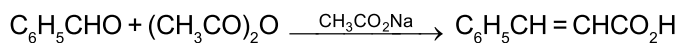
Formation of hydrazones and azines



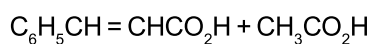
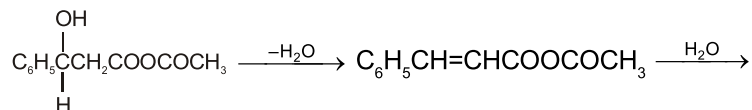
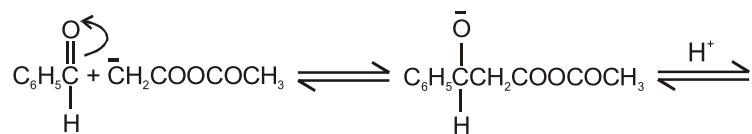
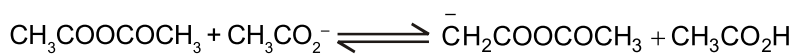
Perkin reaction :

When benzaldehyde (or any other aromatic aldehyde) is heated with the

anhydride of an aliphatic acid (containing two α -hydrogen atoms) in the presence of its sodium salt, condensation takes place to form a β -arylacrylic acid ; e.g., with acetic anhydride and sodium acetate, cinnamic acid is formed.

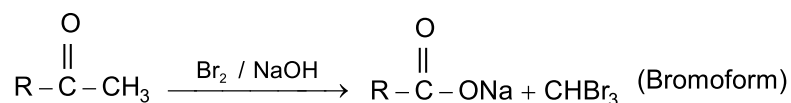


Mechanism :



Haloform reaction :

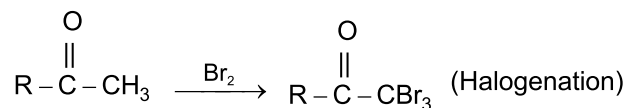
Acetaldehyde and methylalkyl ketones react rapidly with halogen (Cl_2 , Br_2 or I_2) in the presence of alkali to give haloform and acid salt.



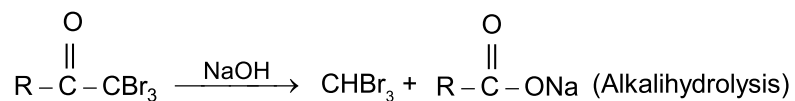
In this reaction $-\text{CH}_3$ of $\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3-\text{C}- \end{array}$ group is converted into haloform as it contains acidic hydrogen atom and rest-part of alkyl methyl ketone give acid salt having carbon atom corresponding to alkyl ketone.

Preparation of haloform from methylketone involves two steps.

(a) Halogenation

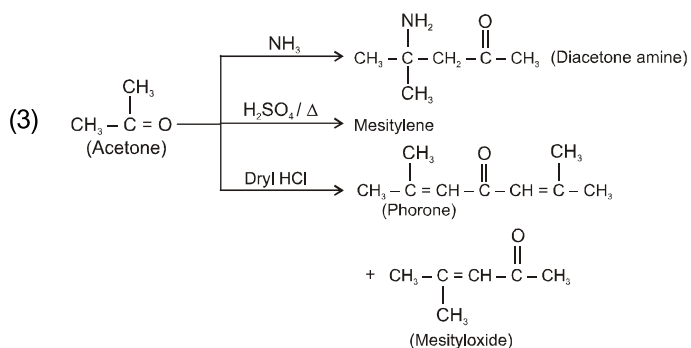
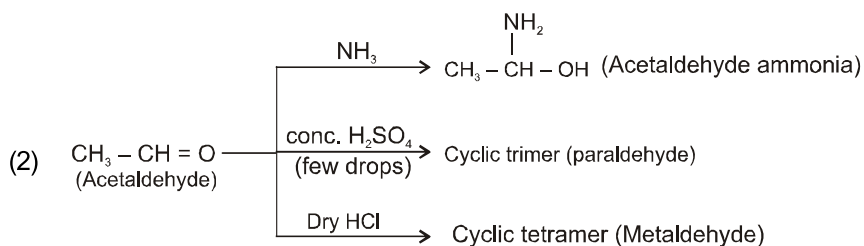
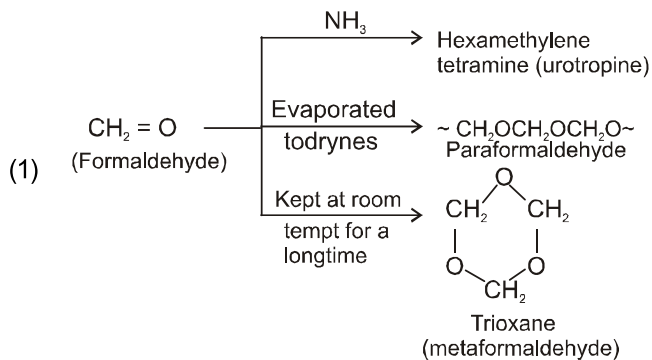


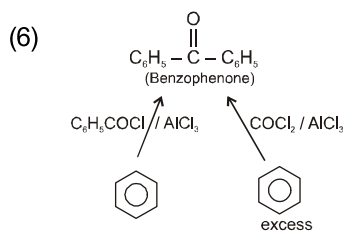
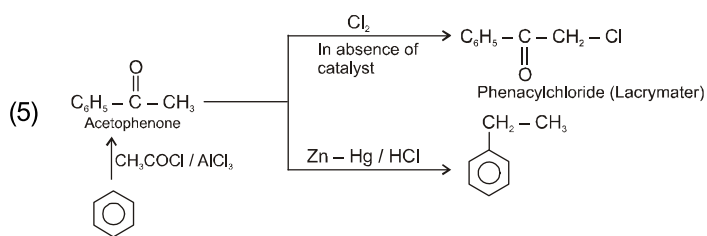
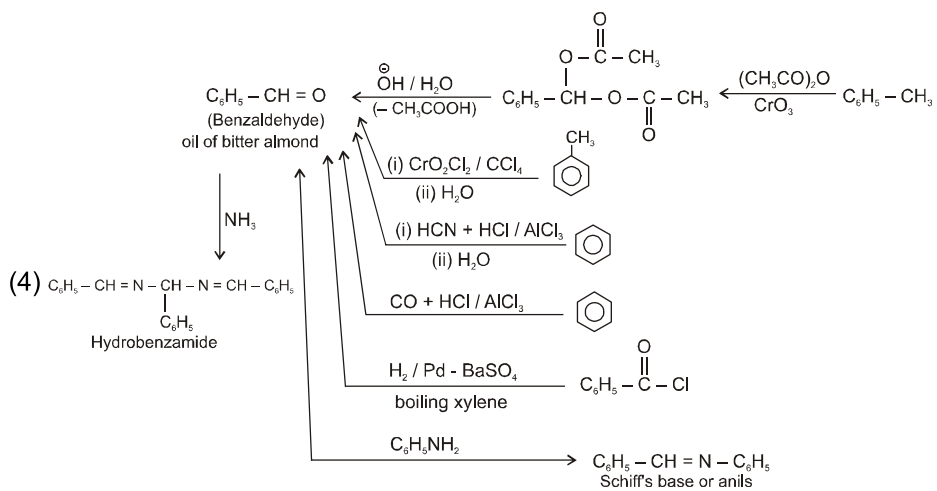
(b) Alkali hydrolysis



Note : This reaction is used to distinguish the presence of $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-$ group.

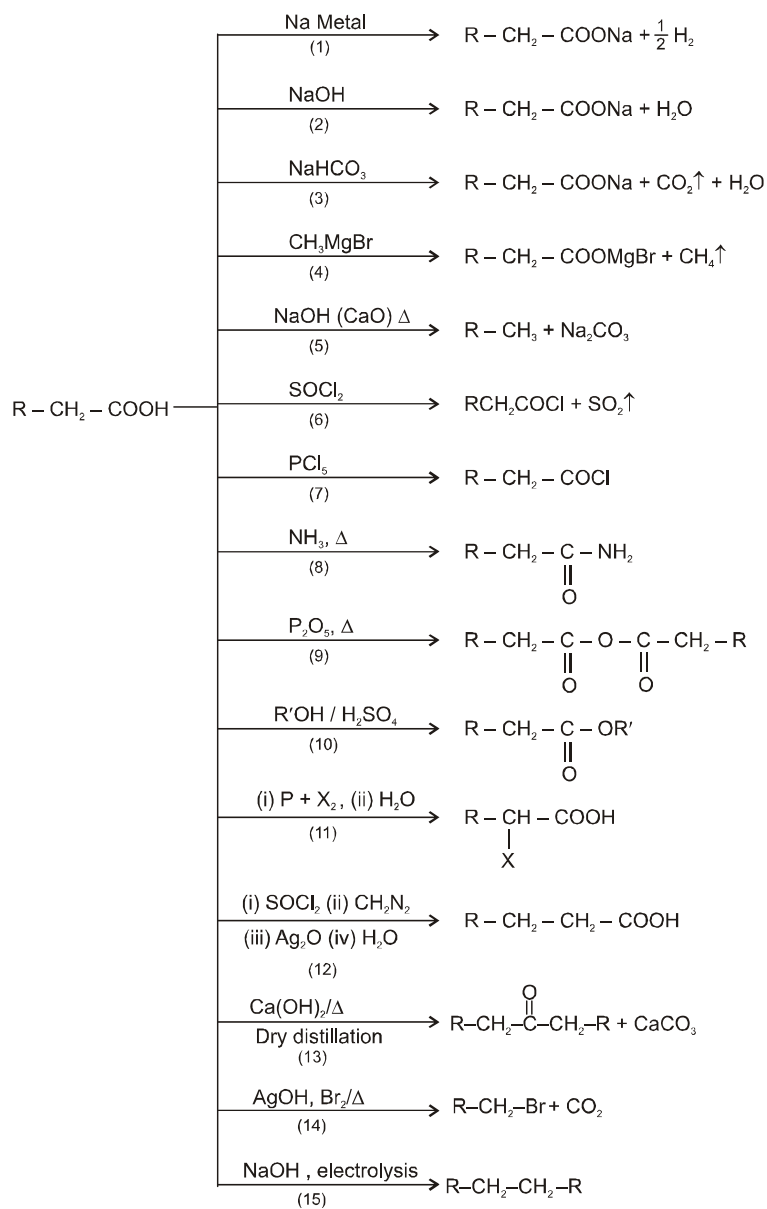
Other reactions :



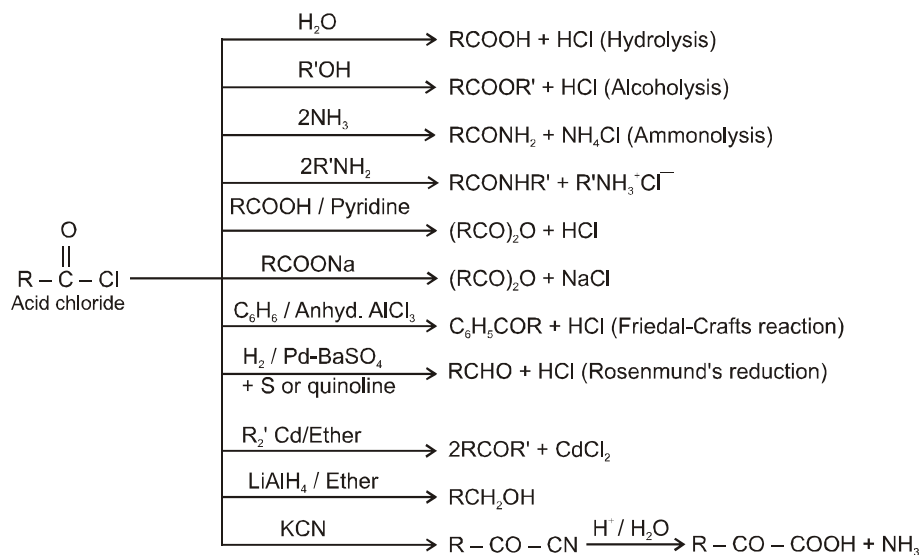


• Points to remember in Carboxylic acid & Derivative

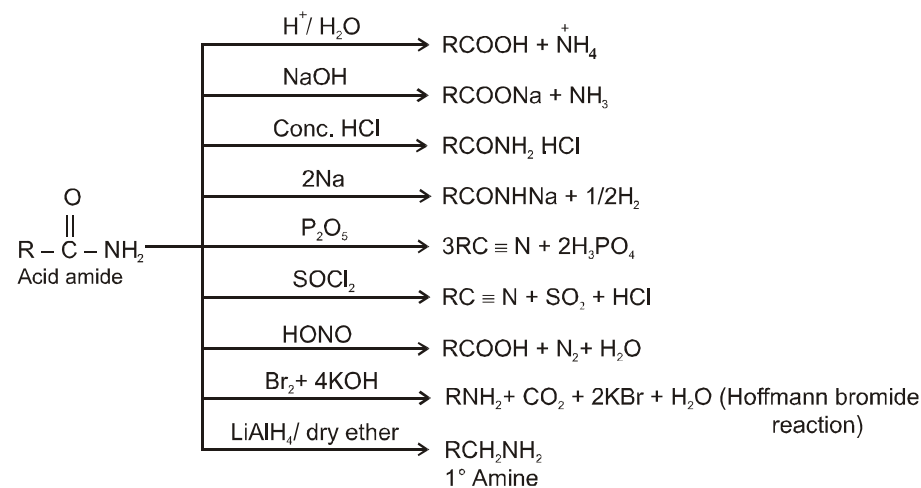
Summary of reactions of carboxylic acids :



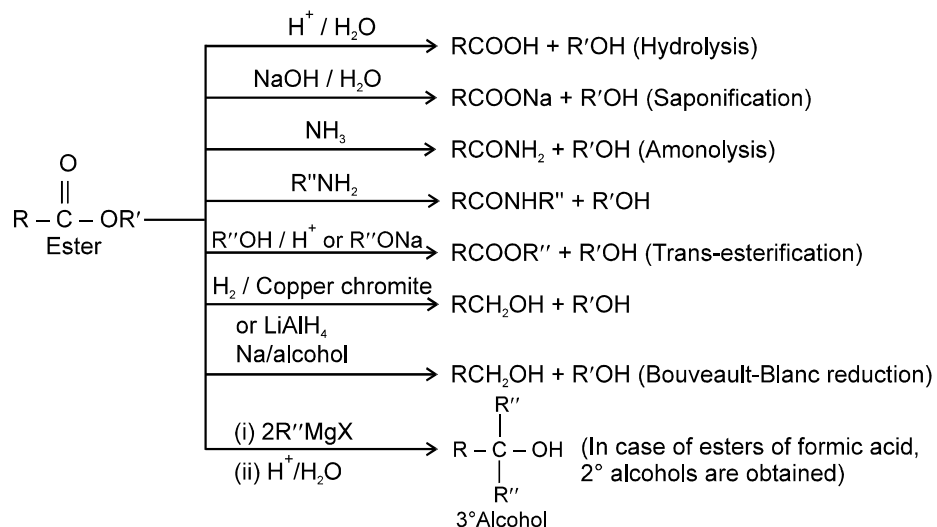
Summary of reactions of acid halide



Summary of reaction of amide:



Summary of reaction of esters :



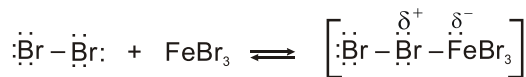
• Points to remember in Aromatic Compounds

Electrophilic aromatic substitution :

(a) Bromination of Benzene :

Bromination follows the general mechanism for electrophilic aromatic substitution. Bromine itself is not sufficiently electrophilic to react with benzene, but a strong Lewis acid such as FeBr_3 catalyzes the reaction.

Step 1 : Formation of a stronger electrophile.



Step 2 : Electrophilic attack and formation of the sigma complex.

