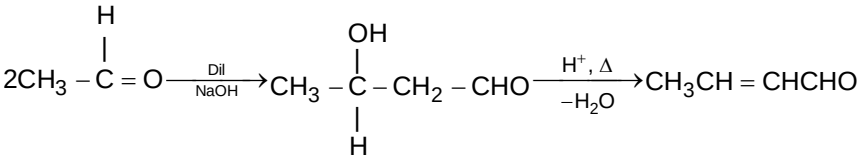
• Points to remember in Aldehyde & ketone

Aldol condensation :

Carbonyl compounds having acidic sp^3 α-H shows this reaction in presence of dil. NaOH or dil. acid.



Crossed aldol condensation

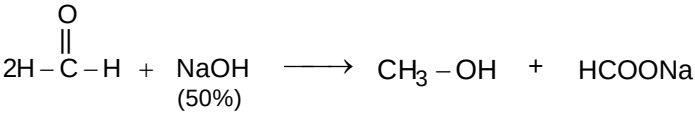
(i) $CH_3CHO + HCHO \xrightarrow{\text{Dil. NaOH}} HOCH_2–CH_2–CHO \xrightarrow[\Delta]{H^+ / H_2O} CH_2=CH–CHO$

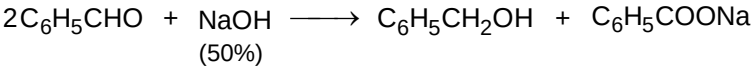
(ii) $CH_3COCH_3 + HCHO \xrightarrow{\text{Dil. NaOH}} CH_3CO–CH_2CH_2OH \xrightarrow[\Delta]{H^+ / H_2O}$

$CH_3CO–CH=CH_2$

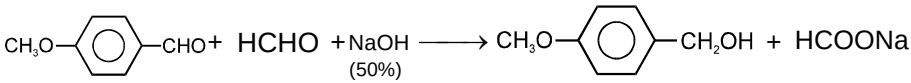
Cannizzaro reaction :

Carbonyl compounds not having $sp^3\alpha$-H shows following disproportion reaction

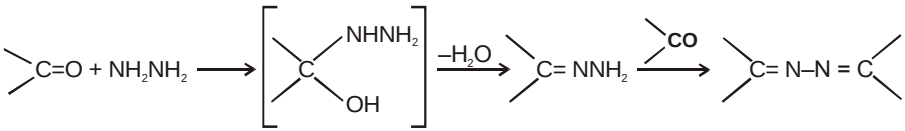




Crossed Cannizzaro reaction :



Formation of hydrzones and azines



Perkin reaction :

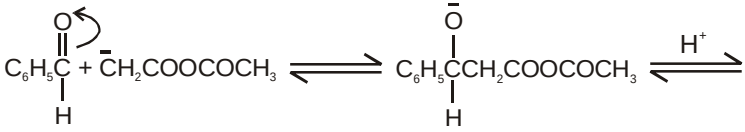
When benzaldehyde (or any other aromatic aldehyde) is heated with the

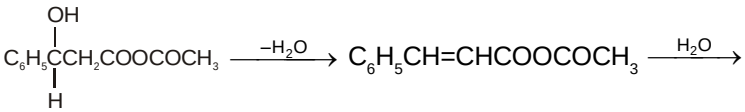
anhydride of an aliphatic acid (containing two α-hydrogen atoms) in the presence of its sodium salt, condensation takes place to form a β-arylacrylic acid ; e.g., with acetic anhydride and sodium acetate, cinnamic acid is formed.

$$C_6H_5CHO + (CH_3CO)_2O \xrightarrow{CH_3CO_2Na} C_6H_5CH=CHCO_2H$$

Mechanism :

$$CH_3COOCOCH_3 + CH_3CO_2^- \rightleftharpoons \bar{C}H_2COOCOCH_3 + CH_3CO_2H$$

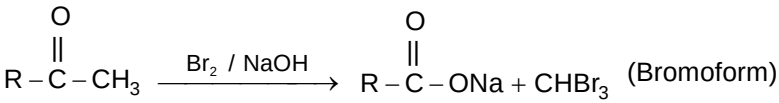




$$C_6H_5CH=CHCOOCOCH_3 + H_2O \longrightarrow C_6H_5CH=CHCO_2H + CH_3CO_2H$$

Haloform reaction :

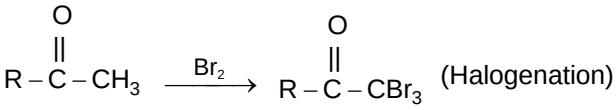
Acetaldehyde and methylalkyl ketones react rapidly with halogen (Cl_2, Br_2 or I_2) in the presence of alkali to give haloform and acid salt.



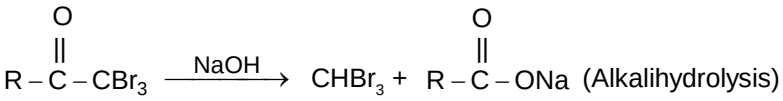
In this reaction $-CH_3$ of $CH_3-\overset{O}{\overset{\|}{C}}-$ group is converted into haloform as it contains acidic hydrogen atom and rest-part of alkyl methyl ketone give acid salt having carbon atom corresponding to alkyl ketone.

Preparation of haloform from methylketone involves two steps.

(a) Halogenation



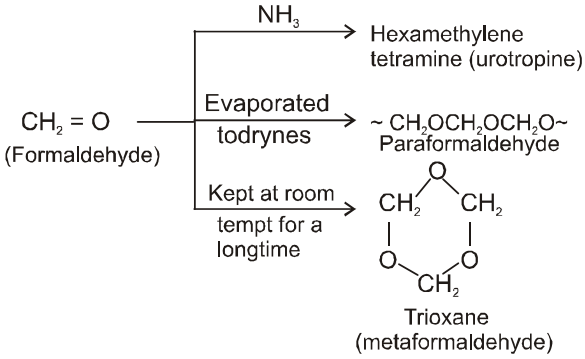
(b) Alkalihydrolysis



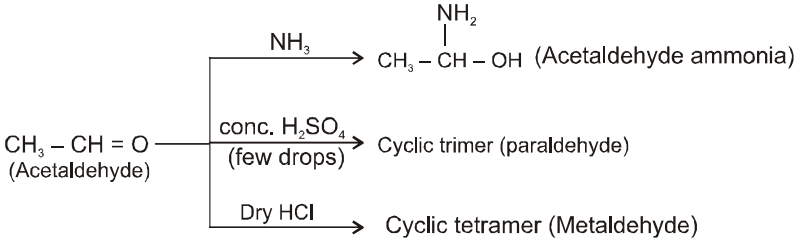
Note : This reaction is used to distinguish the presence of $CH_3-\overset{O}{\overset{\|}{C}}-$ group.

Other reactions :

(1)



(2)



(3)