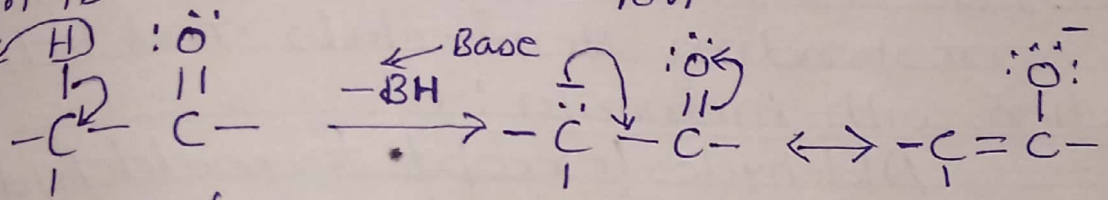
Dr Chandan Kr Choudhary,
R.N College Pandaul.

Aldehydes and Ketones:

Acidity of α-Hydrogen :→

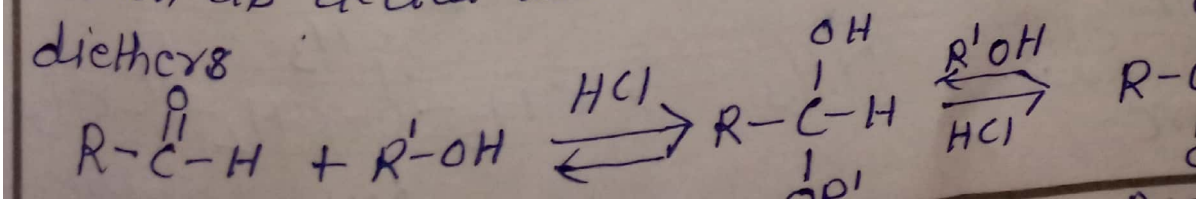
A carbon atom next to the carbonyl group is called an α-carbon. A hydrogen attached to an α-carbon is called α-hydrogen. The α-hydrogen of aldehydes and ketones are acidic in nature. The acidity is due to the fact that the anion, which result form the removal of an α-hydrogen by a base, is stabilised by resonance. The resonance stabilized anion is called Enolate ion.



The α-carbon of the enolate ion is negatively charged. It ~~act~~ can act as a nucleophile. The formation of the enolate ion followed by its ~~addb~~ addition to a carbonyl group is the process involved in all the condensation reactions of aldehydes and ketones.

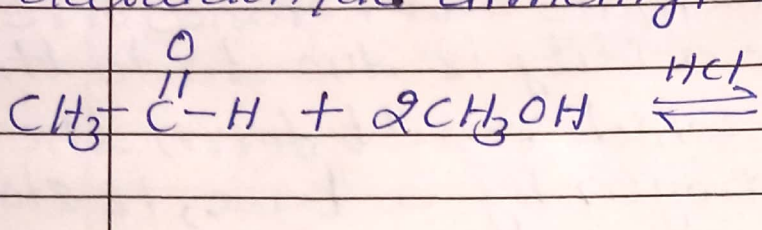
Addition of alcohols :→

Alcohols react with aldehydes in the presence of anhydrous HCl to form unstable addition Products known as Hemiacetals. These hemiacetals further react with alcohol to form stable compounds known as acetal which is also known as geminal diethers



Hemi Acetal
Acetal
gem. diether

The reaction is reversible. A large excess of alcohol is used to shift the equilibrium in favour of acetal formation. The reaction of acetaldehyde with methyl alcohol results in the formation of acetaldehyde dimethyl acetal.

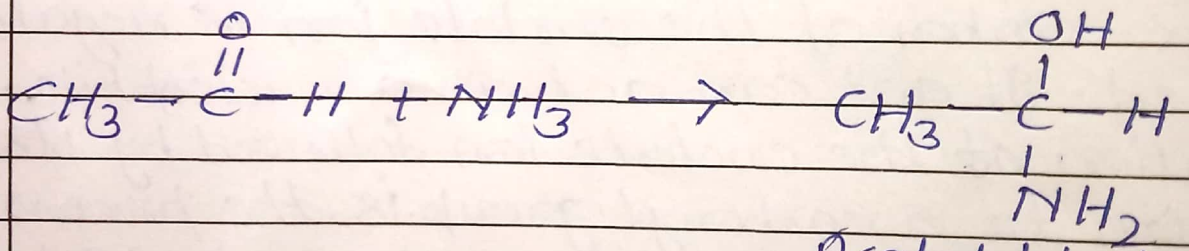


Acetal.

Ketones do not react with alcohols to form the corresponding Hemiketals and ketals.

Reaction with Ammonia :→

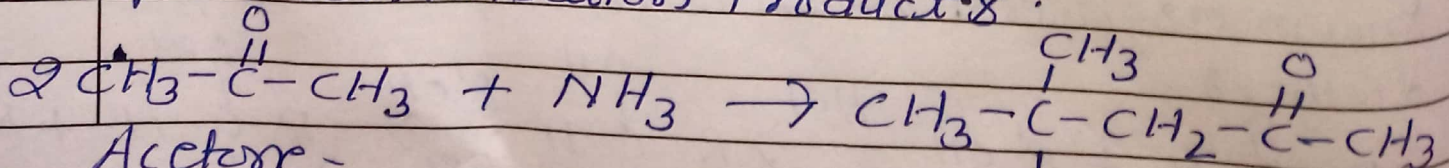
Aldehydes (except formaldehyde) react with ammonia to form solid aldehyde ammonias.



Acetaldehyde ammonia

The aldehyde ammonias when heated with dilute acids, regenerate the aldehydes. Thus the formation and decomposition of these compounds is used for purification of aldehydes.

Formaldehyde and ketones do not form addition Product with ammonia, but instead yield complex condensation Products.



Acetone-

Diacetone amine

Remarks .....

Teacher's Signature .....