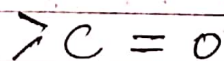


Aldehydes and Ketones



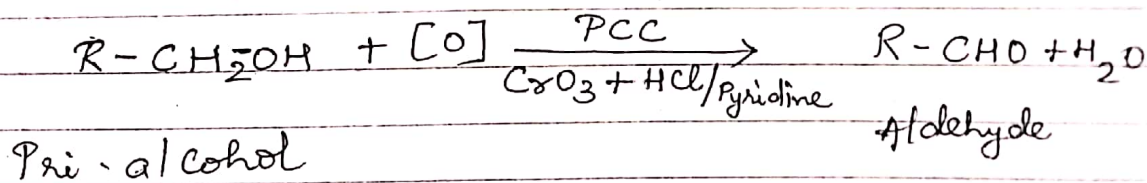
Aldehydes and ketones are known as Carbonyl compounds because these have common Carbonyl group ($>C=O$).

* General methods of preparation of Aldehydes and Ketones :-

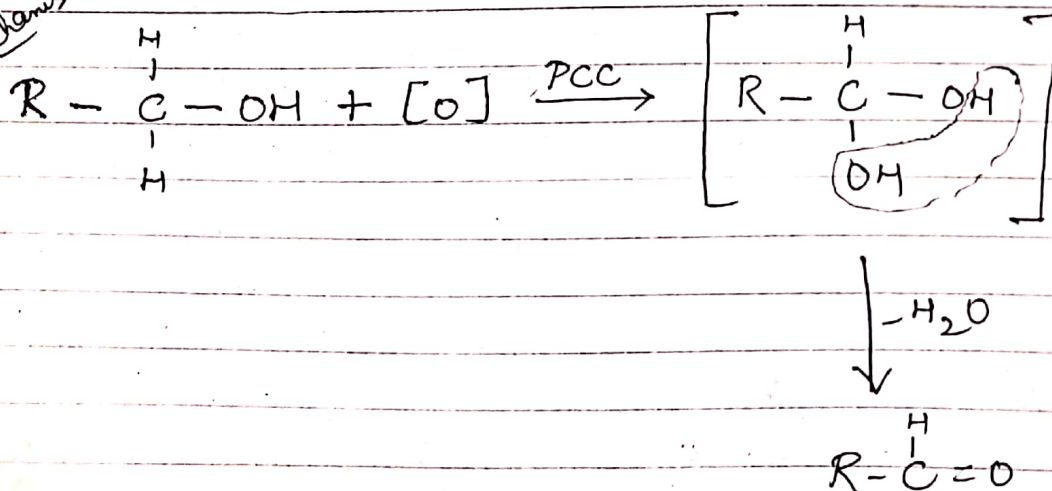
① From Alcohols :-

~~Aldehydes are converted into primary alcohol by using Pyridine chlorochromate~~

Primary alcohols are oxidised to Aldehydes by using Pyridine chlorochromate (PCC). In this case aldehydes do not oxidise to Carboxylic acid.



Mechanism

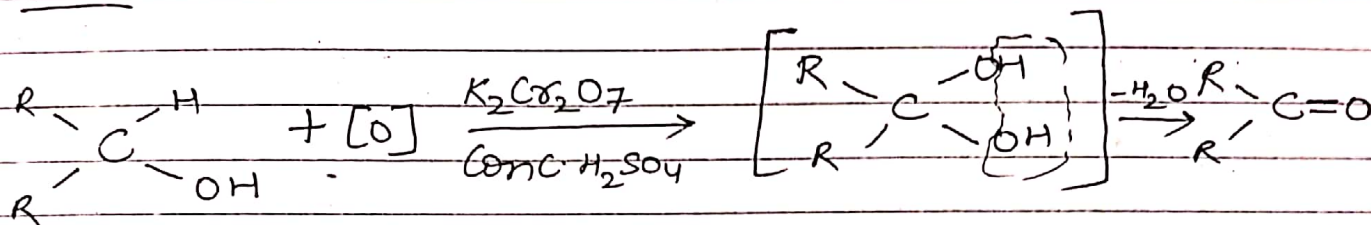


$$\begin{array}{c} R \\ \diagdown \\ CH-OH \\ \diagup \\ R \end{array} + [O] \xrightarrow[\text{Conc. } H_2SO_4]{K_2Cr_2O_7} \begin{array}{c} R \\ \diagdown \\ C=O \\ \diagup \\ R \end{array} + H_2O$$

Ketone

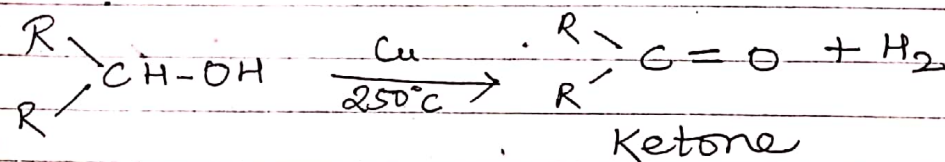
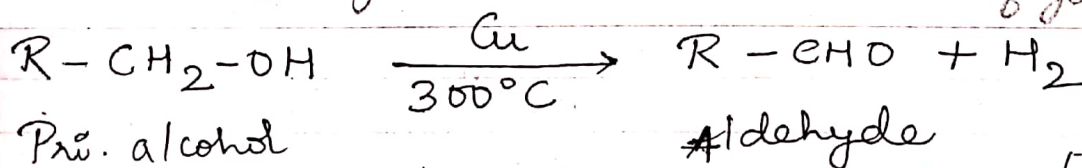
Sec. Alcohol

Mechanism



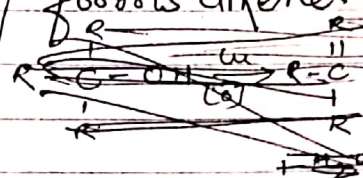
(2) Catalytic Dehydrogenation of Alcohols :-

On heating with Copper, Primary and Secondary alcohols are converted into corresponding aldehydes and ketones by removal of hydrogen. (Hydrogen is absorbed not released in the form of gas)



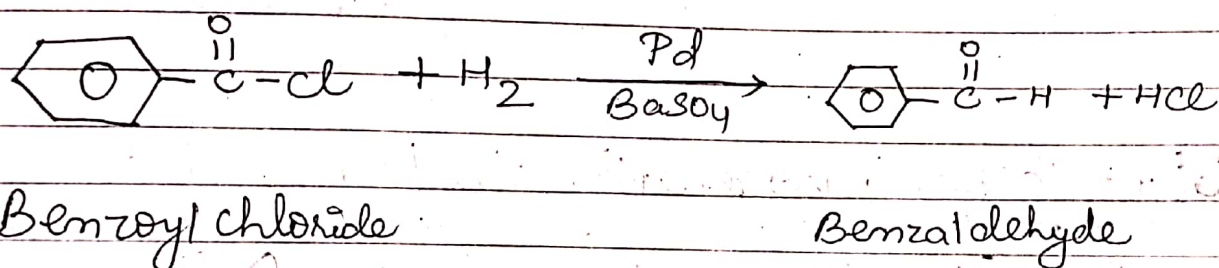
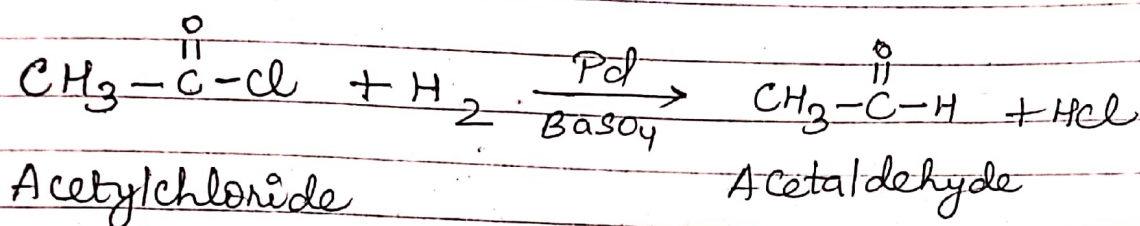
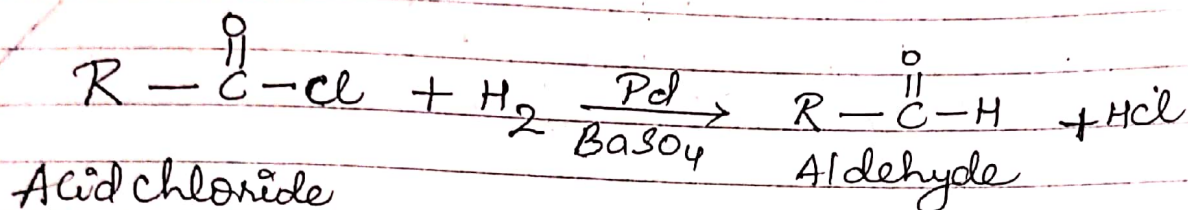
Sec. alcohol

Tertiary alcohol
forms alkene.

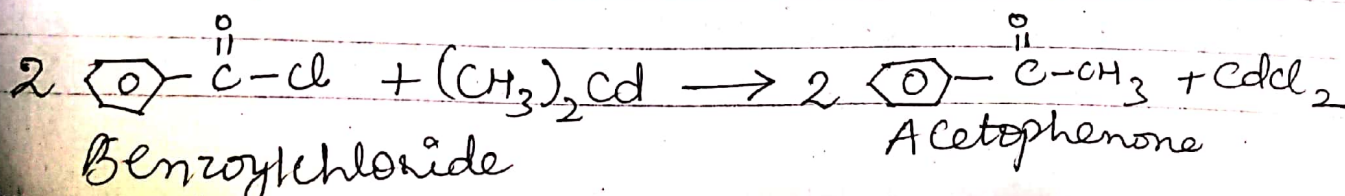
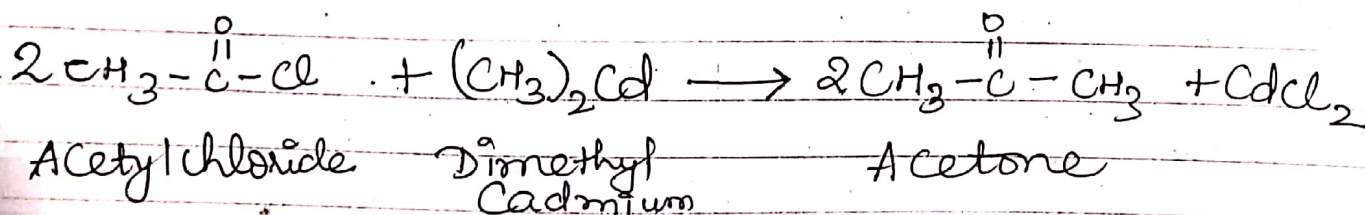
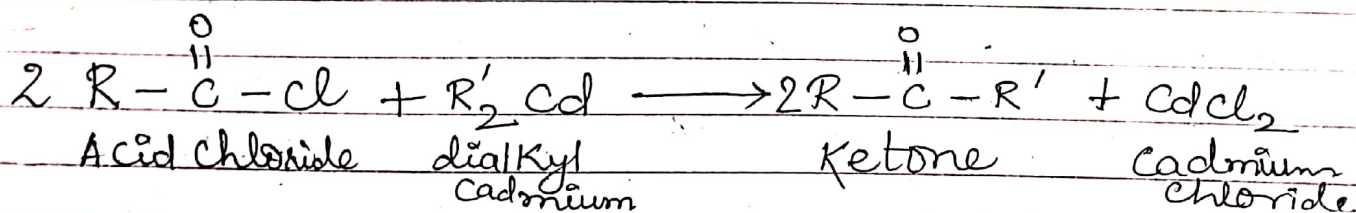


③ From Acid chlorides :-

(a) Acid chlorides are converted into aldehyde by reduction with Rosenmund Catalyst (Pd/BaSO_4) or by using (NaBH_4) Sodium borohydride

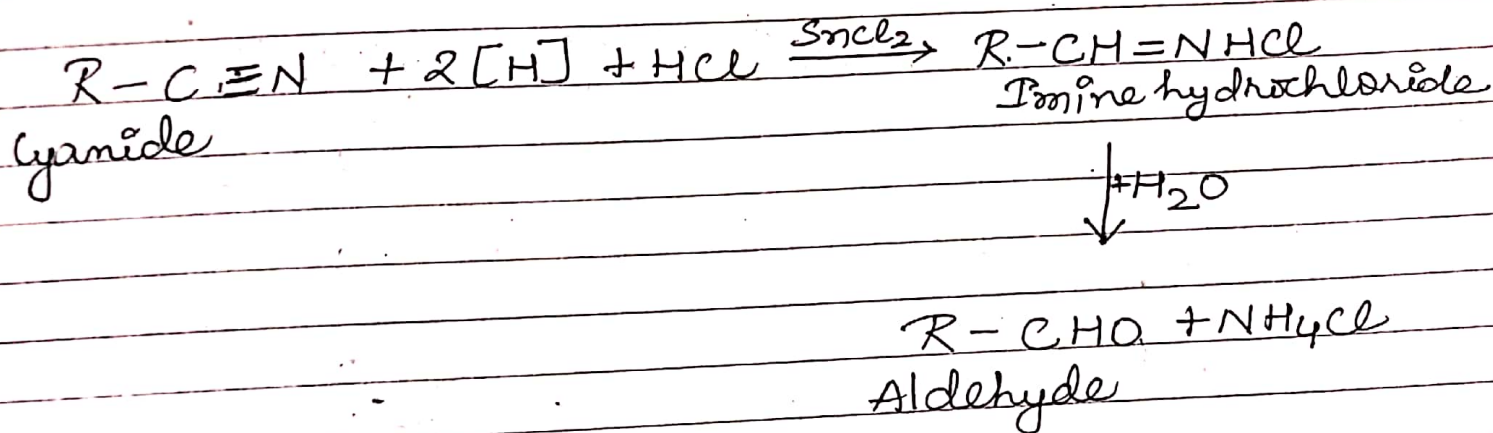


(b) Acid chlorides are converted into ketones by action of dialkyl Cadmium.

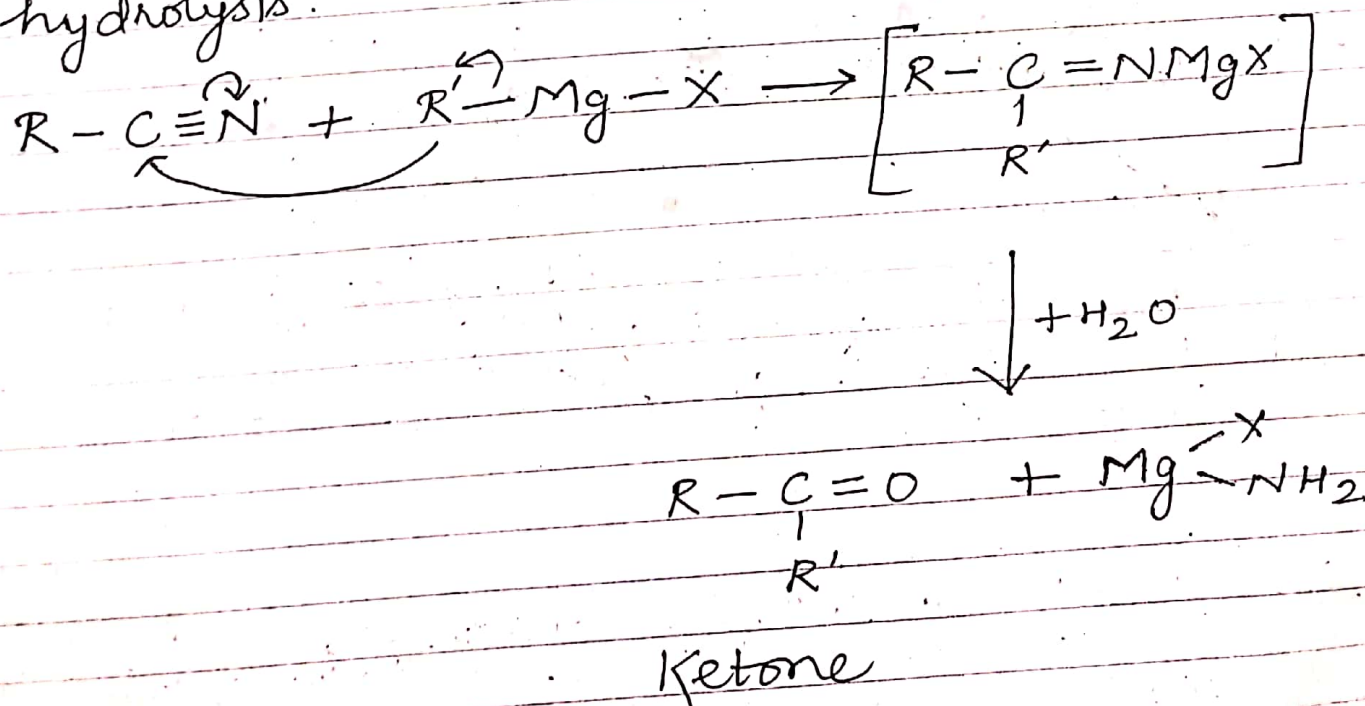


(4) From Cyanides or Nitriles :-

(a) Cyanides are converted into aldehydes by ^{Stephen} ~~Stephen~~ reduction. In this process, cyanides are converted into imine hydrochloride which on hydrolysis ^{is} converted into aldehyde.

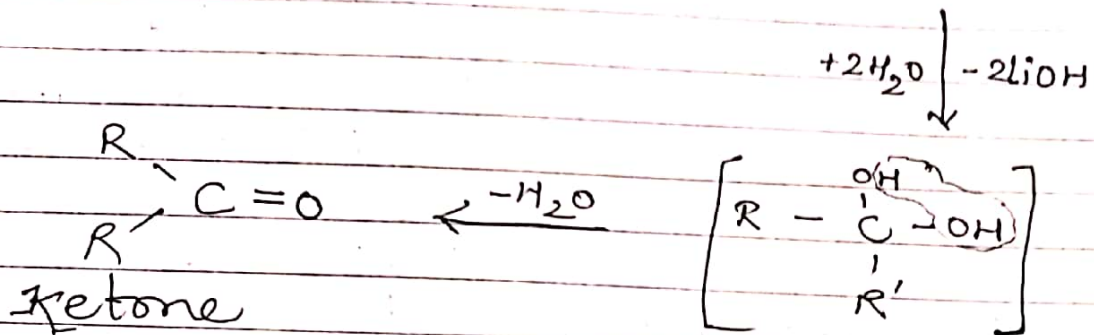
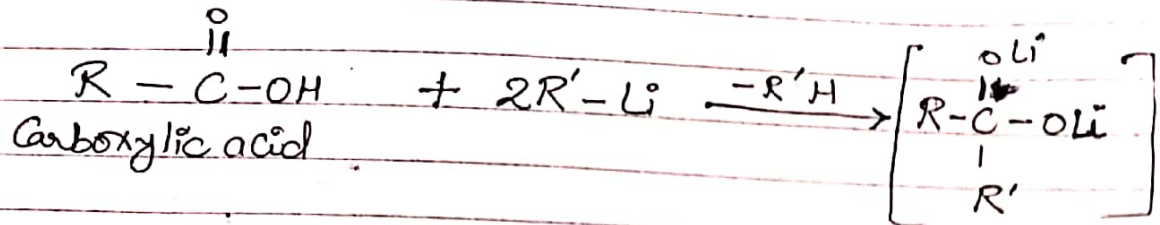


(b) Cyanides are converted into ketone by action of Grignard Reagent followed by hydrolysis.



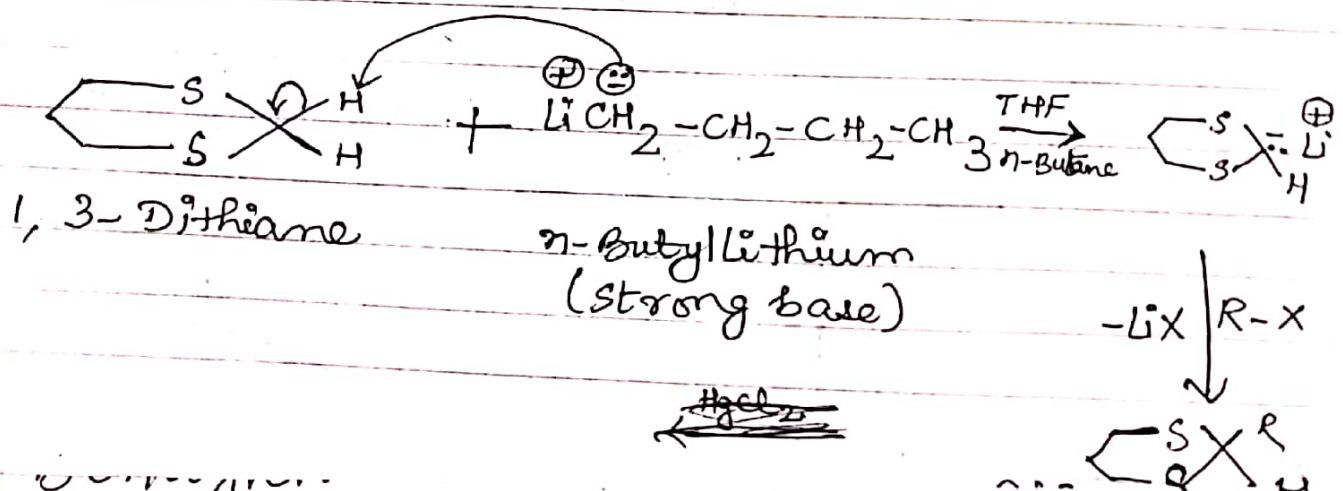
(5) Preparation of Aldehydes and Ketones from Carboxylic Acid :-

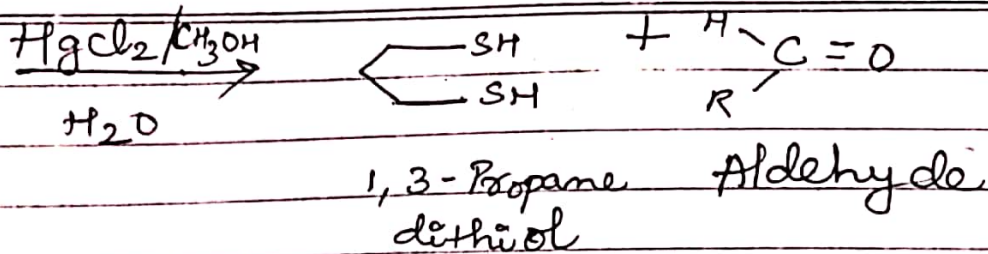
By action of alkyl or aryl Lithium Compounds followed by hydrolysis, Carboxylic acids are converted into ketones.



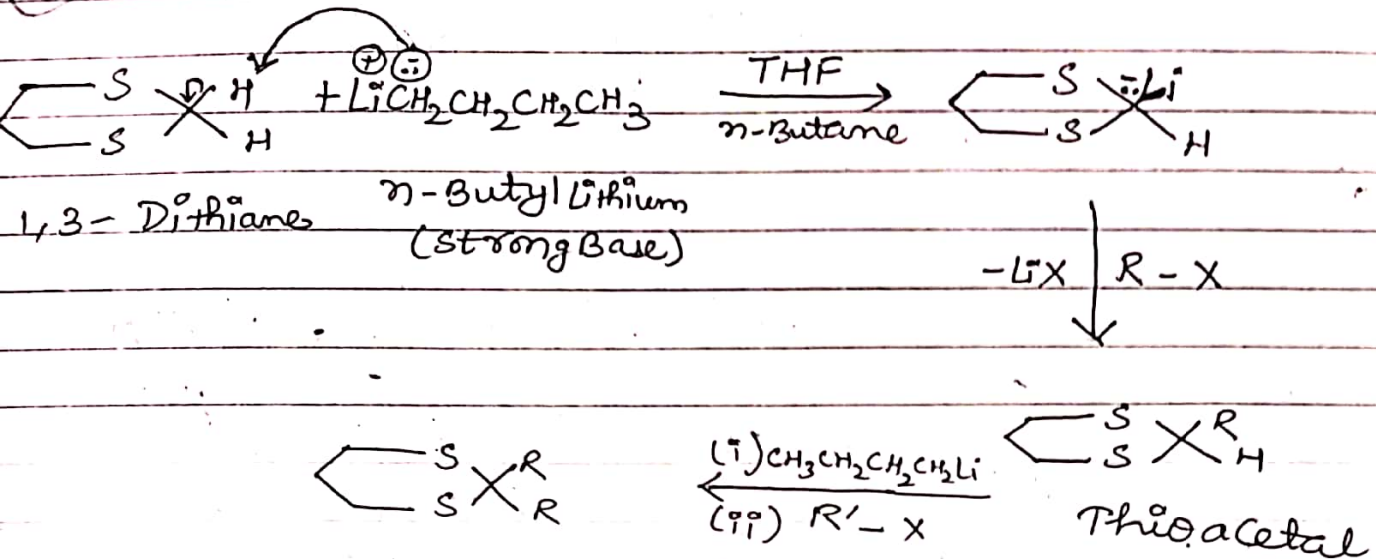
(6) Synthesis of Aldehydes and Ketones from 1,3-dithianes $\left(\begin{smallmatrix} \text{S} \\ \text{S} \end{smallmatrix} \right)$

Dithianes are converted into aldehydes and ketones by action of *n*-Butyllithium which acts as strong base. Synthesis is completed by following steps -





Preparation of Ketone



Thioacetal

