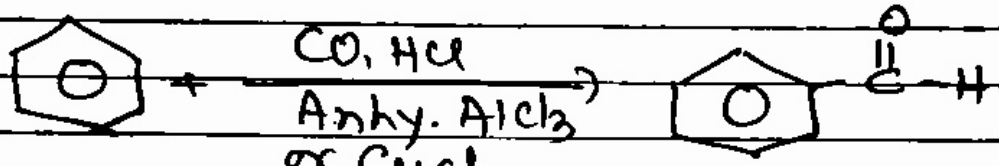
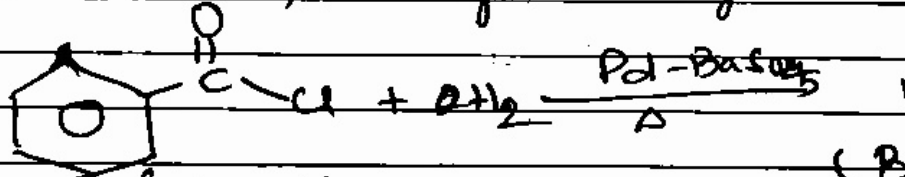
3. Gatterman-Koch reaction :→

When benzene or its derivatives is treated with Carbon monoxide & HCl in presence of Anhy. $AlCl_3$ or $CuCl_2$ or CuCl it give Benzaldehyde.



Benzaldehyde.

V.V.9 4. By Rosenmund reaction :→ When acyl Chloride (acid chloride) is treated with H_2 in presence of Pd on Basoy & heat it form Corresponding aldehyde.

a) 

(Benzoyl Chloride) (Benzaldehyde)

It is a partial hydrogenation reaction.

b) $R-COCl + H_2 \xrightarrow{Pd\text{-}BaSoy} R-CHO + HCl$

In this reaction Lindler Catalyst (Pd-BaSoy) a Poisoned Pd is used as Catalyst which help for partial hydrogenation, & here BaSoy act as poison for Pd, So in ponsence of BaSoy with Pd there is partial hydrogenation and in absence of BaSoy there is Complete hydrogenation and it give alcohol as product.

Note H–C–Cl is unstable so H–C–H (Methanal) can

not be prepared by this method.

Preparation of Ketone :→

1. By Acyl Chloride or Acid Chloride →

At first Grignard reagent is treated with Cadmium chloride to form dialkylcadmium further when acid chloride / Acyl Chloride react with dialkyl cadmium it gives Ketone & $CdCl_2$.

$$2\,R-Mg-X + CdCl_2 \longrightarrow R_2'Cd + 2Mg\langle^{X}_{Cl}$$

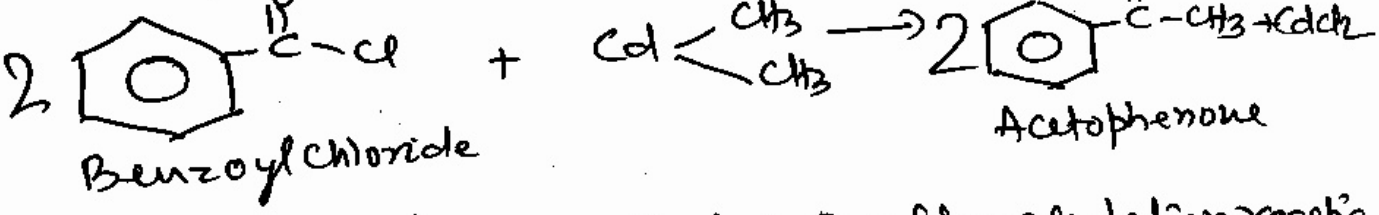
(Grignard reagent) (Dialkyl Cadmium)

$$R-\overset{O}{\overset{\|}{C}}-Cl + Cd\langle^{R'}_{R'} \longrightarrow 2\,R-\overset{O}{\overset{\|}{C}}-R' + CdCl_2$$

i.e $$2\,CH_3-\overset{O}{\overset{\|}{C}}-Cl + (CH_3)_2-Cd \longrightarrow 2\,CH_3-\overset{O}{\overset{\|}{C}}-CH_3 + CdCl_2$$

OR $$2\,CH_3-\overset{O}{\overset{\|}{C}}-Cl + Cd\langle^{CH_2-CH_3}_{CH_2-CH_3} \longrightarrow 2\,\overset{1}{CH_3}-\overset{2}{\overset{\|}{C}}-\overset{3}{CH_2}-\overset{4}{CH_3}$$

But-2-one + $CdCl_2$

OR 

Benzoyl Chloride

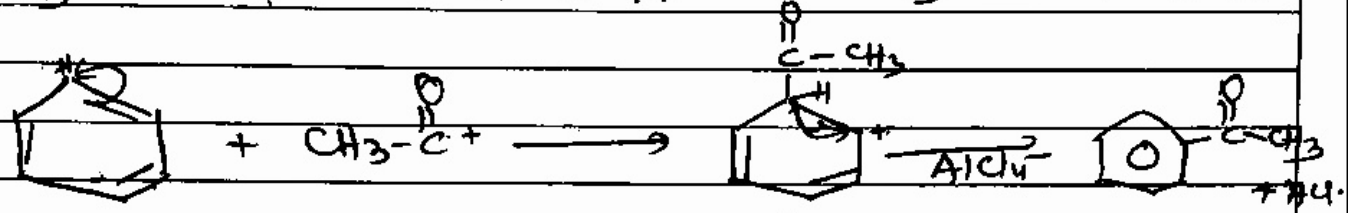
Acetophenone + $CdCl_2$

2. from Benzene or Friedal Crafts acylation reaction

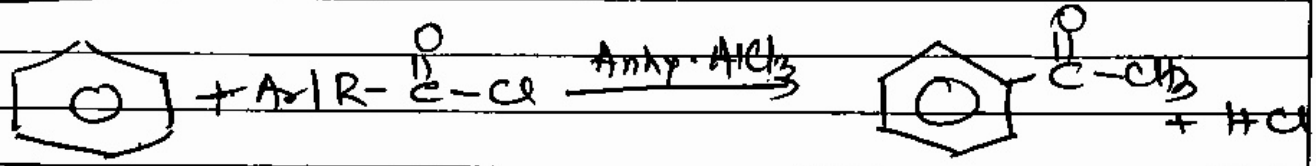
By the help of Benzene we can prepare Ketone when it react with acid chloride / Acyl Chloride in presence of anhy. $AlCl_3$ it gives Ketone. In this reaction Anhy. $AlCl_3$ is called Friedal Craft reagent.

During reaction first acid chloride reacts with Anhy. $AlCl_3$ to form electrophile i.e $CH_3\overset{+}{C}=O$ which attacks on benzene ring to give ketone.

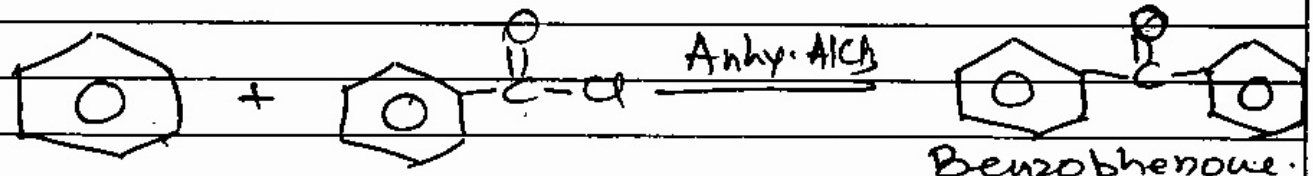
$$CH_3-\overset{O}{\overset{\|}{C}}-Cl + \text{Anhy. } AlCl_3 \longrightarrow CH_3-\overset{O}{\overset{\|}{C}}{}^{+} + AlCl_4^-$$



→ General reactions

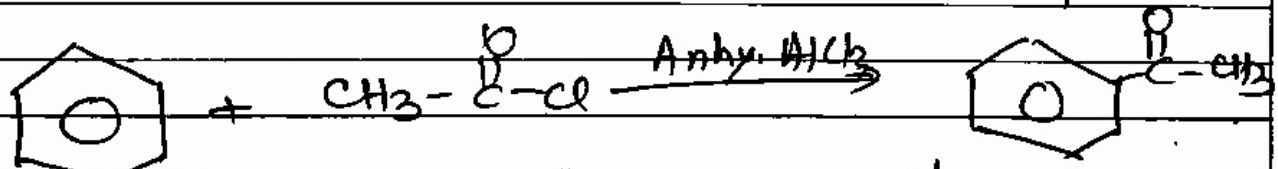


OR



Benzophenone.

Or

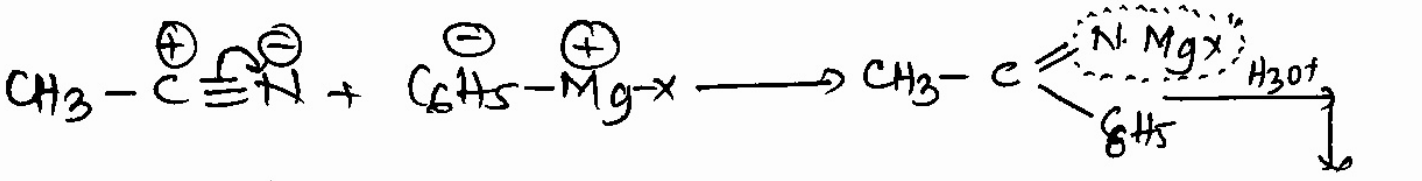


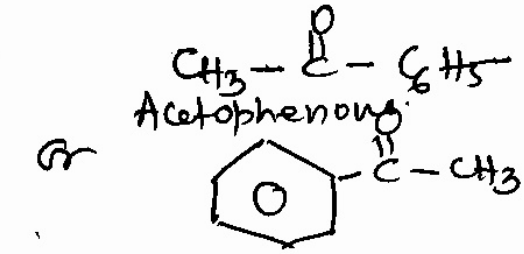
Acetophenone.

3. By nitriles :→

When alkane nitriles react with Grignard reagent (by using R or Ar) then first it form an unstable product which on further hydrolysis in acidic medium it form Ketones!

Teacher's Signature : _____





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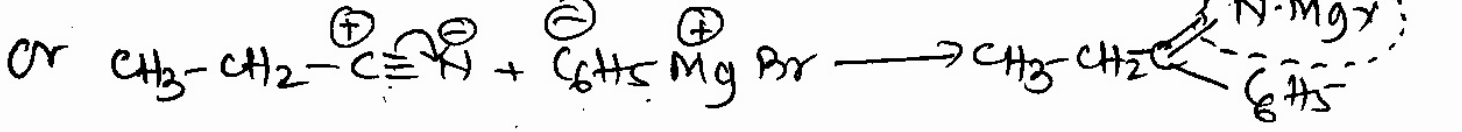

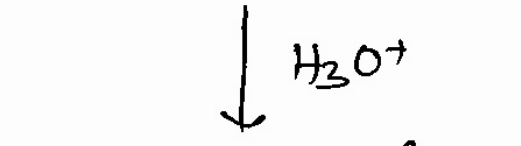

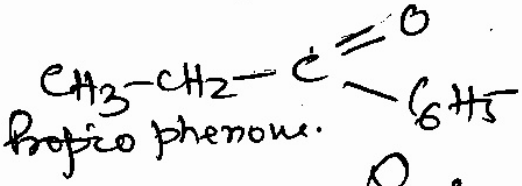

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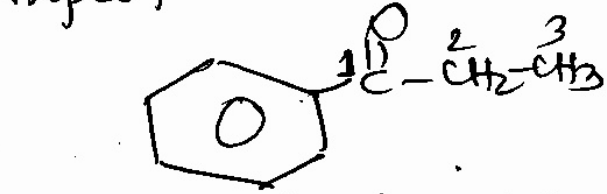
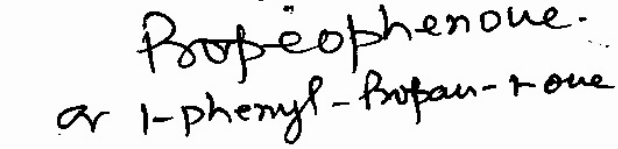


Propiophenone.

Or



Propeophenone.

or 1-phenyl-Propan-1-one