Important *Name Reactions* of Chemistry in Class 12th CBSE and ISC Board

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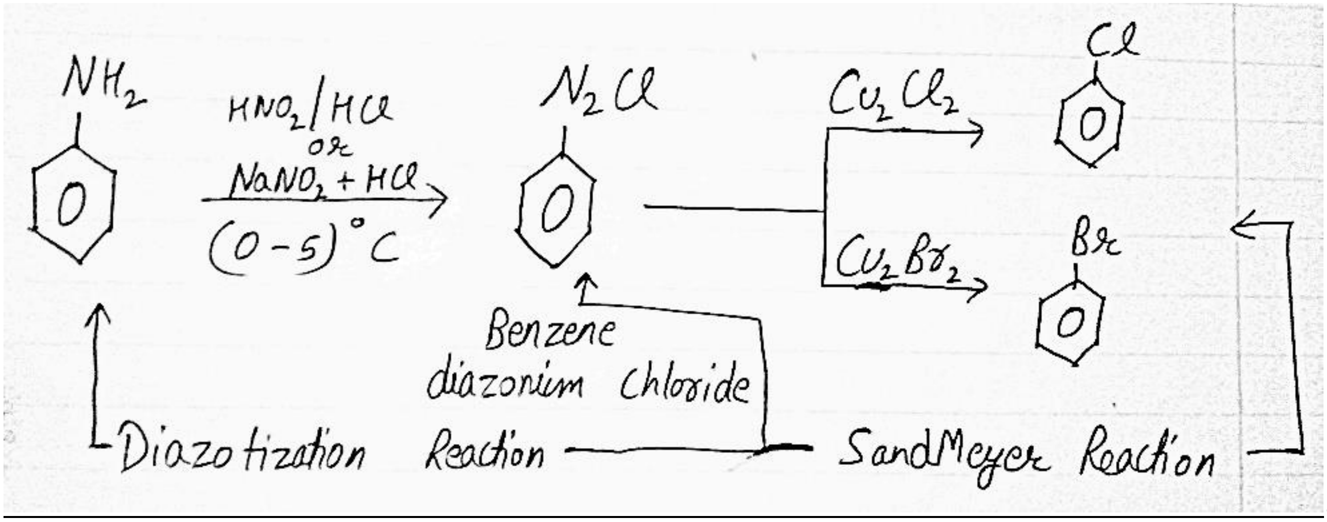
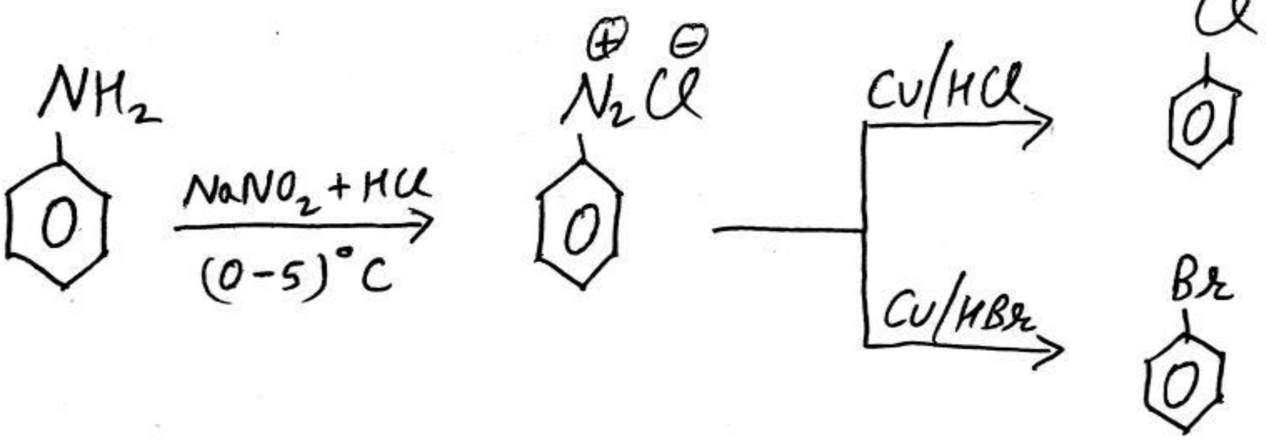
1. SANDMEYER REACTION

The **DIAZONIUM ($C_6H_5N_2Cl$)** is prepared by treating ice cold solution of **ANILINE ($C_6H_5NH_2$)** in excess of *dilute* **HCl** with an *aqueous solution* of **$NaNO_2$** at low temperature (0-5)°C and the reaction is known as ***DIAZOTIZATION REACTION***. **BROMO** and **CHLORO ALKANES** can be prepared by treating a freshly prepared **DIAZONIUM SALT** with **CUPPEROUS BROMIDE** or **CUPPEROUS CHLORIDE** and this reaction is called as ***SANDMEYER REACTION.***



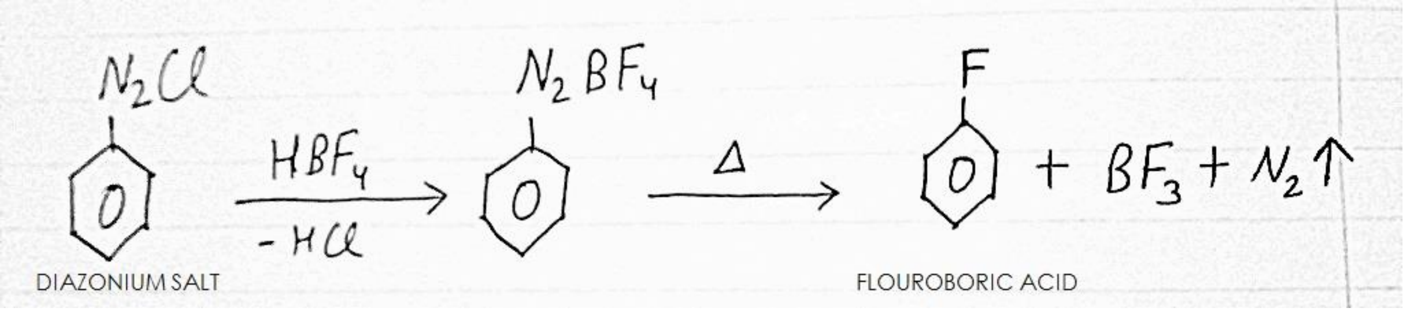
2. GATTERMANN REACTION

This Reaction is same as **SANDMEYER REACTION**. But the only difference between both of them is that here we use *COPPER POWDER (Cu)* in the presence of *HCl/HBr*, and in **SANDMEYER REACTION** we use Cu_2Cl_2/Cu_2Br_2 as catalyst.



3. BALZ-SCHIEMANN REACTION

It is a method of preparation of **FLOUROBENZENE**. In this method **DIAZONIUM SALT** is reacted with **FLOUROBORIC ACID**, followed by heating the *complex compound formed*.



4. FINKELSTEIN REACTION

ALKYL IODIDE (R-I) are often prepared by the Reaction of **ALKYL CHLORIDE (R-Cl)** or **ALKYL BROMIDE (R-Br)** with **SODIUM IODIDE (NaI)** in *Dry Acetone*.

$$R-X + NaI \longrightarrow R-I + NaX$$

$$(X = Cl, Br)$$

5. SWARTZ REACTION

FLOUROALKANE (ex. – CH_3CH_2F) are prepared by treating **ALKYL CHLORIDE (ex. – CH_3CH_2Cl)** or **BROMIDE (ex. – CH_3CH_2Br)** in the presence of metallic **FLOURIDES** such as **AgF, Hg_2F_2, CoF_2** etc.

$$CH_3-CH_2-Br + AgF \xrightarrow{\Delta} CH_3-CH_2-F + AgBr$$

6. WURTZ REACTION

ALKYL HALIDE/HALOALKANE react with metallic **SODIUM** in the presence of *DRY ETHER* to form **ALKANE** containing double the no. of *CARBON* atom as present in parent **ALKYL HALIDE**.

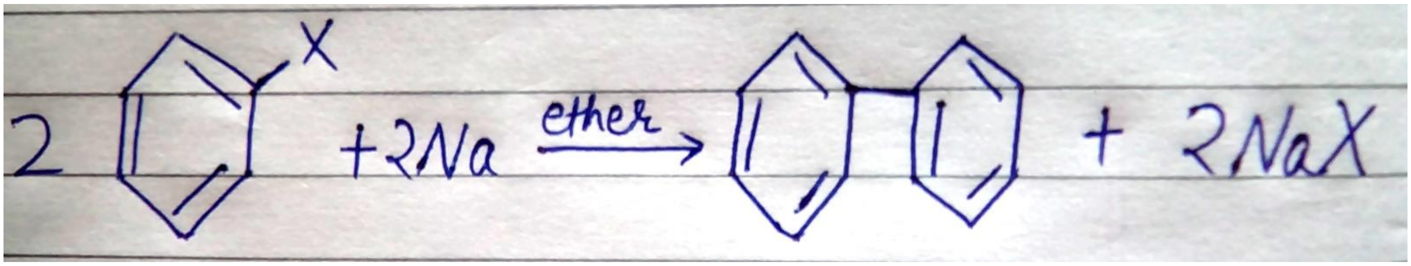
$$R-\boxed{X + 2Na + X}-R \xrightarrow[\text{ether}]{\text{dry}} R-R + 2NaX$$

e.g :-

$$CH_3-CH_2-\boxed{Br + 2Na + Br}-CH_2-CH_3 \xrightarrow[\text{dry ether}]{-2NaBr} CH_3-CH_2-CH_2-CH_3$$

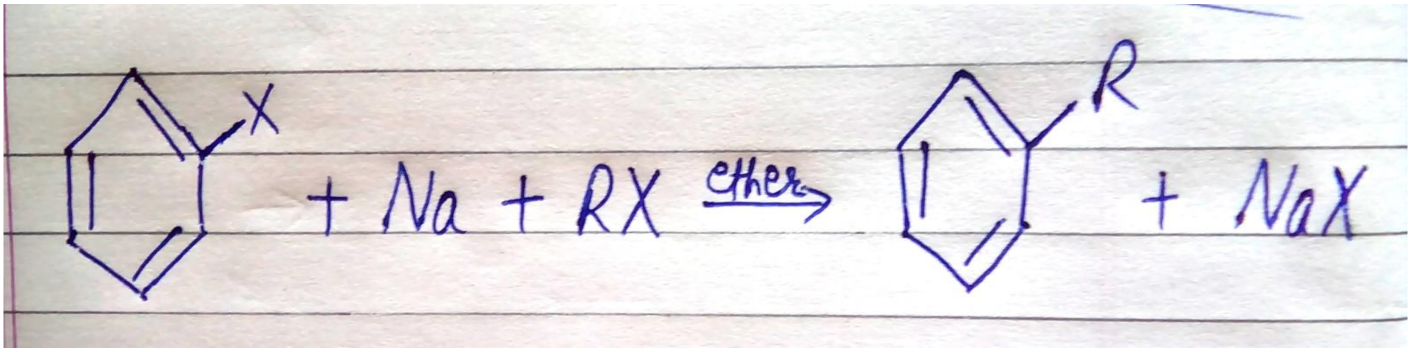
7. FITTIG REACTION

Aryl Halides prepared with **Sodium** (Na) in dry ether to give analogous compounds where two aryl groups joined.



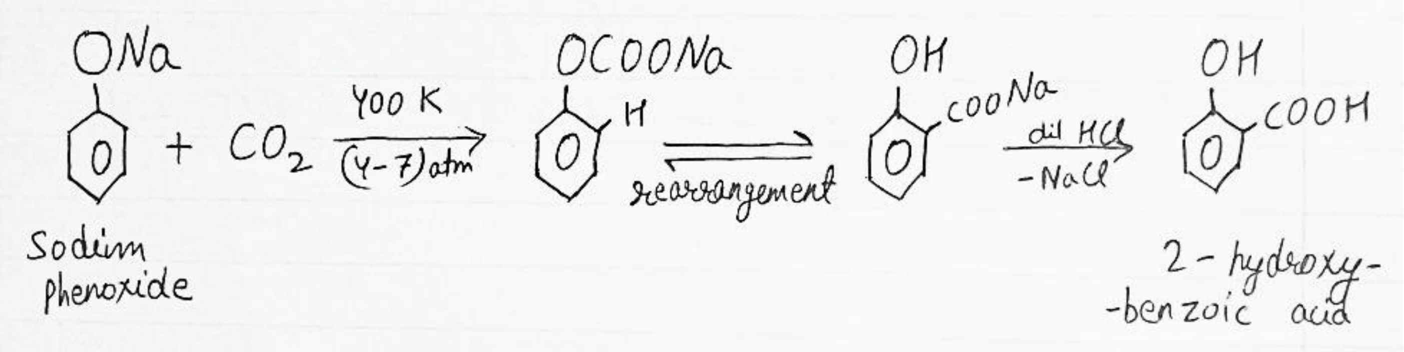
8. WURTZ-FITTIG REACTION

When a mixture of Alkyl Halide and Aryl Halide gets treated with sodium in dry ether, we get an Alkyl Arene.



9. KOLBE-SCHMITT REACTION

SODIUM PHENOXIDE (C_6H_5ONa) when heated with **CARBON DIOXIDE (CO_2)** at 400 Kelvin under a pressure of (4-7)atm followed by acidification gives **2-HYDROXYBENZOIC ACID (SALICYLIC ACID)** as the main product. This Reaction is called **KOLBE'S REACTION**.



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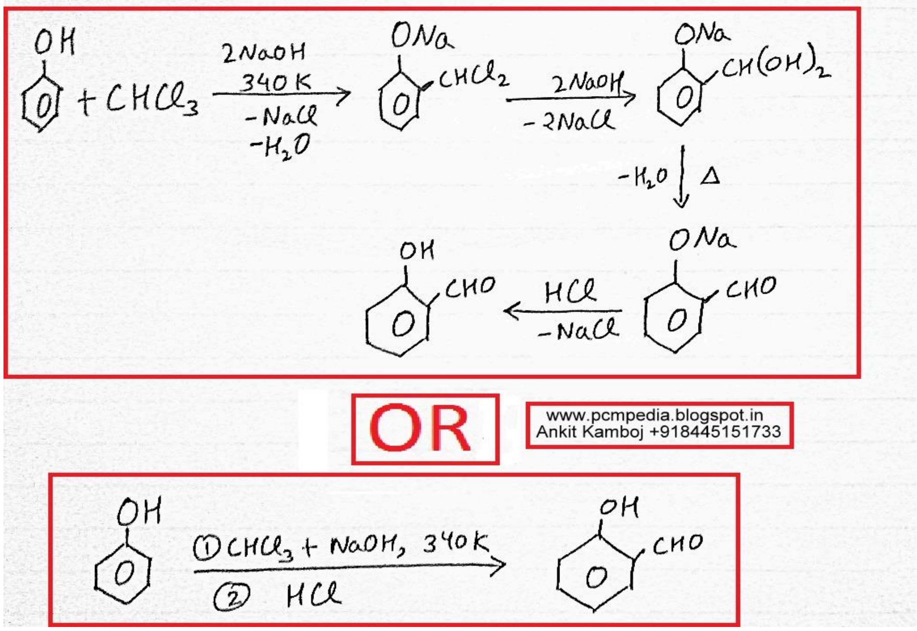
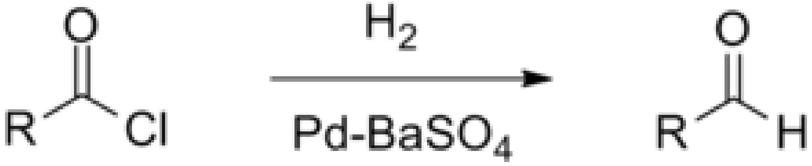
10. REIMER TIEMANN REACTION

When **PHENOL (C_6H_5OH)** reacts with **CHLOROFORM ($CHCl_3$)** in the presence of *NaOH* (SODIUM HYDROXIDE), a *CHO group* is introduced at *ortho position* of the Ring. This Reaction is known as REIMER TIEMANN REACTION.



11. Roesnmund Reaction

The Rosenmund Reduction is a hydrogenation process in which an Acyl Chloride is selectively reduced to an Aldehyde. The reaction is catalysed by Palladium on Barium Sulphate.



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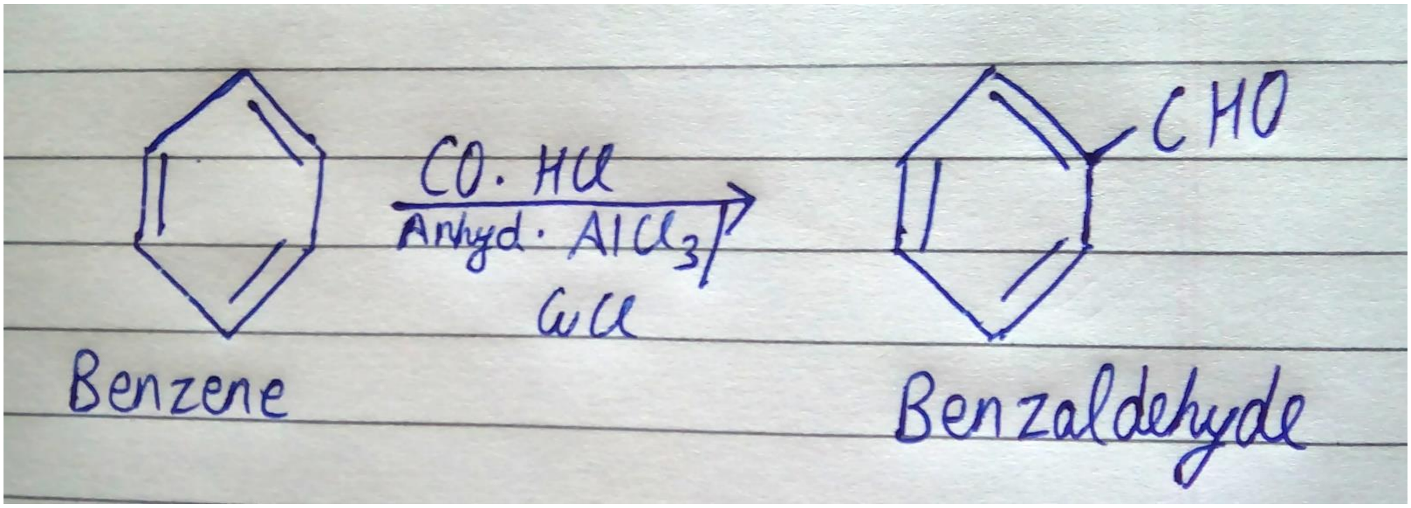
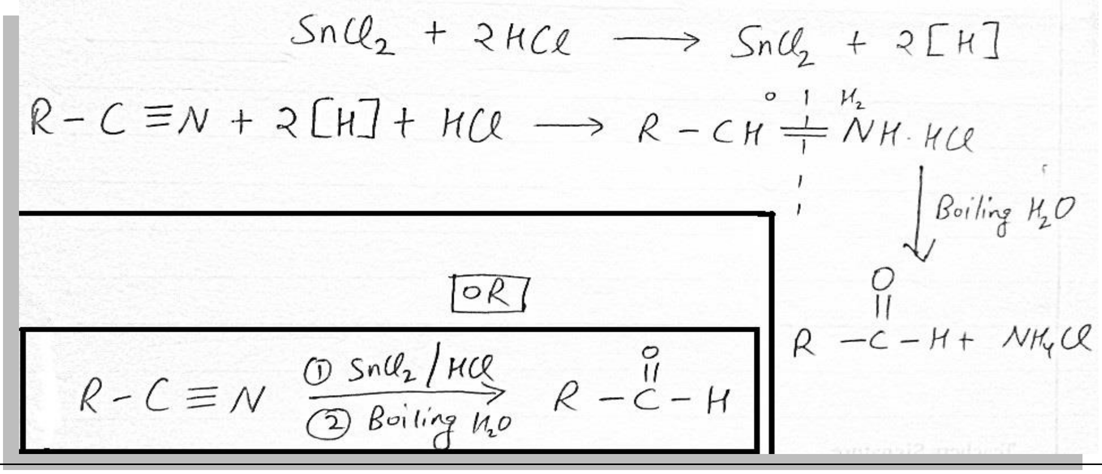
12. GATTERMAN-KOCH REACTION

When **Benzene** or **its derivative** is treated with *Carbon Monoxide (CO)* and *Hydrogen Chloride (HCl)* in the presence of *Anhydrous* $AlCl_3$ *or* $CuCl_2$, it gives **Benzaldehyde** or **substituted benzaldehyde**. This Reaction is called **Gatterman Koch Reaction**.



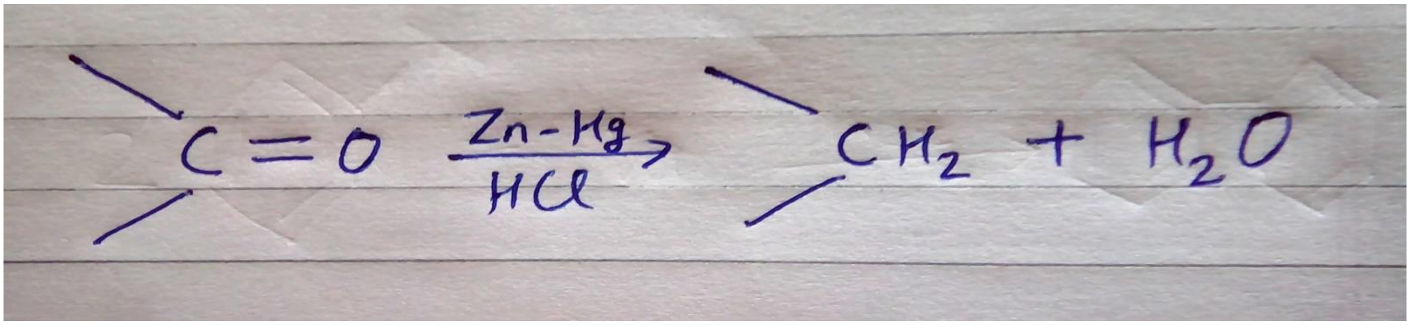
13. STEPHEN REACTION

When *Ethereal solution* of a *Nitrile* is reduced with **STANNOUS CHLORIDE ($SnCl_2$)** in the presence of **HYDROCHLORIC ACID (HCl)** at room temperature, **Imine Hydrochloride (R–CH=NH.HCl)** is formed. This up on Hydrolysis with boiling H_2O give *Aldehyde* and the Reaction is called **STEPHEN REACTION**.



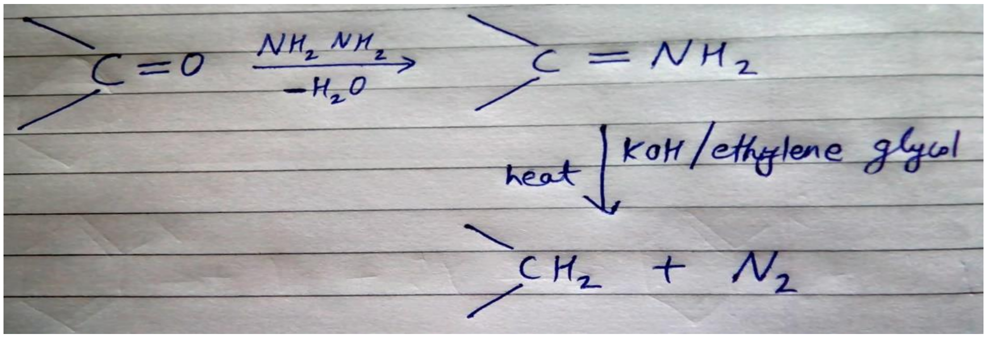
14. CLEMMENSEN REDUCTION

Aldehyde and Ketone are reduced to corresponding hydrocarbon when they are reacted with a mixture of Zinc Mercury Alloy and Concentrated HCl. This reaction is called as Clemmensen Reduction.



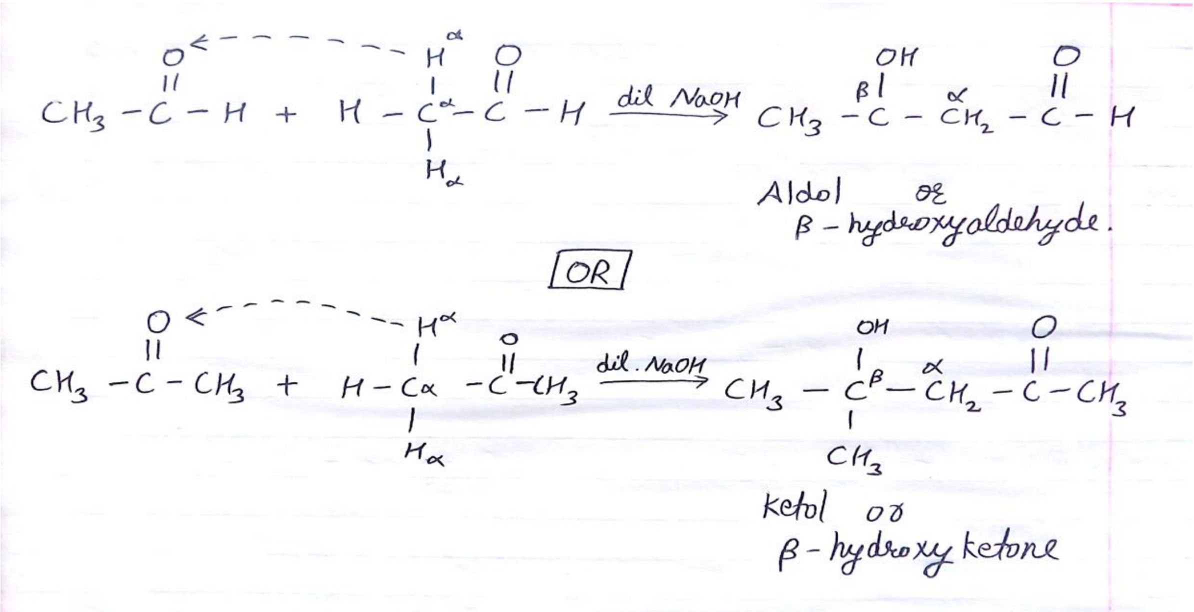
15. WOLFF - KISHNER REDUCTION

Carbonyl group of Aldehydes and Ketones on treatment with Hydrazine which on heating with Potassium Hydroxide in high boiling solvent (ethylene glycol) reduced to CH_2 group.



17. ALDOL CONDENSATION

In this Reaction two Molecules of an **ALDEHYDE** or a **KETONE** condense in presence of a *Dilute* **ALKALI** (*Dilute* **NaOH, Na_2CO_3, $Ba(OH)_2$** etc.) to form a **β-hydroxyaldehyde** or **β-hydroxyketone** resp. These β-hydroxyaldehydes or ketones are collectively called **ALDOLS**.



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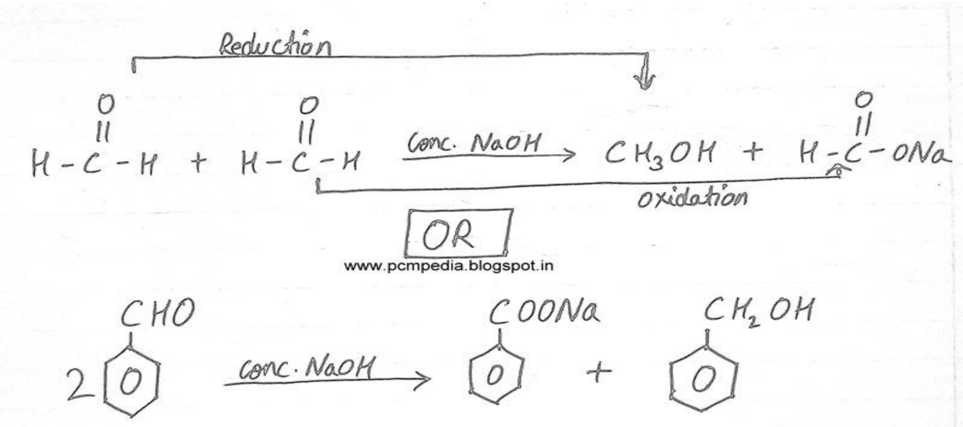
18. CANNIZZARO REACTION

ALDEHYDES which do not contain a **α–hydrogen** atom when treated with concentrated **ALKALI SOLUTION (NaOH)** undergo *disproportionation reaction*, i.e. self-Oxidation/Reduction. As a result one molecule is oxidized to **CARBOXYLIC ACID** and another molecule is reduced to **ALCOHOL**.



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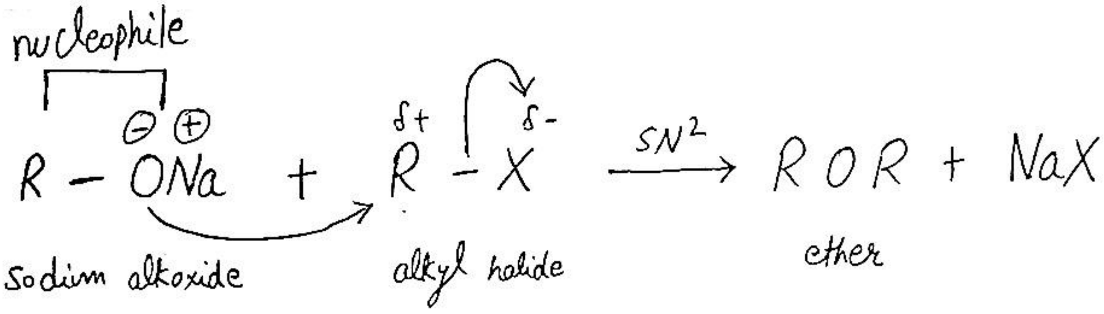
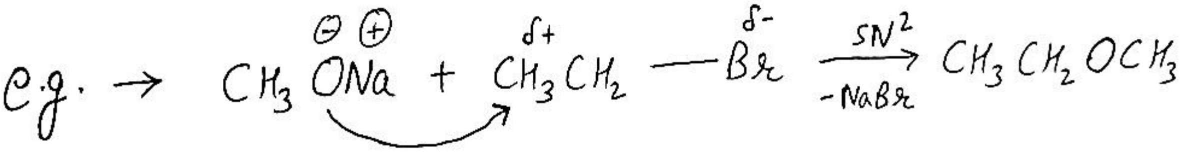
22. WILLIAMSON SYNTHESIS

It is an important Laboratory method for the preparation of *Symmetrical* and *Unsymmetrical **ETHER***. In this method an **ALKYL HALIDE** is allowed to react with **SODIUM ALKOXIDE**.





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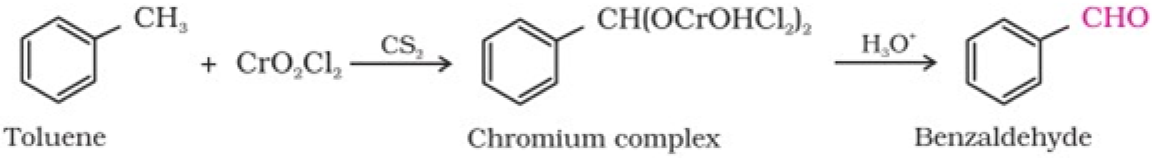
24. ETARD REACTION

Chromyl chloride oxidises methyl group to get chromium complex which on hydrolysis provides corresponding benzaldehyde.



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25. HELL – VOLHARD ZELINSKY (HVZ) REACTION

Carboxylic acids having an α-hydrogen are halogenated at the α-position on treatment with chlorine (Cl) or bromine (Br) in the presence of small amount of red phosphorus to give α-halocarboxylic acid. This reaction is known as HVZ reaction.

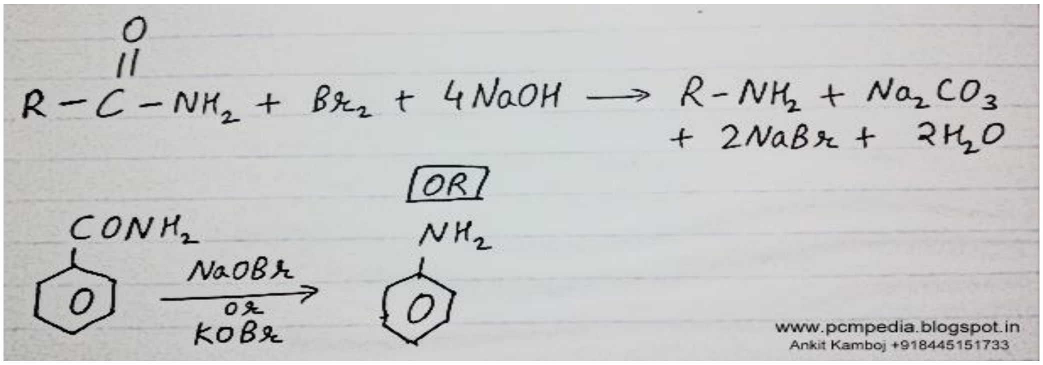
$$R\text{-}CH_2\text{-}COOH \xrightarrow[\text{(ii) } H_2O]{\text{(i) } X_2\text{/Red phosphorus}} R\text{-}\underset{X}{\underset{|}{C}}H\text{-}COOH$$

X = Cl, Br

α – Halocarboxylic acid

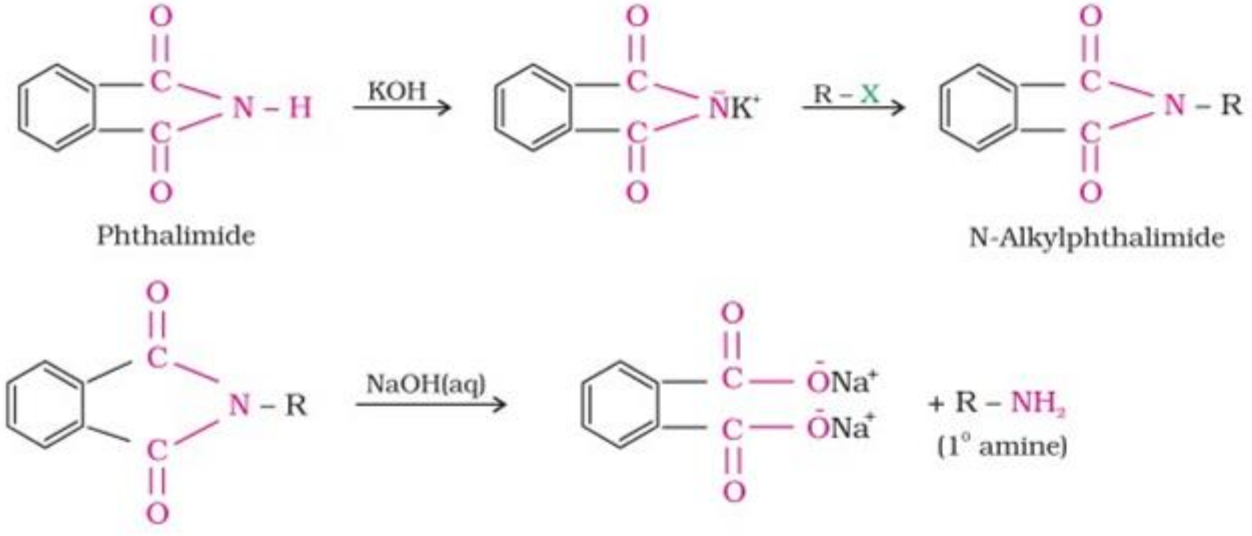
27. HOFMANN BROMIDE REACTION

When a Primary **AMIDE** is treated with an Aqueous or Alcoholic *NaOH (SODIUM HYDROXIDE)* or *KOH (POTASSIUM HYDROXIDE)* solution and **BROMINE**, it gives a Primary AMINE which has *one CARBON atom less than the original A**MIDE***.



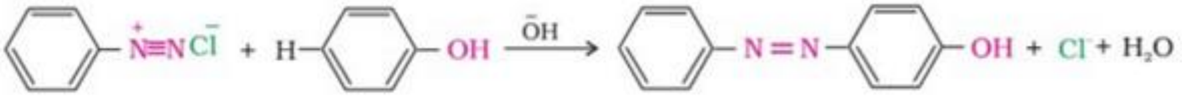
28. GABRIEL PHTHALIMIDE SYNTHESIS

Phthalimide prepared with Ethanolic Potassium Hydroxide produces Potassium salt of Phthalimide when heated with Alkyl Halide followed by Alkaline hydrolysis forms the corresponding primary Amine.



29. COUPLING REACTION

Benzene diazonium chloride gets reacted with phenol in which the phenol molecule at its para position is mixed with the diazonium salt to give p-hydroxyazobenzene.



p-Hydroxyazobenzene (orange dye)

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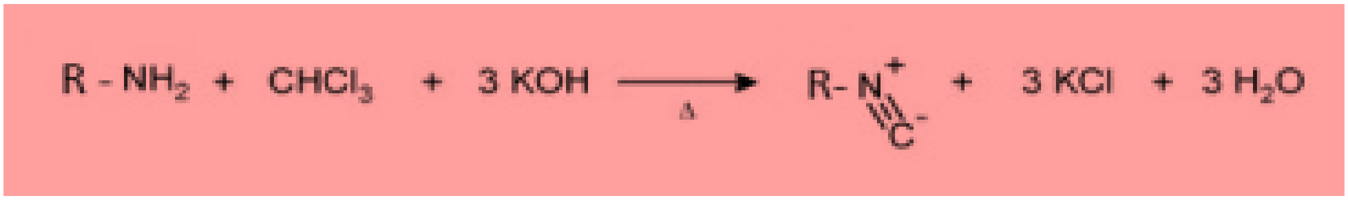
30. CARBYLAMINE REACTION

Primary amine (both aliphatic and aromatic) when warmed with chloroform and alcoholic KOH, gives isocyanides (carbylamines). This is called carbylamine reaction. Carbylamines has an offensive smell. This reaction is answered only by primary amine and hence to distinguish primary amine from other classes of amines.



$$R-NH_2 + CHCl_3 + 3\,KOH \xrightarrow[\Delta]{} R-\overset{+}{N}\equiv\overset{-}{C} + 3\,KCl + 3\,H_2O$$

Preparation of Iodobenzene

Replacement of the **DIAZONIUM** Group by **IODINE** is done simply by *Shaking* the **DIAZONIUM SALT** with *KI*.