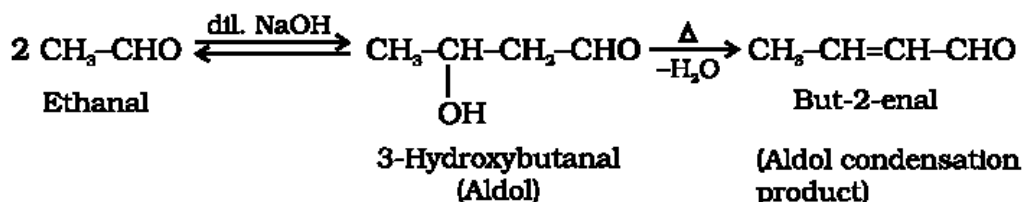


Organic Chemistry

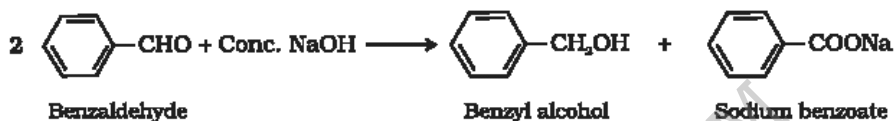
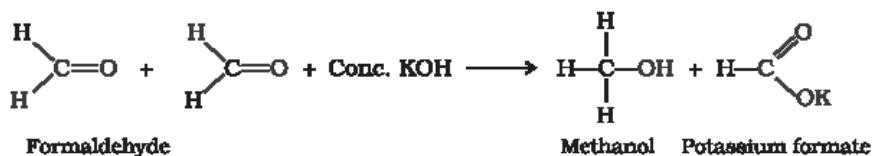
Name Reactions

1. Aldol Condensation: condensation between two molecule of an aldehyde or a ketone having atleast one α -hydrogen atom to form a β -hydroxyaldehyde or a β -hydroxyketone is known as aldol condensation.

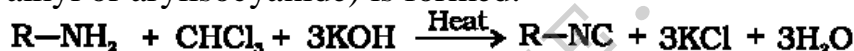


Aldol condensation takes place in presence of dil base.

2. Cannizzaro Reaction: The disproportionation (self-redox) of aldehydes lacking α -hydrogen atom (as $\text{C}_6\text{H}_5\text{CHO}$, HCHO , $\text{R}_3\text{C}\cdot\text{CHO}$ etc.) in presence of strong base to form salt of an acid & a primary alcohol is known as Cannizzaro reaction.

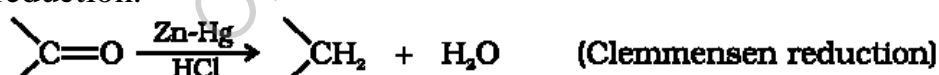


3. Carbylamine test: When a primary amine is heated with alcoholic caustic potash and chloroform, an offensive smelling compound called carbylamine (alkyl or arylisocyanide) is formed.

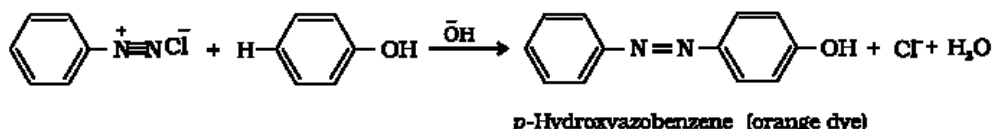


4. Claisen Condensation: The self condensation of ester containing α -hydrogen atom in the presence of an alkoxide ($\text{C}_2\text{H}_5\text{ONa}$) to give a β -ketoester is called Claisen condensation. Eg. Two molecule of ethylacetate condenses together to form ethyl β -ketobutanoate.

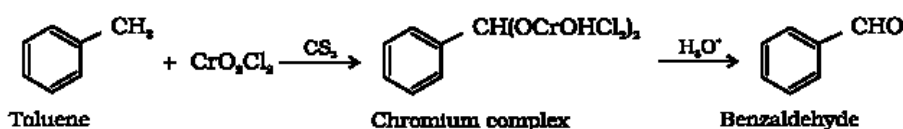
5. Clemmenson Reduction: The reduction of $>\text{C}=\text{O}$ group to methyl group ($>\text{CH}_2$) with amalgamated zinc and conc. HCl is known as Clemmenson reduction.



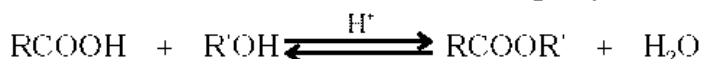
6. Coupling Reaction: The reaction in which a diazonium salt condenses with an aromatic compound having an electron rich group eg, aniline, phenol or their derivatives to form an azo compound (Ar-N=N-Ar) is termed as coupling reaction.



7. Etard Reaction: Chromyl chloride (CrO_2Cl_2) oxidizes methyl group to a chromium complex, which on hydrolysis gives corresponding benzaldehyde. It is called Etard reaction.



8. Esterification Reaction: Reaction of an alcohol with a carboxylic acid in the presence of a small quantity of conc. H_2SO_4 to form an ester is called esterification.



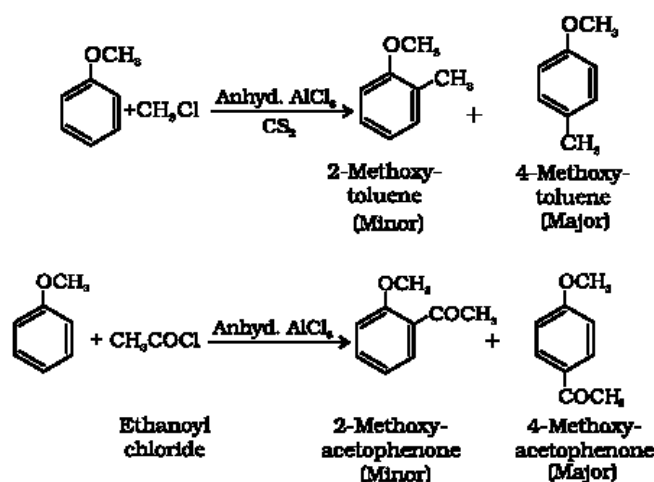
Esterification process is generally reversible.

9. Finkelstein Reaction: Alkyl iodides can be prepared by the reaction of alkyl chlorides/ bromides with NaI in dry acetone.



X=Cl, Br

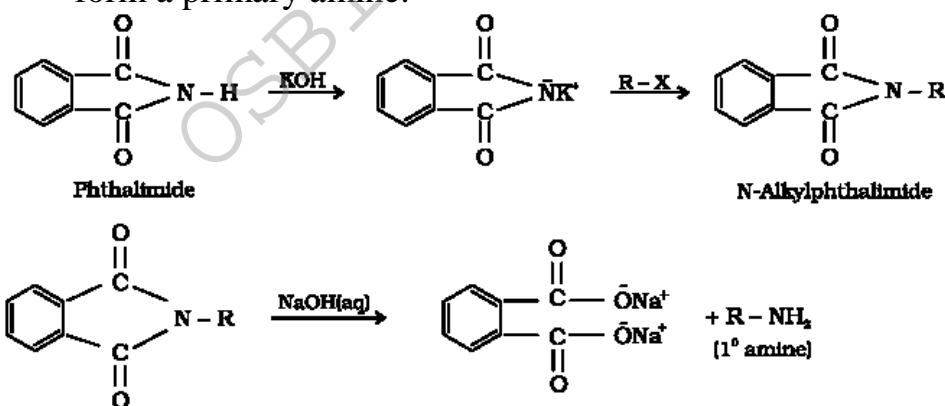
10. Friedel-Craft Reaction: Introduction of an alkyl (-R) or an acyl (RCO-) group in to the benzene ring of an aromatic compound in the presence of a lewis acid catalyst (eg.anhydrous aluminium chloride or Zinc chloride) is called as Friedel-Craft reaction).



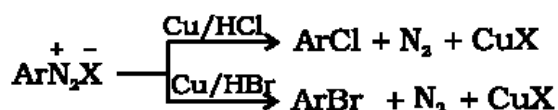
Introduction of an acyl group (RCO-) is called acylation.

11. Gabriel phthalimide synthesis: This method is used to prepare primary amine. The various steps involved are:

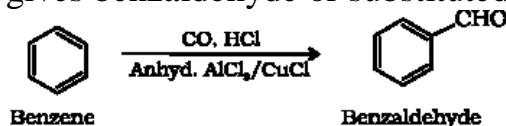
- i) phthalimide is treated with alcoholic solution of KOH to form potassium phthalimide.
- ii) The potassium salt is treated with an alkylhalide.
- iii) The product N-alkyl phthalimide is hydrolysed with dilute HCl to form a primary amine.



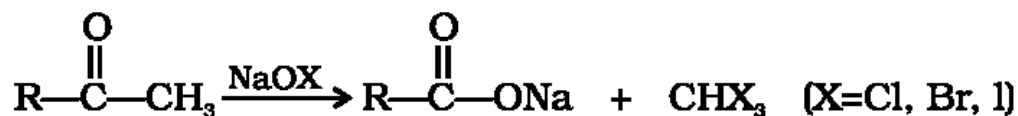
12. Gattermann Reaction: Gattermann reaction is used for obtaining chlorobenzene or bromobenzene from benzenediazonium chloride by treating it with Cu/HCl or Cu/HBr respectively.



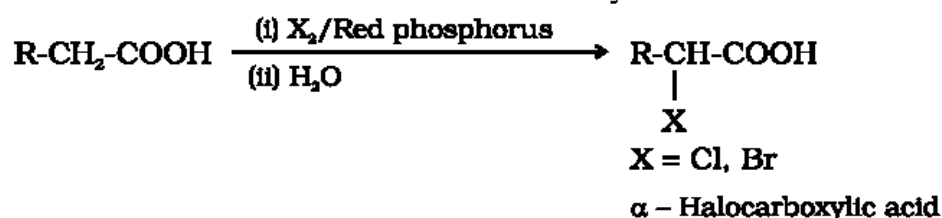
13. Gattermann-Koch Reaction: When benzene or its derivative is treated with carbon monoxide and HCl in the presence of anhydrous aluminium chloride or CuCl, it gives benzaldehyde or substituted benzaldehyde.



14. Iodoform test: The compound containing methyl group bonded to carbonyl group (CH₃-CO-) or (CH₃-CH.OH-) reacts with aqueous NaOH and iodine solution gives yellow ppt of Iodoform.

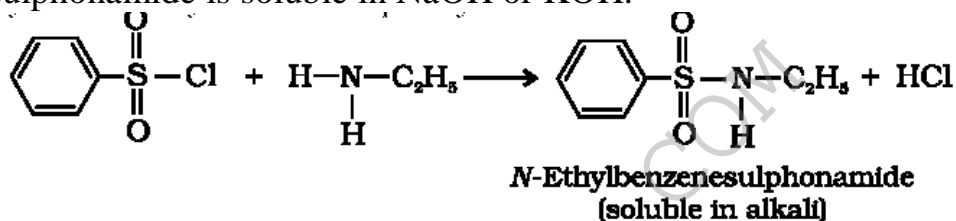


15. Hell-Volhard-Zelinsky Reaction: When aliphatic carboxylic acid containing α -hydrogen are reacted with chlorine or bromine in presence of small amount of red phosphorous, the corresponding α -haloacids are obtained.

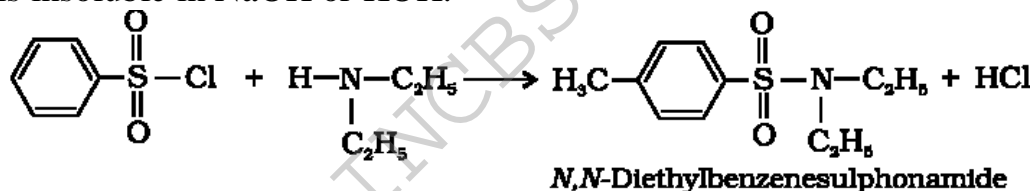


16. Hinsberg Test: Hinsberg test is employed to distinguish primary, secondary and tertiary amine. The reagent used in this test is benzene sulphonyl chloride. The tests are:

a) Primary amine:- It gives sulphonamide with hinsberg reagent, this sulphonamide is soluble in NaOH or KOH.

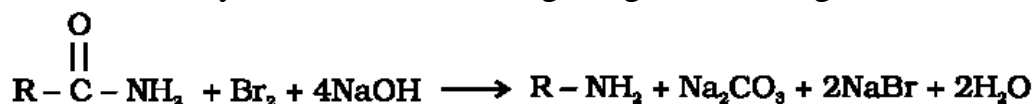


B) Secondary amine:-With hinsberg reagent,it forms sulphonamide, which is insoluble in NaOH or KOH.



C) Tertiary amine:- Tertiary amine do not react with hinsberg reagent ,because it is not having replaceable hydrogen.

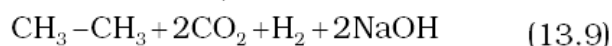
17. Hoffmann-Bromamide Reaction: When an amide is heated with bromine and an alkali, a primary amine containing one carbon less than the amide is obtained. This reaction is called Hoffmann-Bromamide reaction. This reaction is very useful for converting a higher homologue to next lower one.



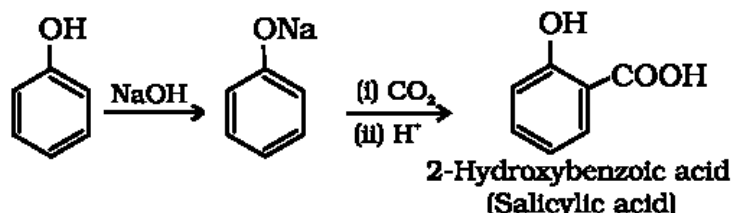
18. Kolbe's-Electrolysis process: Preparation of higher alkanes by the electrolysis of sodium or potassium salt of lower fatty acids is called Kolbe's electrolysis reaction.



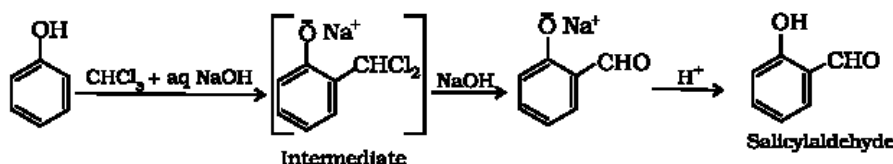
↓ Electrolysis



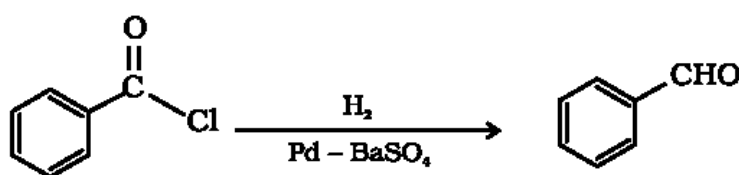
19. Kolbe's Schmith process: This reaction gives the method for fixation of CO₂ in the benzene ring. Sodium phenoxide on heating that 120-140⁰C under 4-7 atm pressure with CO₂ gives sodium salicylate which on reaction with dil.HCl gives salicylic acid(2-hydroxy benzoic acid).



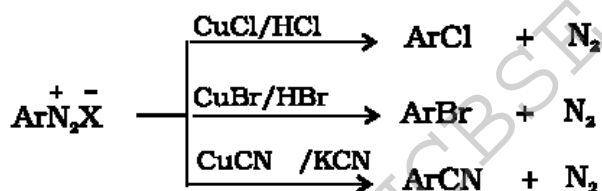
20. **Riemer-Tiemann Reaction:** The reaction of phenol with chloroform or carbon-tetrachloride in the presence of aqueous alkali at 340K followed by hydrolysis of the resulting product gives salicylaldehyde and salicylic acid respectively.



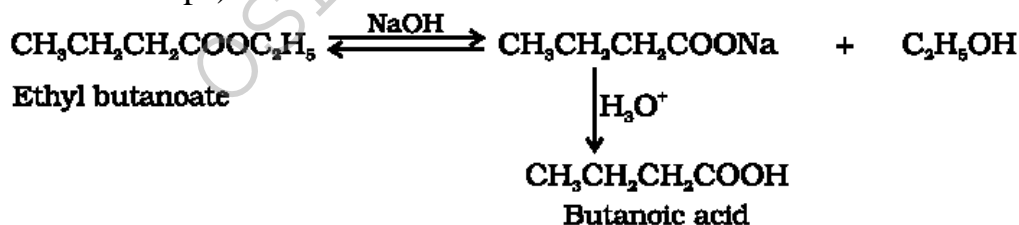
21. **Rosenmund Reduction:** Reduction of acid chloride (RCOCl) to the corresponding aldehyde with hydrogen using Pd/BaSO₄ as catalyst is known as Rosenmund reaction. Here Pd/BaSO₄ is used as a negative catalyst and prevents further reduction to alcohol.

**Benzoyl chloride****Benzaldehyde**

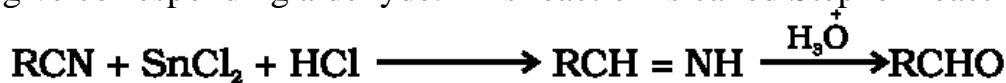
22. **Sandmeyer Reaction:** The conversion of benzene diazonium salt into a halogen or cyano derivative of the parent aromatic hydrocarbon by treating it with a mixture containing the corresponding salt and the acid is called Sandmeyer reaction.



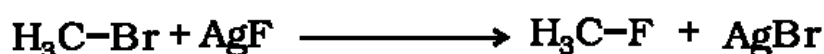
23. **Saponification Process:** Hydrolysis of esters in the presence of an alkali is known as saponification. In this process sodium salts of fatty acids (commonly called as soaps) are obtained.



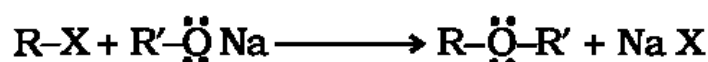
24. **Stephen Reaction:** Nitriles can be reduced to corresponding imine with stannous chloride in the presence of hydrochloric acid, which on hydrolysis give corresponding aldehyde. This reaction is called Stephen reaction.



25. **Swart's reaction:** The synthesis of alkyl fluorides is accomplished by heating an alkyl chloride/bromide in the presence of a metallic fluoride such as AgF, Hg₂F₂ etc.



26. **Williamson's synthesis:** In Williamson synthesis, when an alkoxide or a phenoxide is made to react with an alkyl halide, an ether is obtained. In this method, haloarenes can not be used for the preparation of alkyl-aryl ethers because of the low reactivity of aryl halides.

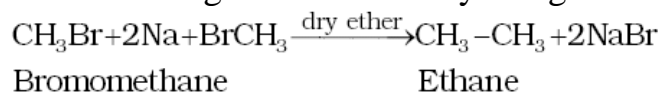


27. Wolf-Kishner reaction: A carbonyl compound on heating hydrazine and potassium hydroxide (KOH) in a high boiling polar solvent such as ethylene glycol, gets reduced to give a hydrocarbon.



(Wolf-Kishner reduction)

28. Wurtz-Fittig Reaction: This reaction is used for obtaining higher alkane from the halogen derivatives by using sodium.



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