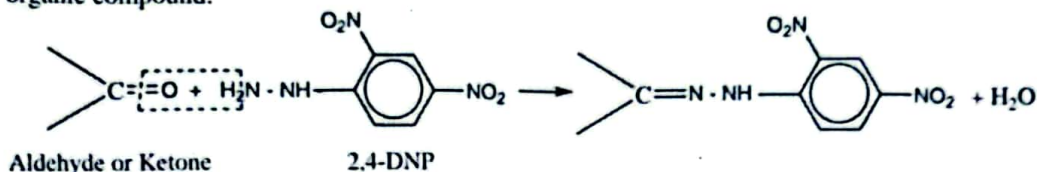


List of Important Name Reactions

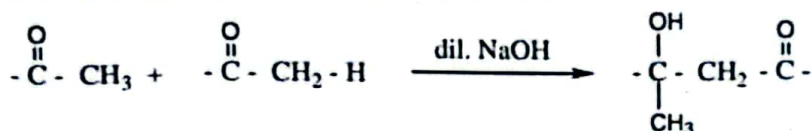
1. 2,4-DNP or DNPH test Reactions:

When carbonyl compound (Aldehyde and Ketone) is treated with 2,4 dinitrophenylhydrazine, yellow ppt of carbonyl 2,4-dinitrophenylhydrazone is formed. This test is used to distinguish carbonyl from other class of organic compound.



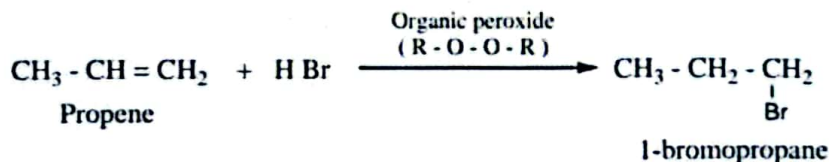
2. Aldol condensation

Two molecules of aldehyde or ketone containing α hydrogen (aromatic or aliphatic) condense in presence dilute alkali to give β - hydroxyl aldehyde or ketone. An aldol condensation between two different aldehydes or ketones is called mixed or cross aldol condensation.



3. Anti-markovnikov's Reaction: Peroxide effect or Kharasch effect :

"When HBr is added to an unsymmetrical alkene in presence of organic peroxides (R-O-O-R), the reaction takes place opposite to the Markovnikov's rule i.e. the H atom of HBr joins with that double bonded carbon atom which contains lesser number of hydrogen atoms".

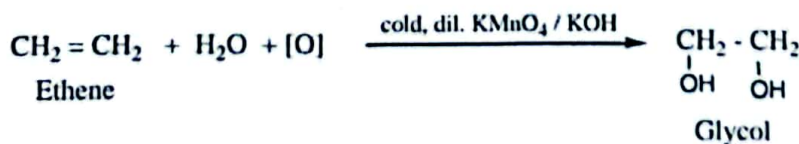


It may be noted that only HBr shows peroxide effect. HF, HCl, and HI do not show peroxide effect even in the presence of peroxides.

4. Baeyer's reagent test reactions:

Cold, dilute alkaline solution of KMnO_4 is known as Baeyer's reagent.

When ethene is treated with dilute alkaline solution of KMnO_4 , glycol is formed. The pink color of KMnO_4 gets decolorized.



5. Benzoin condensation

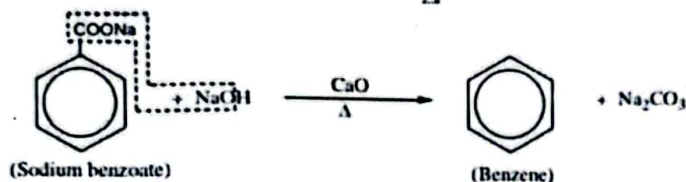
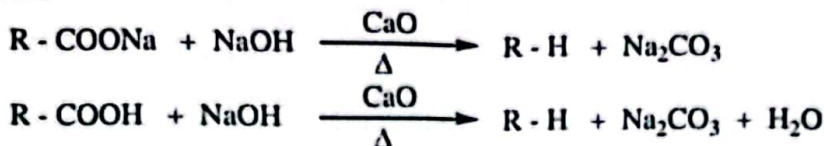
When benzaldehyde is heated with alcoholic KCN, 2 molecules of benzaldehyde condensed together to form a hydroxyl ketone called benzoin.



U-Thinkcrazy Entrance preparation

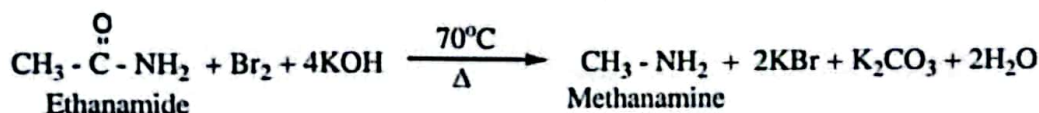
10. Decarboxylation:

When aliphatic or aromatic carboxylic acid or sodium salt of carboxylic acid is heated with soda (NaOH) and Lime (CaO), alkane is formed by the removal of COO group. Thus formed alkane contains one less carbon than parent.



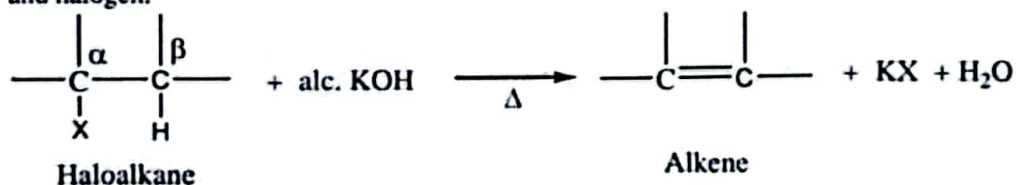
11. Decarbonylation Reaction:

When amide is warmed with bromine and aq. NaOH or aq. KOH solution about 70°C, amine with one less carbon will be formed as compared to the parent compound. This reaction involves the removal of carbonyl (>C=O) group from the amide and hence is also called Decarbonylation reaction.



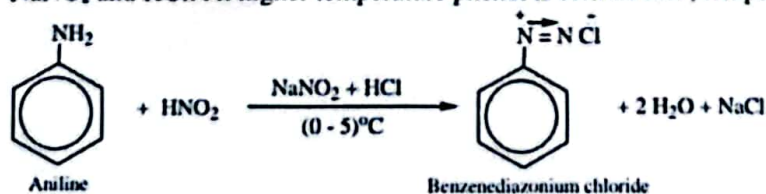
12. Dehydrohalogenation Reaction:

When haloalkane is heated with alc. KOH or NaOH, alkene is formed as a result of elimination of hydrogen and halogen.



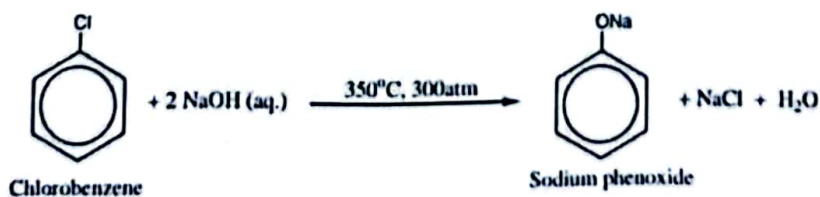
13. Diazotization Reactions:

Aniline reacts with nitrous acid (NaNO₂ + HCl) at ice cold condition to give benzene diazonium chloride. This reaction is called diazotization reaction. Nitrous acid being unstable and is prepared in situ by the reaction of NaNO₂ and HCl. At higher temperature phenol is formed thus, temperature should not be exceeds the 5°C.

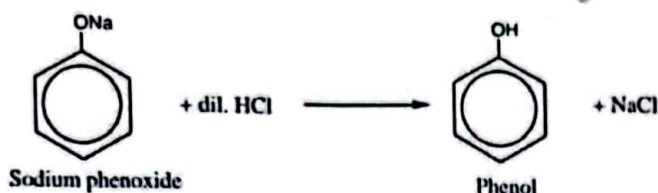


14. Dow's Process Reactions:

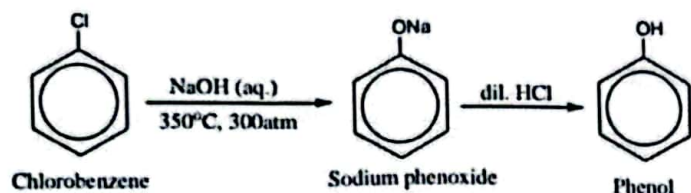
When chlorobenzene is heated with aq. NaOH under high temperature and pressure, sodium phenoxide is formed which on acidification gives phenol.



U-Thinkcrazy Entrance preparation

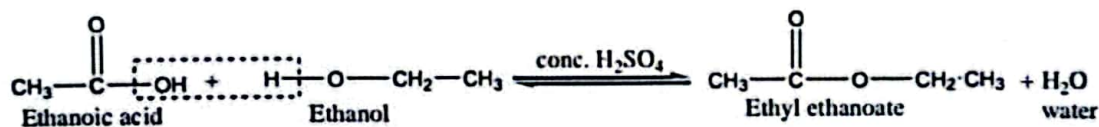
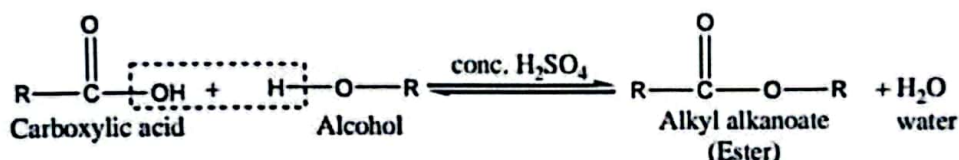


Or



15. Esterification Reaction:

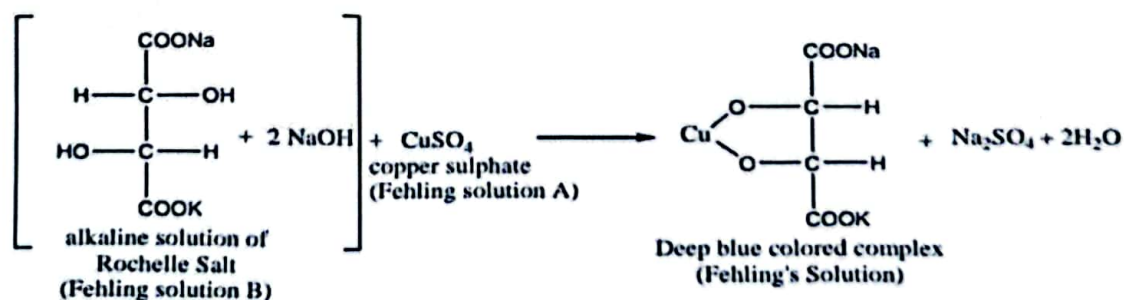
When alcohol is heated with carboxylic acid, in presence of conc. H_2SO_4 ester is formed.



Esters have fruity smell, so this reaction can be used to test the presence of acid or alcohol. Therefore this reaction is also called esterification test.

16. Fehling's Reagent Test Reactions

The alkaline aqueous solution of CuSO_4 containing some Rochelle salt (i.e. sodium potassium tartrate) is called Fehling's solution. The solution is prepared by mixing equal parts of alkaline solution of Rochelle salt (Fehling's solution A) to aqueous CuSO_4 solution (Fehling's solution B)

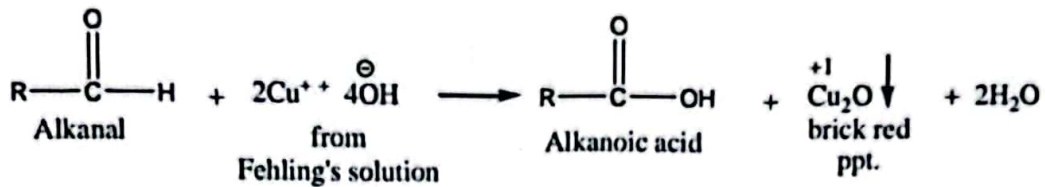


Fehling's solution Test:

The test reaction in which aldehyde reduces the cupric (Cu^{2+}) ions of Fehling solution into cuprous (Cu^+) i.e. cuprous oxide (Cu_2O) which is obtained as brick red ppt and respective aldehyde itself gets oxidized to carboxylic acid is called Fehling's solution test.

Only aliphatic aldehyde (like formaldehyde, acetaldehyde etc.) gives positive Fehling's solution test but aromatic aldehyde and ketones do not give the Fehling solution test.

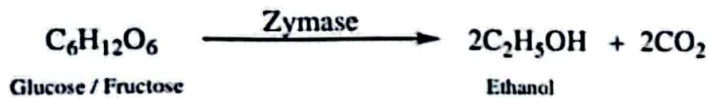
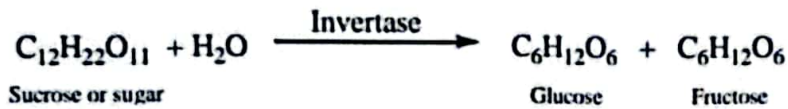
U-thinkcrazy Ethane preparation.



17. Fermentation Reaction

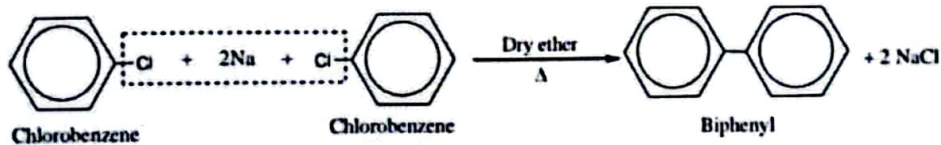
The process of decomposition of complex organic compounds into simpler ones in presence of enzyme produced by yeast as catalyst is called fermentation. Fermentation process is widely used to manufacture ethyl alcohol from carbohydrates.

Preparation of ethyl alcohol from sugar (Sucrose)



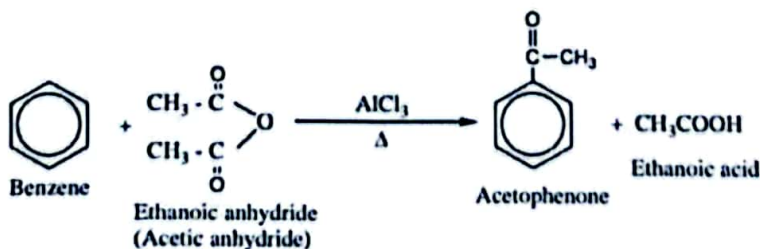
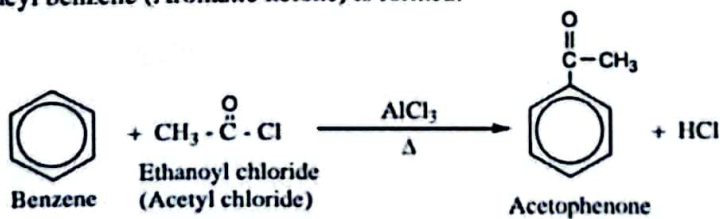
18. Fittig Reaction:

When aryl halide is heated with sodium in presence of dry ether biphenyl is formed.



19. Friedel- Craft's acylation

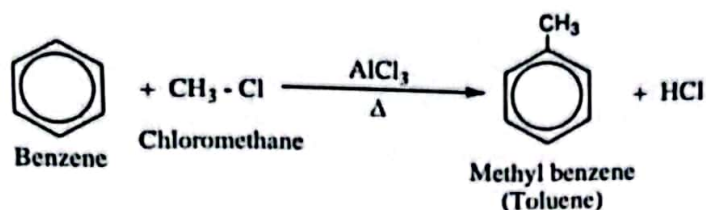
The process of introducing an acyl group into benzene ring in presence of Lewis acid is called Friedel Crafts acylation. When benzene is heated with acid halides or acid anhydride in presence of Lewis acid like AlX_3 or FeX_3 , acyl benzene (Aromatic ketone) is formed.



20. Friedel-Craft's alkylation

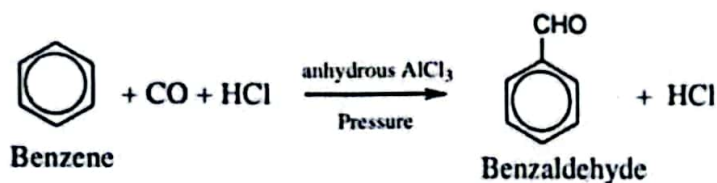
The process of introducing an alkyl group into benzene ring in presence of Lewis acid is called Friedel Crafts alkylation. When benzene is heated with alkyl halides in presence of Lewis acid like AlX_3 or FeX_3 , alkyl benzene is formed.

U-ThinkCrazy Entrance Preparation



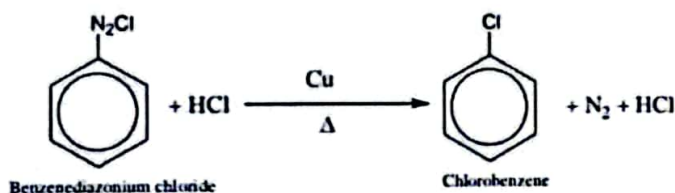
21. Gattermann-Koch aldehyde synthesis reaction

When benzene is treated with mixture of CO and HCl in presence of anhydrous $AlCl_3$ under pressure, benzaldehyde is formed. This reaction is called Gattermann-Koch reaction.



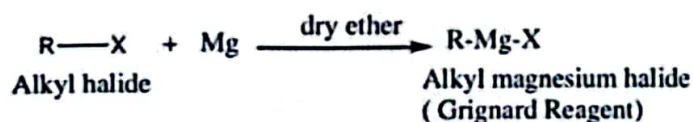
22. Gattermann Reaction:

When benzene diazonium chloride is heated with Cu in presence of HCl or HBr, chlorobenzene or bromobenzene is formed.



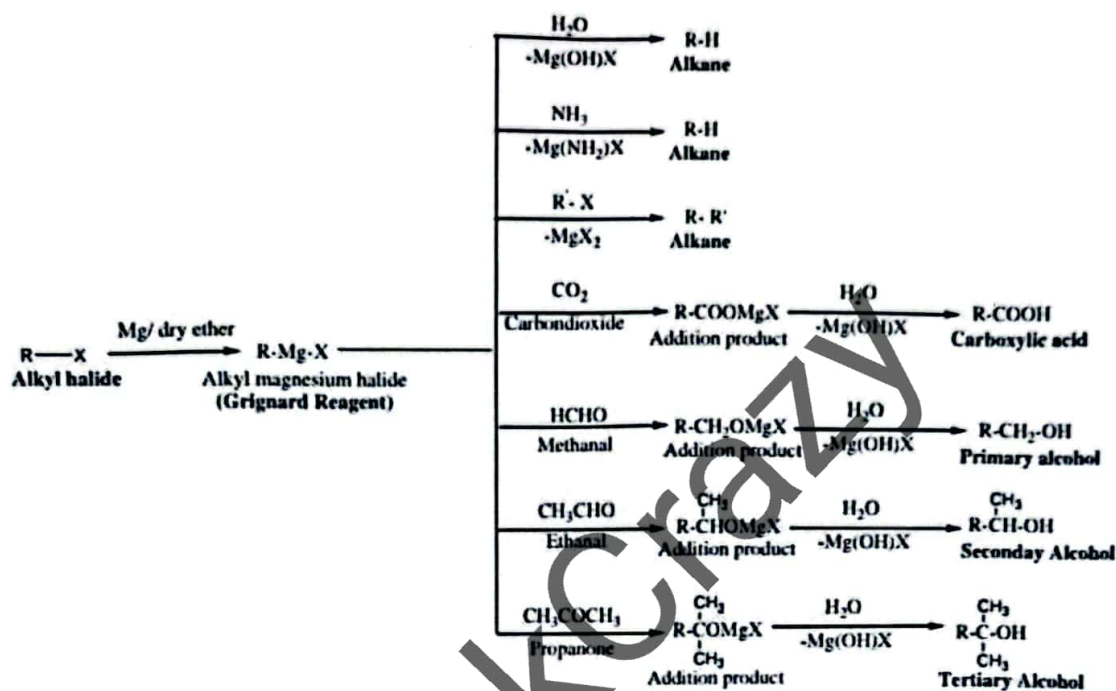
23. Grignard's Reactions (synthesis of alcohol and carboxylic acids)

Alkyl magnesium halide ($RMgX$) or aryl magnesium halide ($ArMgX$) are commonly known as Grignard Reagents. They are prepared by reacting alkyl halide or aryl halide with magnesium metal in presence dry ether.



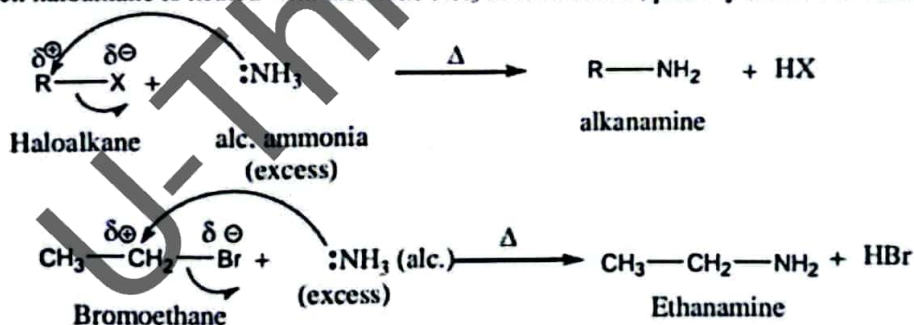
Applications

U-ThinkCrazy Entrance Preparation



24. Hoffmann's Ammonolysis

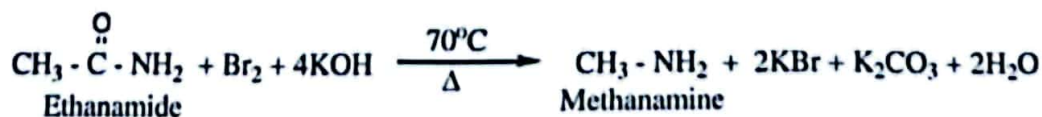
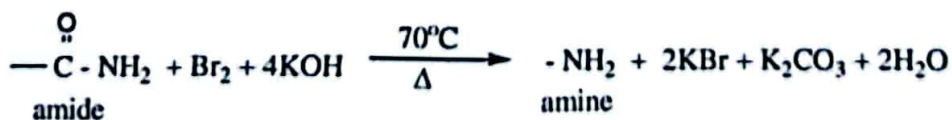
When haloalkane is heated with alcoholic NH_3 in sealed tube, primary amine is formed.



Note: If haloalkane is used in excess then mixtures of primary, secondary, tertiary amines and quaternary salts are formed.

25. Hoffmann's Bromamide Reaction

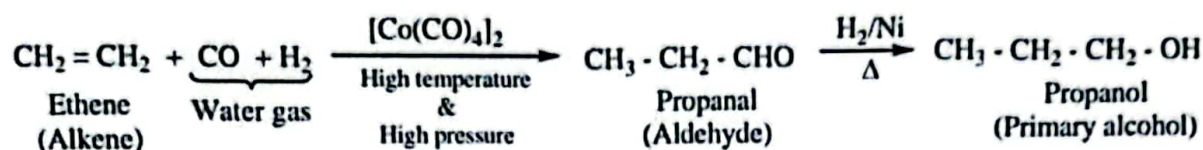
When amide is warmed with bromine and aq. NaOH or aq. KOH solution about 70°C , amine with one less carbon will be formed as compared to the parent compound. Such reaction is called Hoffmann's bromamide reaction or Hoffmann's hypobromide reaction. This reaction involves the removal of carbonyl ($>\text{C}=\text{O}$) group from the amide and hence is also called Decarbonylation reaction. This reaction is used to shorten the number of carbon chain.



U-Thinkcrazy Entrance Preparation

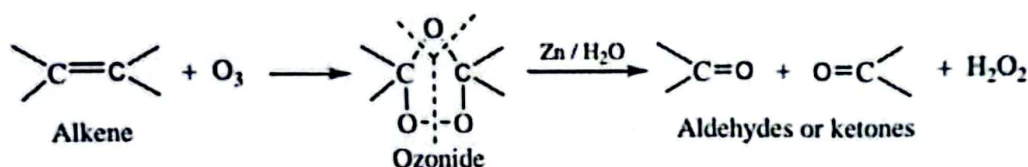
29. Oxo Process Reaction:

Alkene reacts with water gas (CO + H₂) in presence of dicobalt octacarbonyl [Co(CO)₄]₂ as a catalyst under high temperature and pressure to give aldehyde having one more carbon than alkene. Aldehyde on catalytic hydrogenation give primary alcohol.



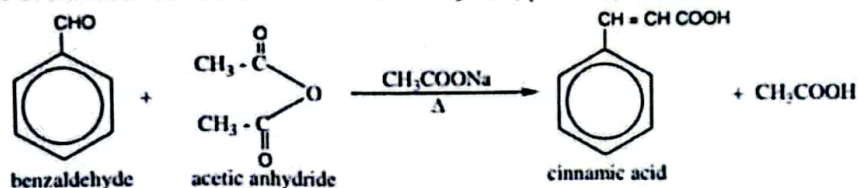
30. Ozonolysis reaction

When alkene is treated with ozone an addition product called ozonide is formed which on treated with water in presence of zinc dust, two molecules of carbonyl compounds are formed (carbonyl compound: aldehyde or ketone)



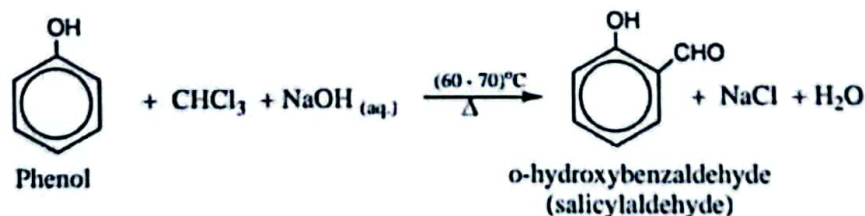
31. Perkin condensation

When an aromatic aldehyde is heated with anhydride of an aliphatic carboxylic acid (containing α hydrogen) in presence of sodium salt of the same acid as catalyst, α, β unsaturated acid is formed.



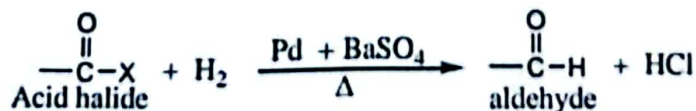
32. Reimer-Tiemann Reaction :

When CHCl₃ is heated with phenol in presence of aqueous NaOH or KOH solution followed by acidification, salicylaldehyde (ortho-hydroxybenzaldehyde) is formed.



33. Rosenmund Reduction

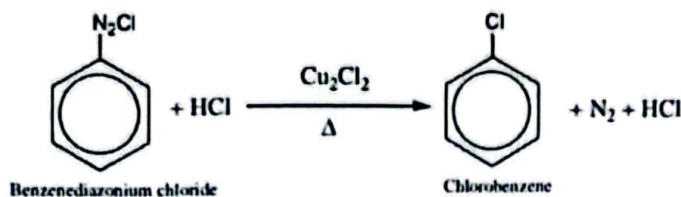
When acid halide is heated with hydrogen in presence of Pd with BaSO₄, aldehyde (aliphatic or aromatic) is formed.



U-Think Crazy Entrance Preparation

34. Sand Meyer's Reaction:

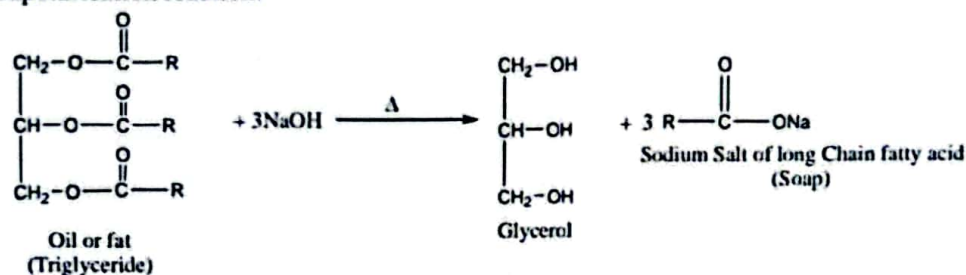
When benzene diazonium chloride is heated with Cu_2Cl_2 or Cu_2Br_2 in presence of corresponding halogen acid (HCl or HBr), chlorobenzene or bromobenzene is formed.



35. Saponification Reactions

Fats and oils are triesters of glycerol with long chain fatty acids (Triglycerides). Long chain fatty acids may be Oleic acid $[\text{CH}_3(\text{CH}_2)_7\text{CH}=\text{CH}(\text{CH}_2)_7\text{COOH}]$, palmitic acid $[\text{CH}_3(\text{CH}_2)_{14}\text{COOH}]$ etc...

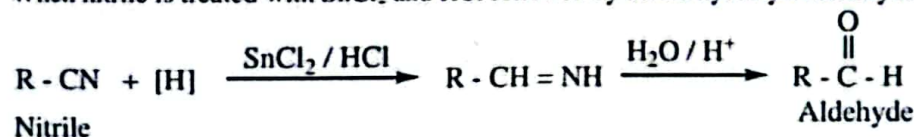
When these triglycerides are hydrolyzed in presence of strong alkali like NaOH or KOH then sodium or potassium salt of long chain fatty acid (Soap) and glycerol are formed. This reaction is commonly called saponification reaction.



For Example, $\text{R} = \text{C}_{15}\text{H}_{31}$ (From Palmitic acid)

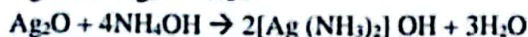
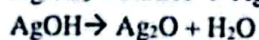
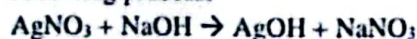
36. Stephen's Reduction

When nitrile is treated with SnCl_2 and HCl followed by acidic hydrolysis aldehyde is formed.



37. Tollens's Reagent Test Reactions:

Ammoniacal silver nitrate solution (Diammine silver (I) hydroxide) is called Tollen's Reagent & is prepared by following process:

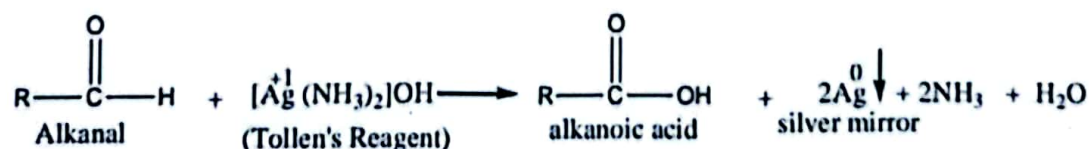


Diammine Silver (I) hydroxide
or Tollen's reagent

Tollen's Test or Silver mirror Test:

The test reaction in which aldehyde reduces the Tollen's reagent into free metallic silver which is deposited around the inner wall of reaction tube (test tube) and aldehyde itself gets oxidized to carboxylic acid is called Tollen's test or Silver mirror test.

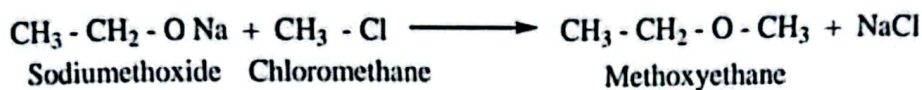
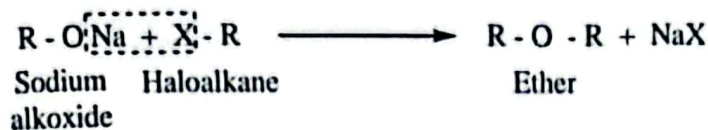
Only aliphatic aldehydes (like formaldehyde, acetaldehyde etc.) & aromatic aldehyde (like Benzaldehyde) gives positive Tollen's test whereas ketones do not give this test.



U-Think Crazy Entrance Preparation

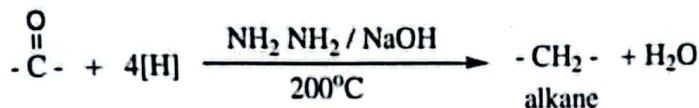
38. Williamson's Synthesis / Williamson's Etherification

When primary haloalkane is treated with sodium alkoxide, ether is formed. Both symmetrical as well as unsymmetrical ether can be prepared by this method.



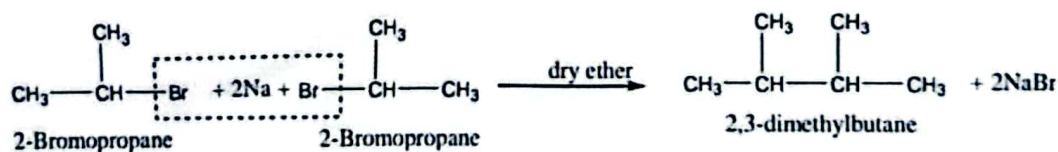
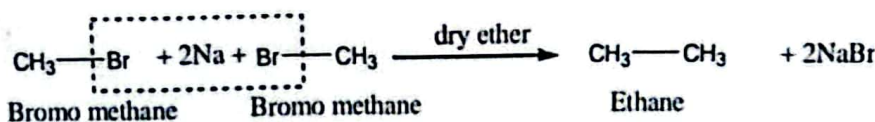
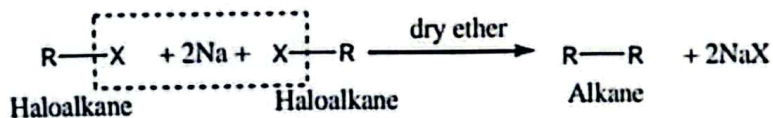
39. Wolff - Kishner Reaction

When aldehyde or ketone is heated with hydrazine ($\text{H}_2\text{N}-\text{NH}_2$) and a strong base (NaOH) at 200°C alkane is formed.



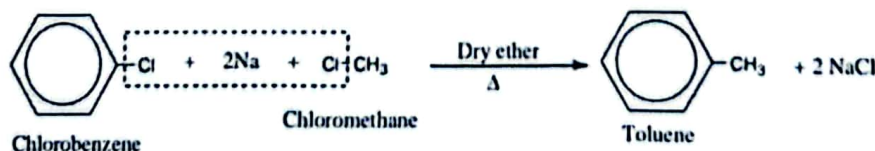
40. Wurtz Reaction

When haloalkane is heated with sodium in presence of dry ether, symmetrical alkane is formed.



41. Wurtz-Fittig Reaction:

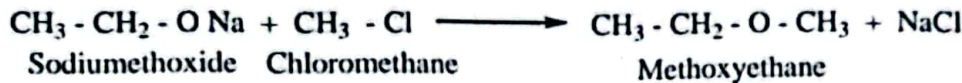
When aryl halide and alkyl halide is heated with sodium in presence of dry ether aromatic alkane is formed.



U-ThinkCrazy Entrance Preparation

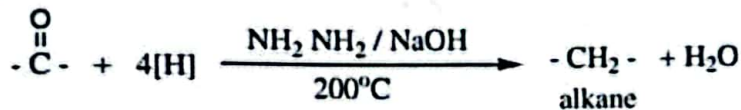
38. Williamson's Synthesis / Williamson's Etherification

When primary haloalkane is treated with sodium alkoxide, ether is formed. Both symmetrical as well as unsymmetrical ether can be prepared by this method.



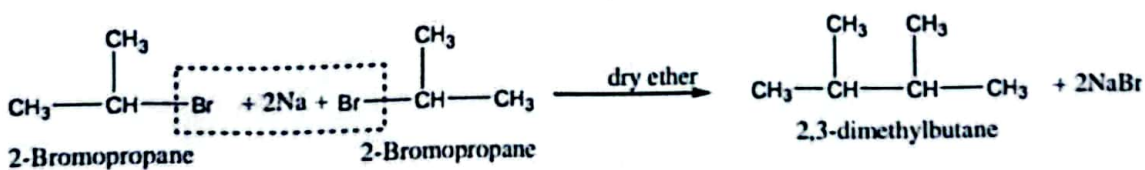
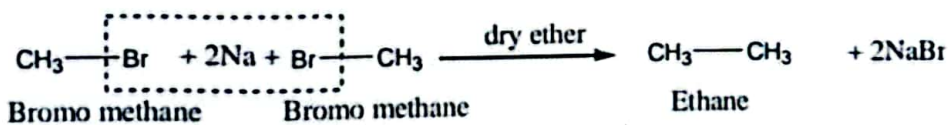
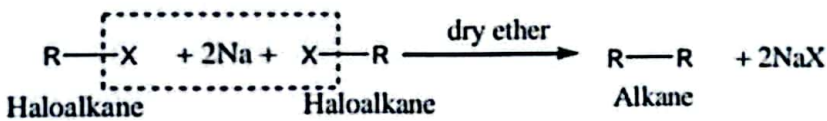
39. Wolff - Kishner Reaction

When aldehyde or ketone is heated with hydrazine (H₂N-NH₂) and a strong base (NaOH) at 200°C alkane is formed.



40. Wurtz Reaction

When haloalkane is heated with sodium in presence of dry ether, symmetrical alkane is formed.



41. Wurtz-Fittig Reaction:

When aryl halide and alkyl halide is heated with sodium in presence of dry ether aromatic alkane is formed.

