Mount Carmel Mission Mat. Hr. Sec. School, Kallakurichi

Praise the Lord

MOUNT CARMEL MISSION MATRICULATION HIGHER SECONDARY SCHOOL

Mount Road, Carmel Nagar, Kallakurichi – 606 202

12th standard *organic chemistry name reaction* in

(unit-11)

Hydroxy compounds and ethers,

(unit -12)

Carbonyl compounds And Carboxylic Acids

&

(unit -13)

Organic nitrogen Compounds

in Department

Important NAME REACTIONS of chemistry in

CLASS 12TH

INDEX

25.Claisen-schmit condensation
26.Cannizaro reaction
27.Crossed cannizaro reaction
28.Perkin's reaction
29.Knoevenagal reaction
30.Tollens reagent & Fehlings solution test
31.Esterification
32.Decarboxylation reaction
33.Kolbe's electrolytic decarboxylation
34.Hall-Volhard-Zelinsky(HVZ) reaction
35.Transesterification
36.Claisen condensation
37.Nef reaction (or) nef carbonyl synthesis
38.Gabriel phthalimide synthesis
39.Hoffmann's degradation reaction
40.Hoffmann's ammonolysis
41.Mendius reaction
42.Libermann's nitroso test
43.Carbylamine reaction
44.Mustard oil reaction
45.Hofmann-mustard oil reaction
46.Sandmeyer reaction
47.Gattermann reaction
48.Baltz-schiemann reaction
49.Gomberg reaction
50.Levine and Hauser acetylation
51.Diazotization reaction
52.Alcohol from grignard reagent(RMgX)
53.Acid from grignard reagent(RMgX)

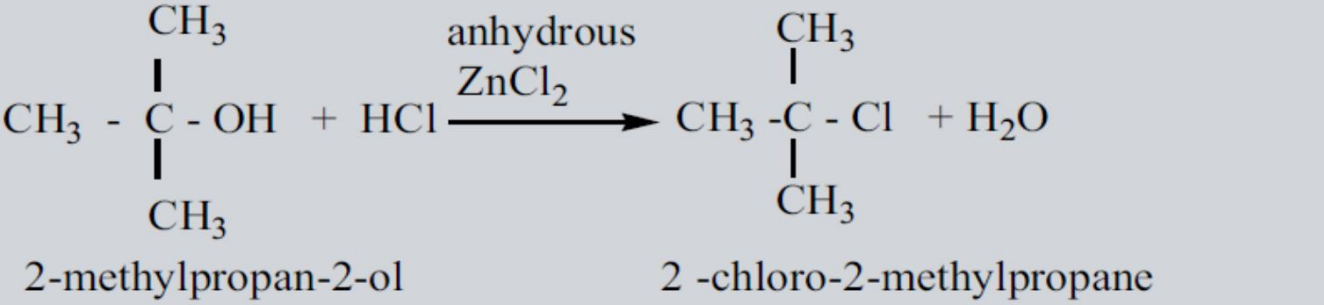
Important another more reaction

1.Using baeyer's reagent
2.Biological oxidation
3.1,4-dioxane
4.TNG(TriNitroGlycerine)
5.Acrolein
6.Glycerose
7.Phenol to benzene
8.Phenol to 1,4 benzoquinone
9.Phenol to cyclohexanol
10.Phenol to picric acid
11.Diethyl ether react with some compounds
12.Calcium salt of carboxylic acid
13.Ketone reduction to pinacols
14.benzoin condensation
15.Schiff's base
16.malachite green dye
17.Bezaldehyde react with chlorine presence and absence of catalyst
18.Reducing property of formic acid
19.Amphoteric character of acetamide
20.Dehydration of amide
21.Preparation of nitro benzene
22. Reduction of nitro alkane
23. Chloropicrin
24. Reduction to nitrobenzene
25. Amine react with nitrous acid
26.$C_6H_5N_2Cl$ to iodobenzene
27. $C_6H_5N_2Cl$ to phenol
28. $C_6H_5N_2Cl$ to benzoic acid
29. $C_6H_5N_2Cl$ to phenyl hydrazine
30.Thore nitrile condensation
31. $C_6H_5N_2Cl$ to nitrobenzene

01.LUCAS TEST

Lucas reagent is con HCl + unhyd. $ZnCl_2$ .lucas agent react with alcohol to form alkyl halaide..

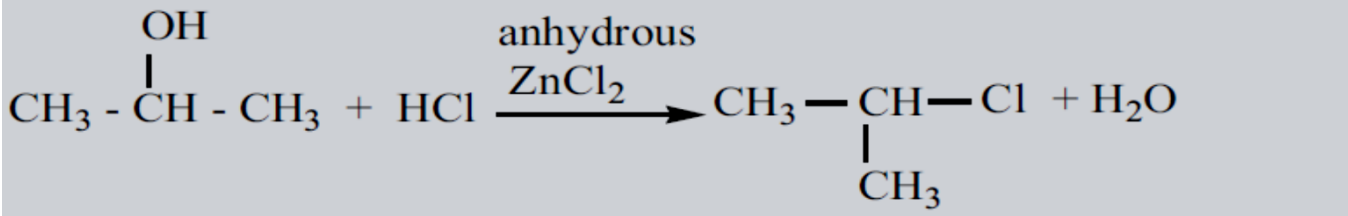
i)Test for tertiary alcohol :



2-methylpropan-2-ol

2 -chloro-2-methylpropane
(immediate appearance of turbidity)

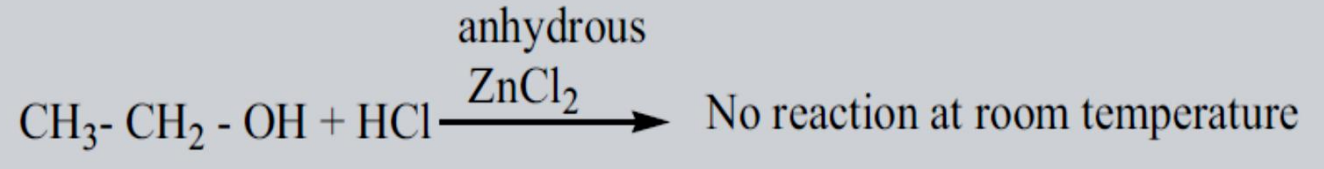
ii)Test for secondary alcohol :



propan-2-ol

2 -chloropropane
(slow appearance of turbidity)

iii)Test for primary alcohol:



No reaction at room temperature

ethanol

(Turbidity appears only on heating)

RESULT:

1.tertiary alcohol is immediately turbidity form.

2.Secondery alcohol is within 10 minutes turbidity form.

3.Primary alcohol is no turbidity at room temperature

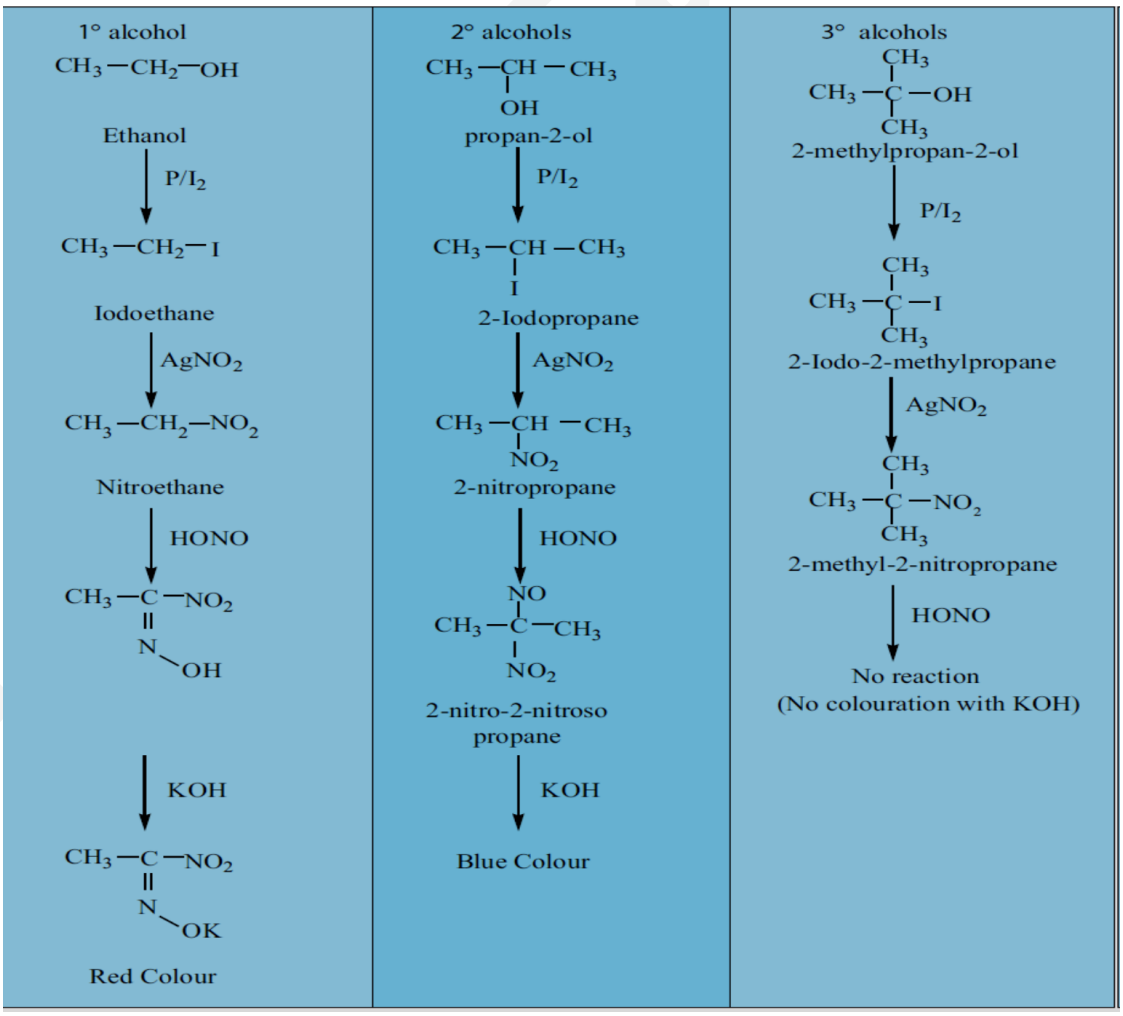
2.VICTOR MEYER'S TEST

This test based on the behaviour of the different nitro alkanes formed by the three types of alcohols with nitrous acid and it consists of the following steps.

i) **Alcohols** are converted into **alkyl iodide** by treating it with I_2/P

ii) **Alkyl iodide** so formed is then treated with $AgNO_2$ to form **nitro alkanes**

iii) **Nitro alkanes** are finally treated with HNO_2 (mixture of $NaNO_2$/ HCl) and the resultant solution is made **alkaline with KOH**



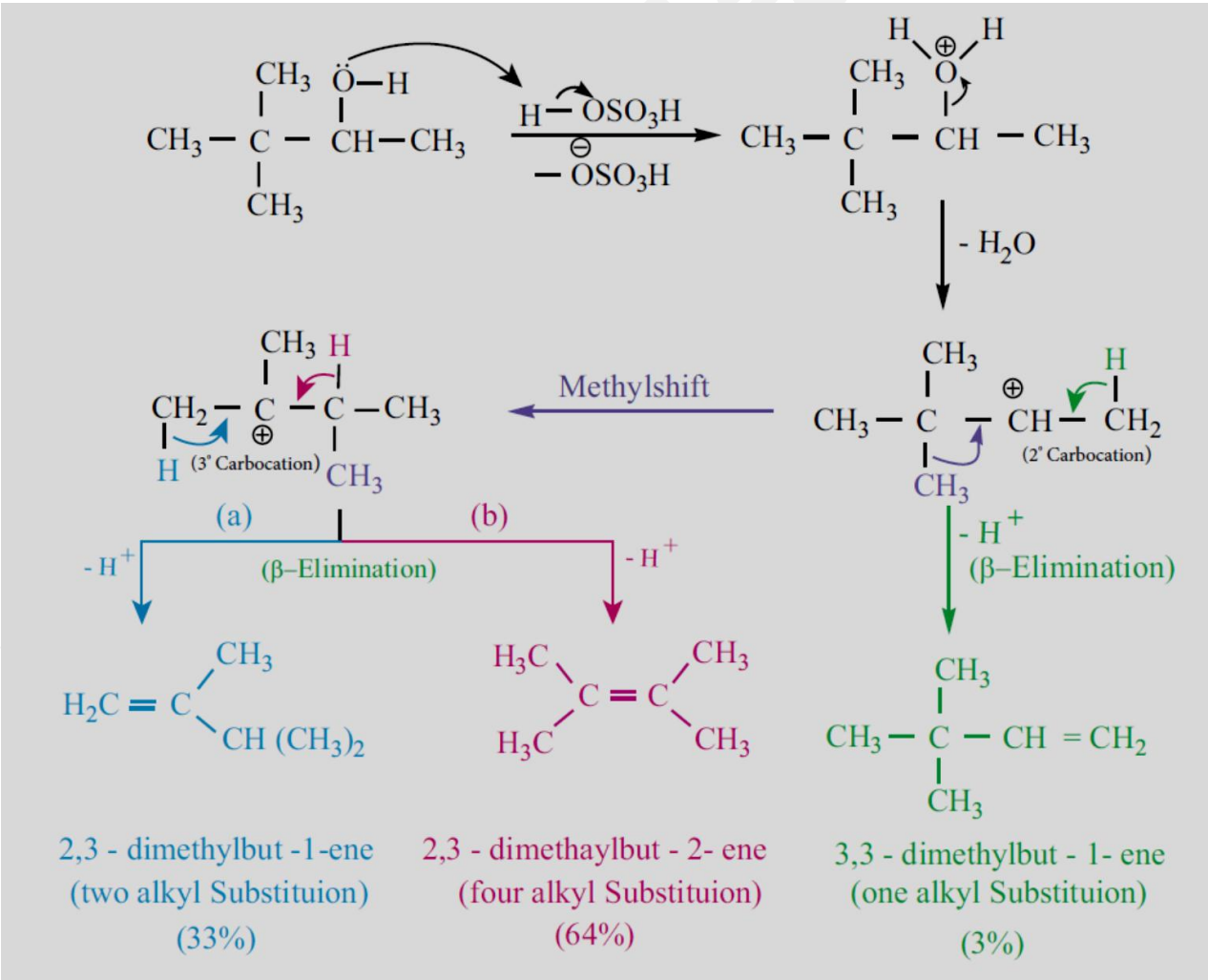
Result

- Primary alcohol gives **red colour**
- Secondary alcohol gives to **blue colour**
- **No colouration** will be observed in case of tertiary alcohol.

3.SAYTZEFF'S RULE

During intramolecular dehydration, if there is a possibility to form a carbon-carbon double bond at different locations the preferred location is the one that gives the more (highly) substituted i.e., the stable alkene.

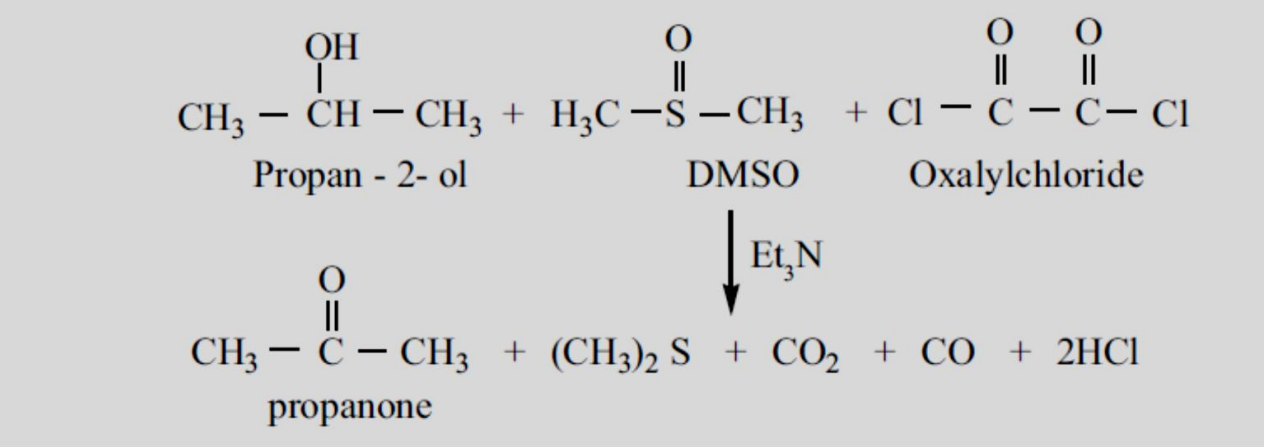
For example the dehydration of **3,3-dimethyl-2-butanol** gives a **mixture of alkenes**. The secondary carbocation formed in this reaction undergoes rearrangement to form a more stable tertiary carbocation.



4.SWERN OXIDATION

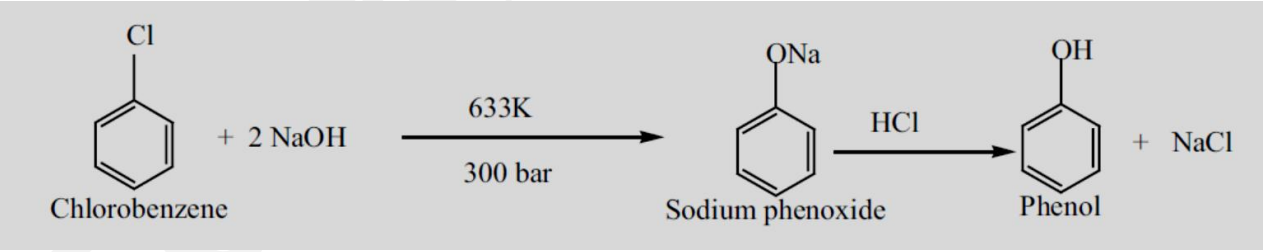
In this method, **dimethyl sulfoxide(DMSO)** is used as the oxidising agent, which **converts alcohols to ketone / aldehydes**.

In this method an an alcohol is treated with DMSO and oxalyl chloride followed by the addition of triethylamine.



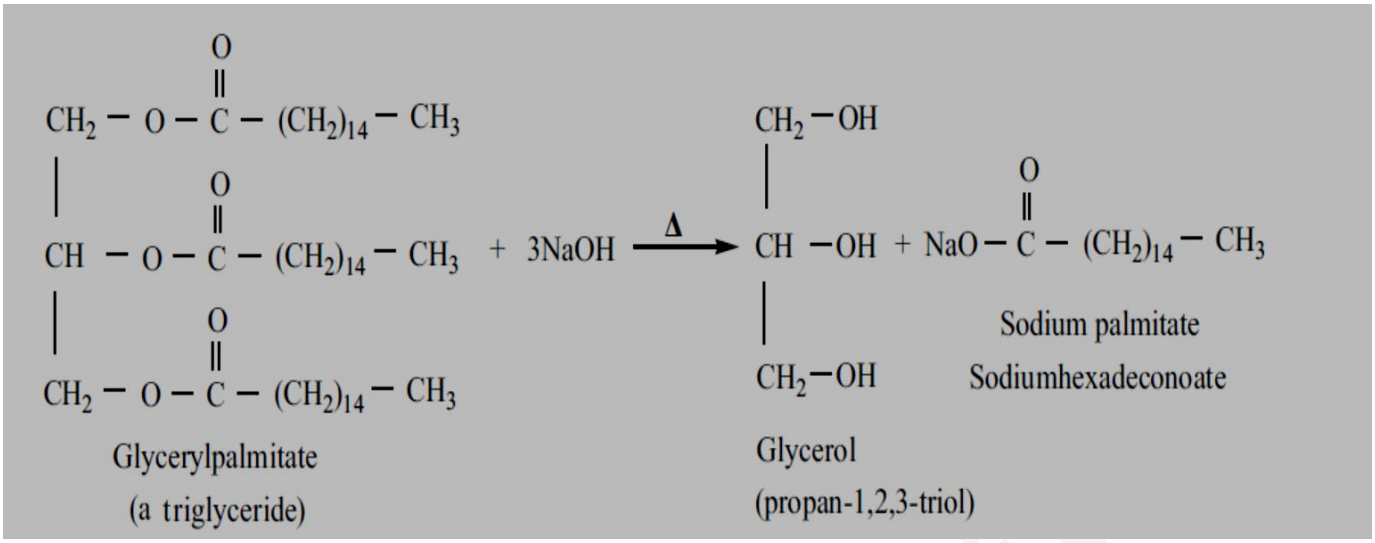
5.DOWS PROCESS

When **chlorobenzene** is hydrolysed with 6-8% **NaOH** at 300 bar and 633K in a closed vessel, **sodium phenoxide** is formed which on treatment with dilute HCl gives **phenol**.



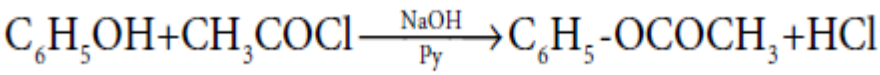
6.SAPONIFICATION REACTION

Glycerol occurs in many natural fats and it is also found in long chain fatty acids in the form of **glyceryl esters(Triglycerides)**. The alkaline hydrolysis of these fats gives **glycerol** and the reaction is known as **saponification reaction**.



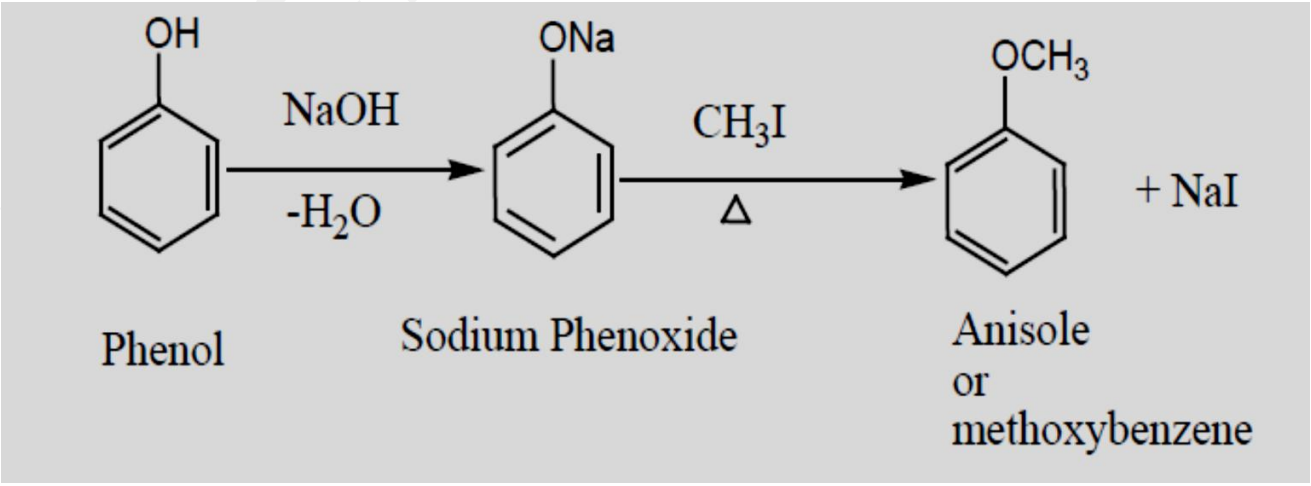
7.SCHOTTEN –BAUMANN REACTION

Phenol on treatment with **acid chlorides** gives **esters**. The acetylation and benzoylation of phenol are called **Schoten-Baumann reaction.**



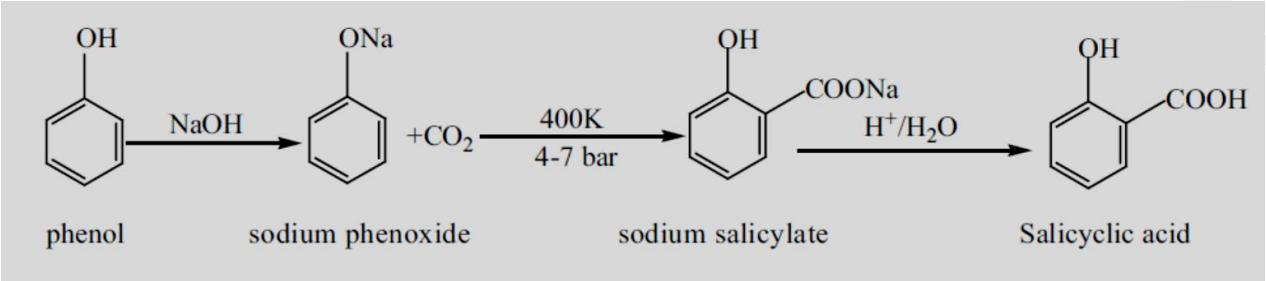
8.WILLIAMSON ETHER SYNTHESIS

An alkaline solution of **phenols** reacts with **alkyl halide** to form **phenyl ethers**. The alkyl halide undergoes nucleophilic substitution by the phenoxide ion in the presence of alkali.



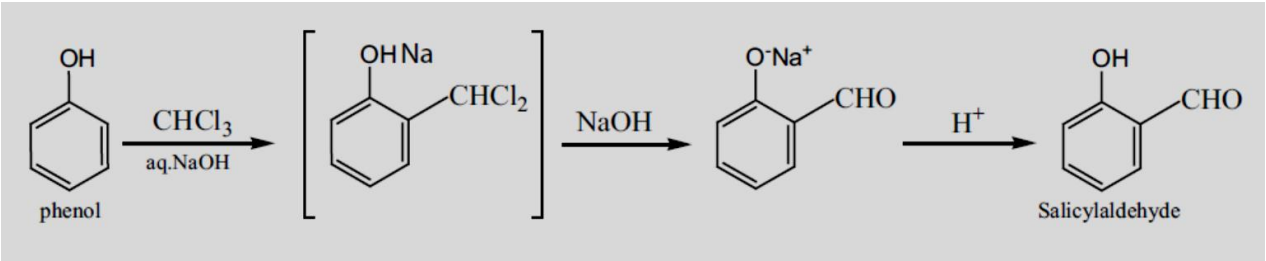
9.KOLBE'S (OR) KOLBE'S SCHMIT REACTION

In this reaction, **phenols** is first converted into **sodium phenoxide** which is more reactive than phenol towers electrophiloc substitution reaction with **CO_2** . Treatment of sodium phenoxide with CO_2 at 400K, 4-7 bar pressure followed by acid hydrolysis gives **salicylic acid**.



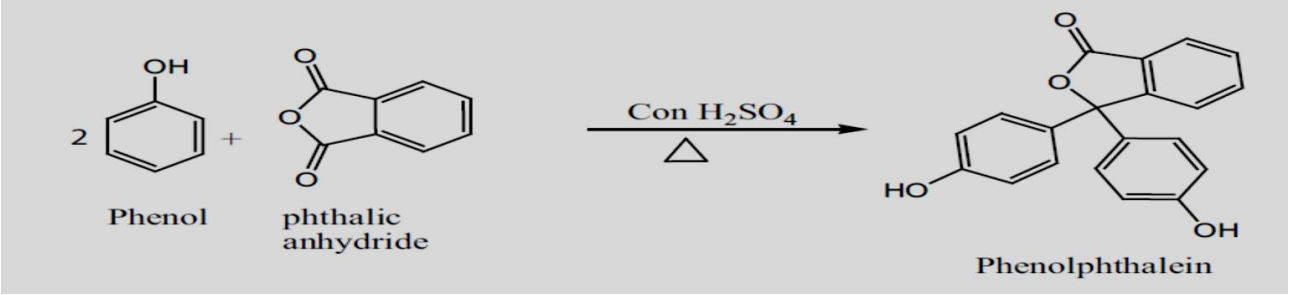
10.RIEMER-TIEMANN REACTION

On treating **phenol** with **$CHCl_3$/NaOH,** -CHO group is introduced at ortho position. The reaction proceeds through the formation of substituted benzal chloride intermediate.



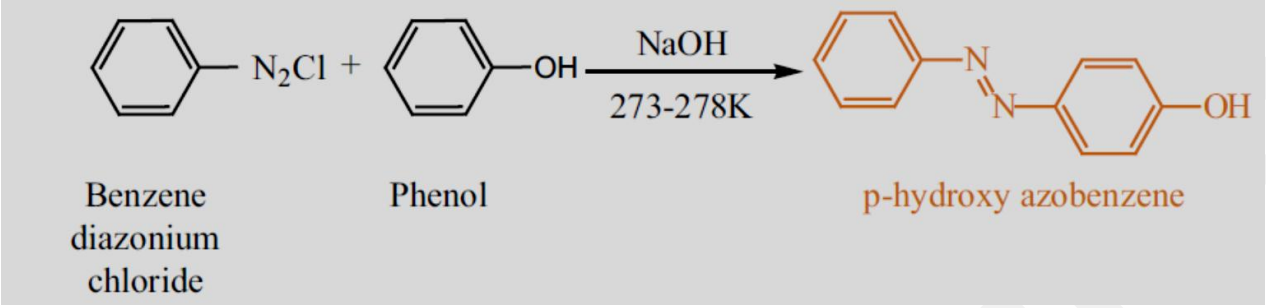
11.PHTHALEIN REACTION

On heating **phenol** with **phthalic anhydride** in presence of con. H_2SO_4 , **phenolphthalein** is obtained.



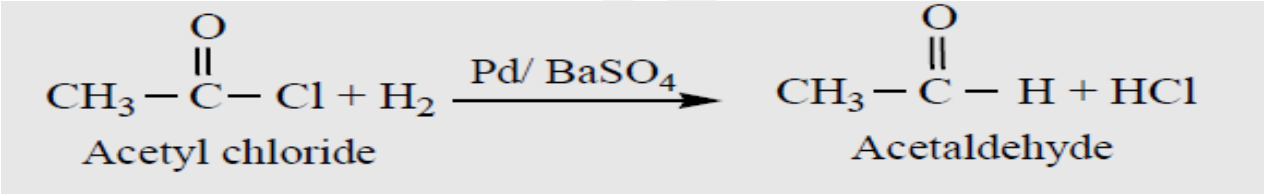
12.COUPLING REACTION

Phenol couples with **benzene diazonium chloride** in an alkaline solution to form **p-hydroxy azobenzene**(red orange dye).



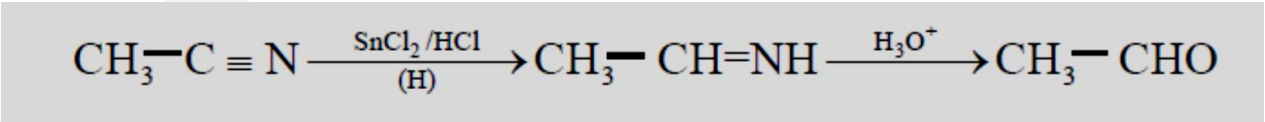
13.ROSENMUND REDUCTION

Aldehyde can be prepared by the **hydrogenation of acid chloride**, in the presence of palladium supported by barium sulphate. This reaction is called Rosenmund reduction.



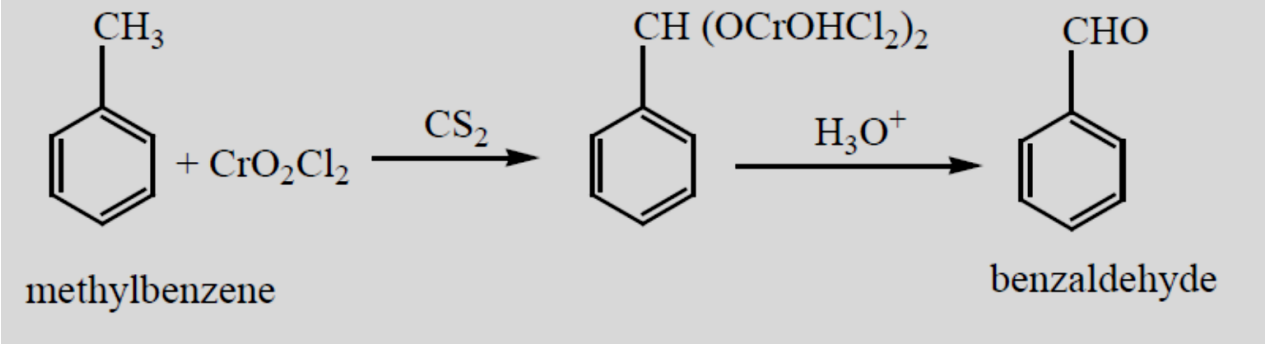
14.STEPHEN'S REACTION

When **alkylcyanides** are reduced using **$SnCl_2$ / HCl,** imines are formed, which on hydrolysis gives corresponding **aldehyde.**



15.ETARD REACTION

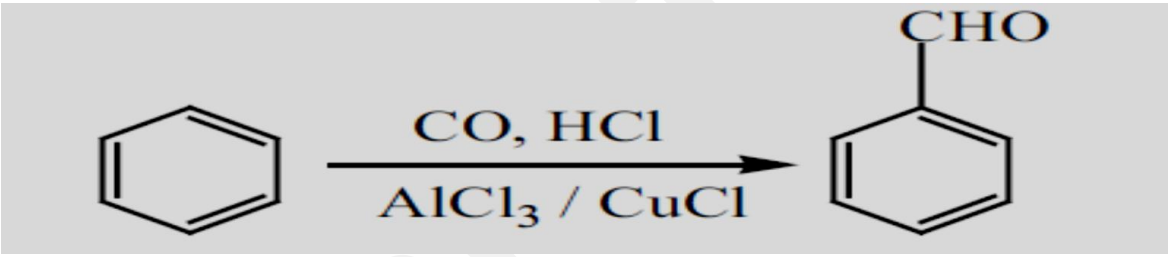
When **chromylchloride** is used as an agent ,**toluene** gives **benzaldehyde.** This reaction is called etard reaction. Acetic anhydride and CrO_3 can also be used for this reaction.



Oxidation of toluene by chromic oxide gives benzylidine diaetate which on hydrolysis gives benzaldehyde.

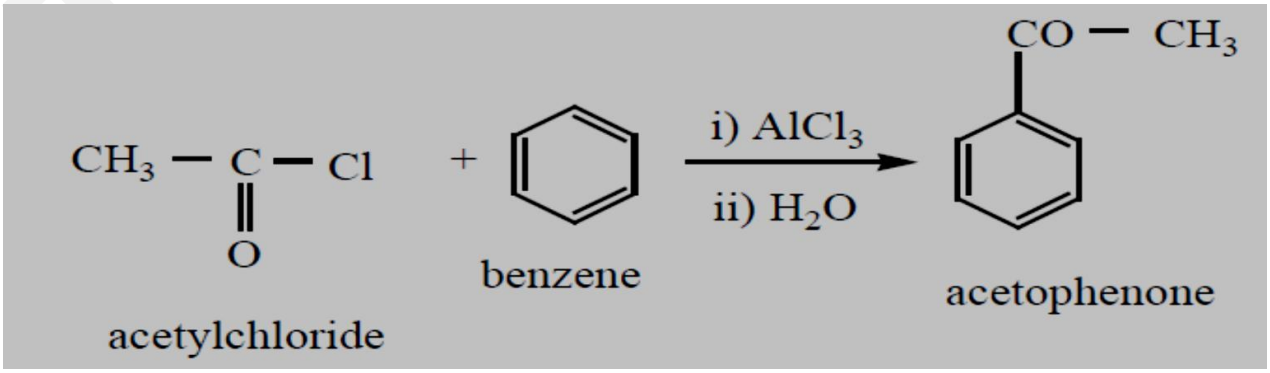
16.GATTERMANN-KOCH REACTION

When **benzene** (or) its derivative is treated with **CO/HCl** in the presence of anhydrous **$AlCl_3$ (or) $CuCl_2$** , it gives **benzaldehyde** (or) substituted benzaldehyde. In this method, reaction of carbon monoxide and HCl generate an intermediate which reacts like formyl chloride.



17.FRIEDEL-CRAFTS ACYLATION

It is the best method for preparing alkyl aryl ketones or diaryl ketones. This reaction succeeds only with benzene and activated benzene derivatives.



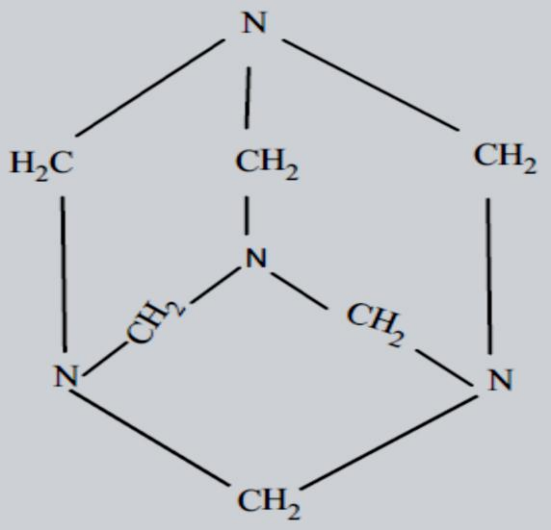
18.UROTROPINE

Formaldehyde reacts with ammonia to form hexa methylene tetramine, which is also knowm as urotropine.

$$6HCHO + 4\,NH_3 \longrightarrow (CH_2)_6N_4 + 6\,H_2O$$

Formaldehyde — Hexamethylene tetramine

STRUCTURE



19.POPOFF'S RULE

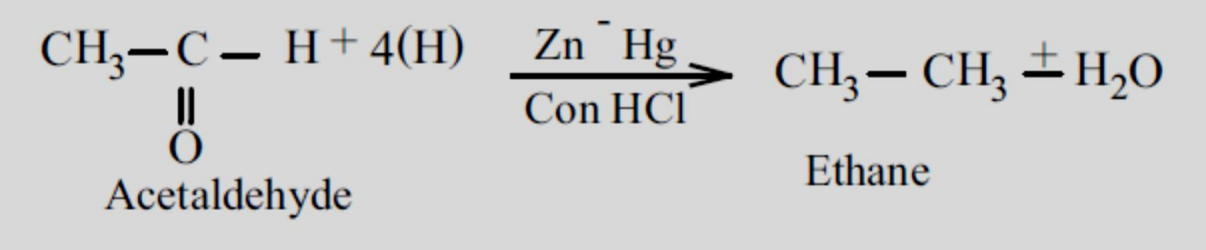
The oxidation of **unsymmetrical ketones** is governed by **popoff's rule**. It states that during the oxidation of an unsymmetrical ketones, a(C-CO) bond is cleaved in such a way that the **keto group** stays with the **smaller alkyl group**.

$$CH_3-CH_2-CH_2-\underset{\underset{O}{\|}}{C}-CH_3 \xrightarrow[\text{Con } HNO_3]{(O)} CH_3CH_2-COOH + CH_3COOH$$

Propanoic acid — acetic acid

20.CLEMMENSEN REDUCTION

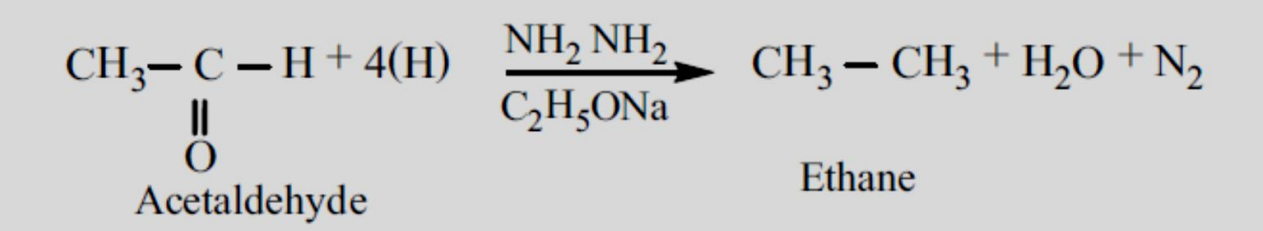
Aldehyde and ketones when heated with **zinc amalgam** and **conc.HCl** gives **hydrocarbons**.



21.WOLF KISHNER REDUCTION

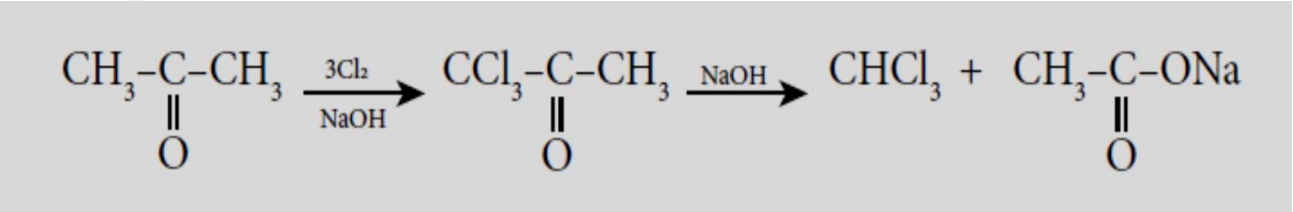
Aldehyde and ketones when heated with **hydrazine(NH_2NH_2)** and **sodium ethoxide** , **hydrocarbons** are formed. Hydrazine acts as a reducing agent and sodium ethoxide as a catalyst

.



22.HALOFORM REACTION

Acetaldehyde and methyl ketones, containing –C- group, when treated with halogen and alkali give the corresponding haloform. This is known as Haloform reaction.



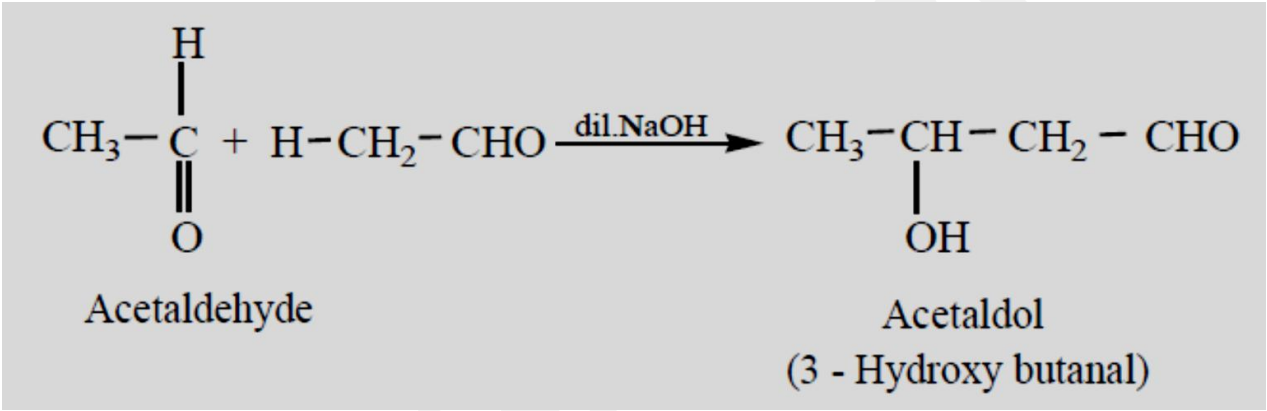
acetone **chloroform** **sodium acetate**

23.ALDOL CONDENSATION

In presence of dilute base NaOH , or KOH , two molecules of an aldehyde or ketone having α - hydrogen add together to give β - hydroxyl aldehyde (aldol) or β –hydroxyl ketone(ketol). The reaction is called aldol condensation. The aldol or ketol readily loses water to give -α, β unsaturated compounds which are aldol condensation products.

Acetaldehyde when warmed with dil NaOH gives β -hydroxyl butraldehyde (acetaldol)

Reaction :



Mechanism:

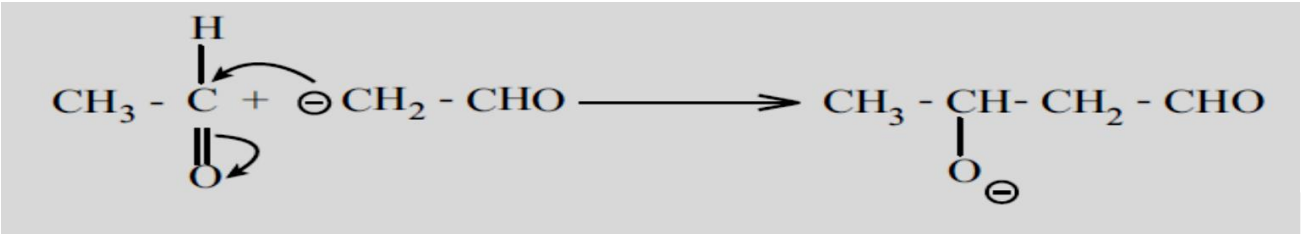
The mechanism of aldol condensation of acetaldehyde takes place in three steps.

Steps 1:

The carbanion is formed as the α - hydrogen atom is removed as a proton by the base

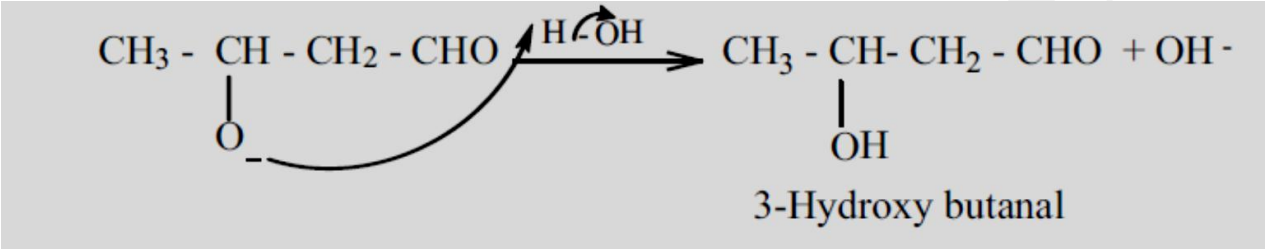
Steps 2 :

The carbanion attacks the carbonyl carbon of another unionized aldehyde to form an alkoxide ion.



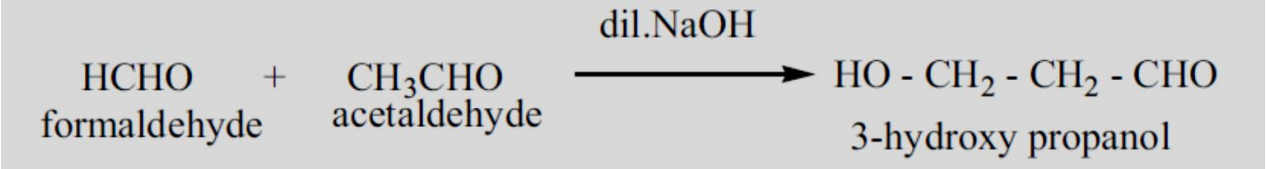
Step 3 :

The alkoxide ion formed is protonated by water to form aldol



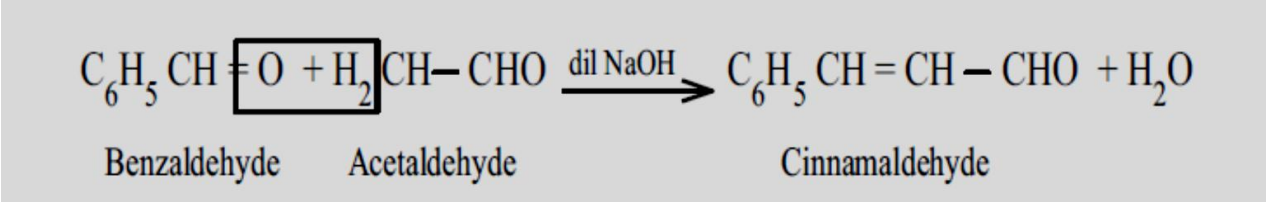
24.CROSSED ALDOL CONDENSATION

Aldol condensation can also take place between two different aldehydes or ketones or between one aldehyde and one ketone such an aldol condensation is called crossed or mixed aldol condensation.



25.CLAISEN-SCHMIT CONDENSATION

Benzaldehyde condenses with aliphatic aldehyde or methyl ketone in the presence of dil.alkali at room temperature to form unsaturated aldehyde or ketone . This type of reaction is called claisen-schmidt condensation.

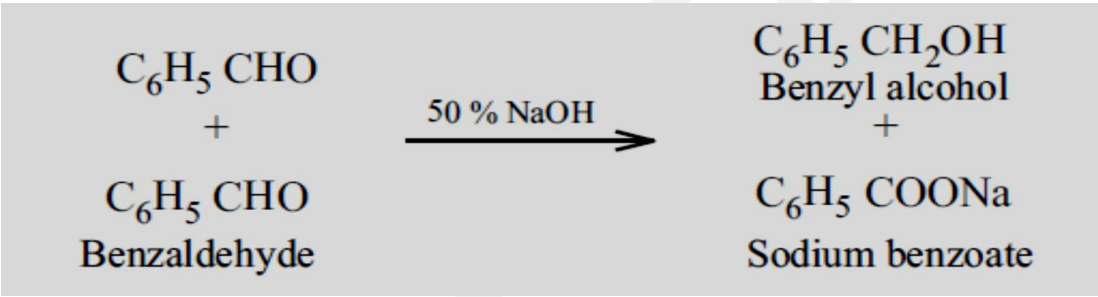


26.CANNIZARO REACTION

In the presence of concentrated aqueous or alcoholic alkali, aldehydes which do not have α -hydrogen atom under go self oxidation and reduction to give a mixture of alcohol and a salt of carboxylic acid. This reaction is called cannizaro reaction.

Benzaldehyde on treatment with concentrated NaOH (50%) gives benzyl alcohol and sodium benzoate.

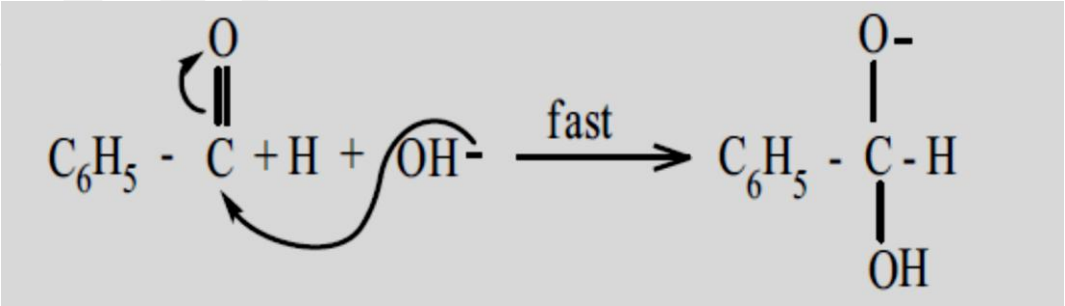
Reaction :



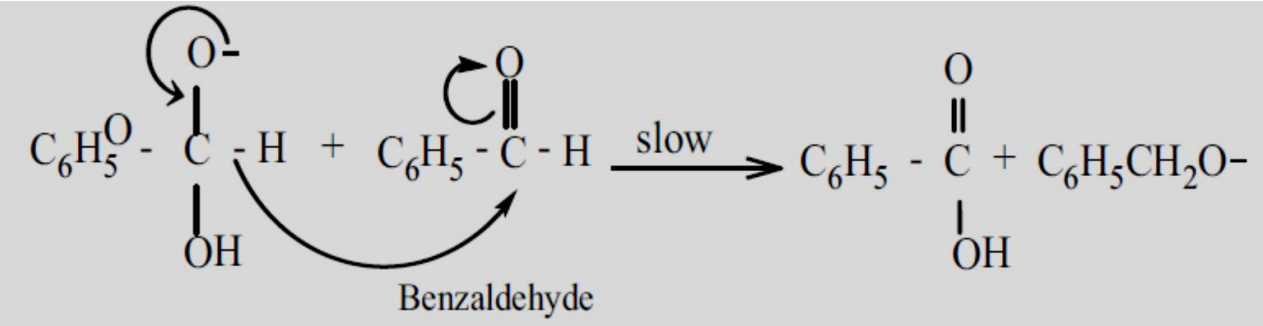
Mechanism:

cannizaro rection involves three steps.

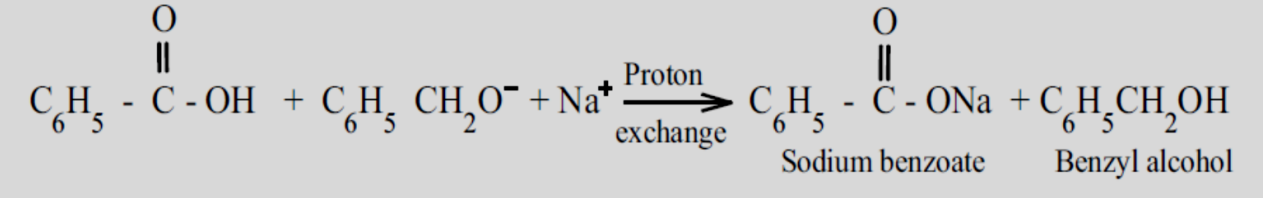
Step 1 : Attack of OH^- the carbonyl carbon.



Step 2 : Hydride ion transfer

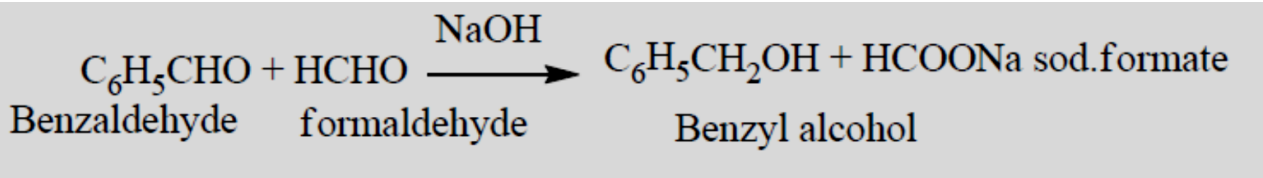


Step 3 : Acid-base reaction.



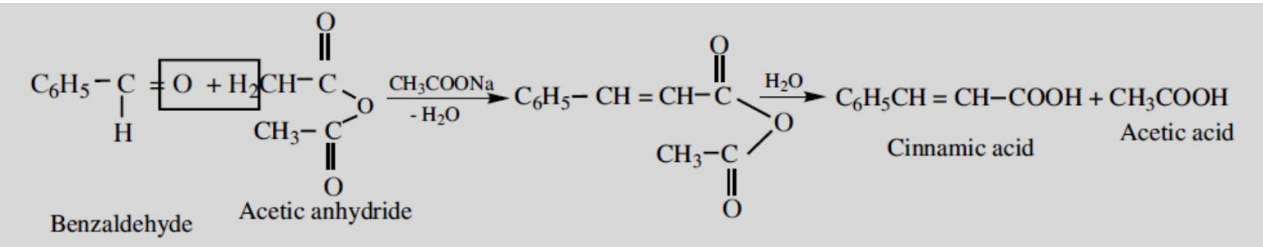
27.CROSSED CANNIZARO REACTION

When Cannizaro reaction takes place between two different aldehydes (neither containing an α hydrogen atom), the reaction is called as crossed cannizaro reaction.



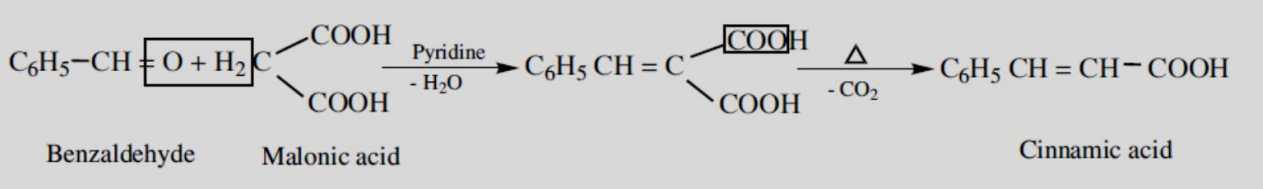
28.PERKIN'S REACTION

When an aromatic aldehyde is heated with an aliphatic acid anhydride in the presence of the sodium salt of the acid corresponding to the anhydride, condensation takes place and an αβ unsaturated acid is obtained. this reaction is known as perkin's reaction.



29.KNOEVENAGAL REACTION

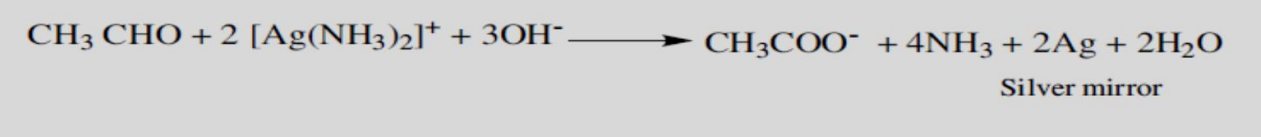
Benzaldehyde condenses with malonic acid in presence of pyridine forming cinnamic acid, pyridine act as the basic catalyst.



30.TOLLENS REAGENT & FEHLINGS SOLUTION TEST

TOLLENS REAGENT TEST :

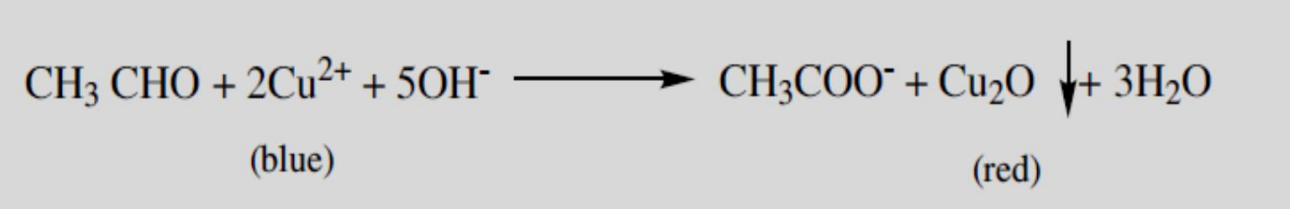
Tollens reagents is an ammonical silver nitrate solution. when an aldehyde is warmed with tollens reagents a bright silver mirror is produced due to the formation of silver metal. This reaction is called silver mirror test for aldehydes.



FEHLINGS SOLUTION TEST:

Fehlings solution is prepared by mixing equal volumes of fehlings solution 'A' aqueous copper sulphate and Fehlings solution 'B' containing alkaline solution of sodium potassium tartarate(Rochelle salt)

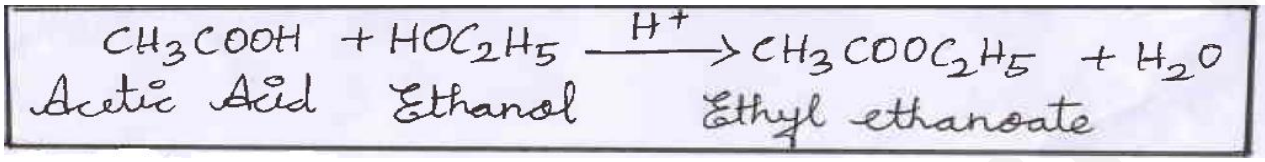
When aldehyde is warmed with Fehlings solution deep blue colour solution is changed to red precipitate of cuprous oxide.



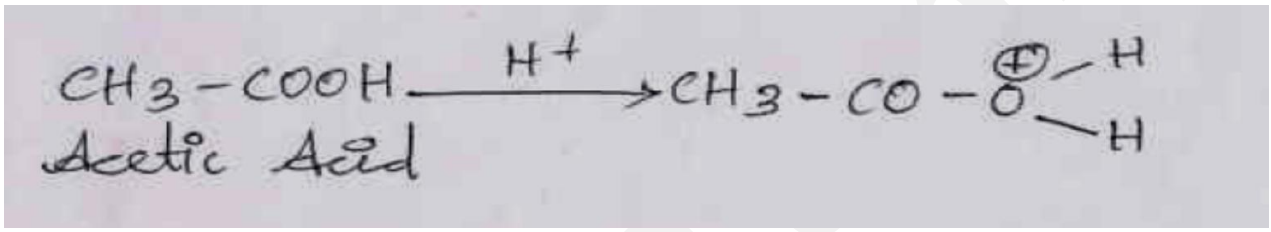
31.ESTERIFICATION

When carboxylic acids are heated with alcohols in the presence of conc.H_2SO_4 or dry HCl gas, esters are formed . The reaction is reversible and is called esterification.

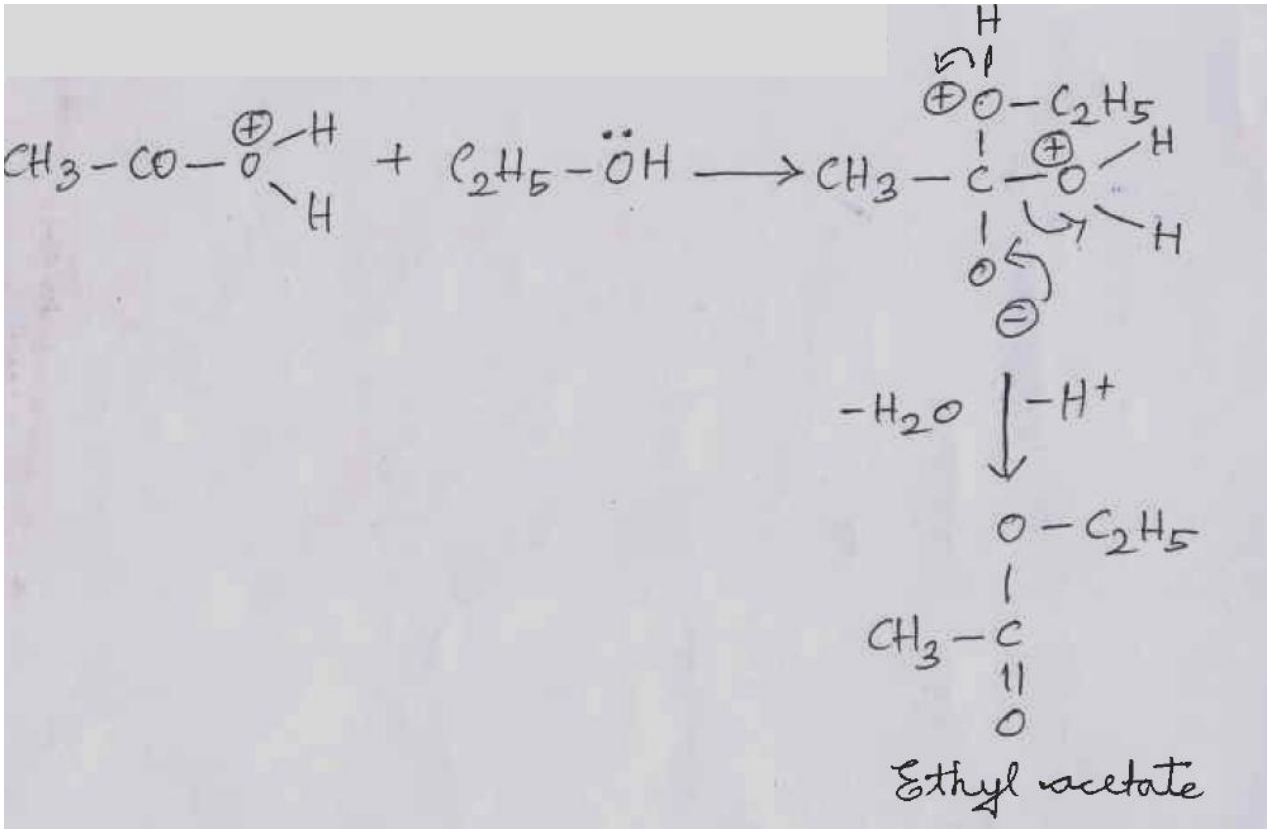
REACTION :



MECHANISM:step:1 protonation of carboxylic acid



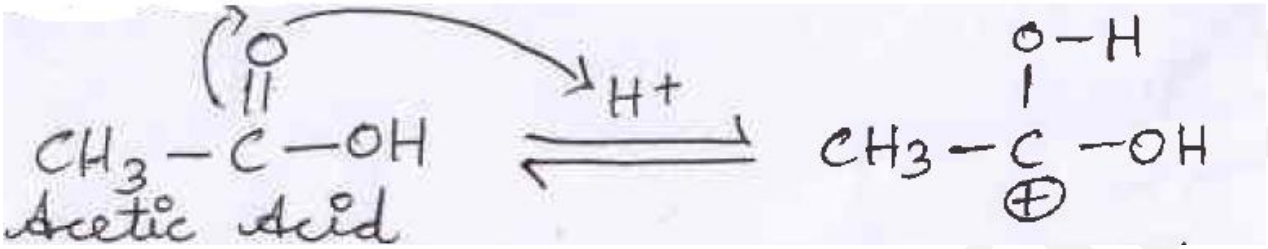
step:2 Attack by nucleophile



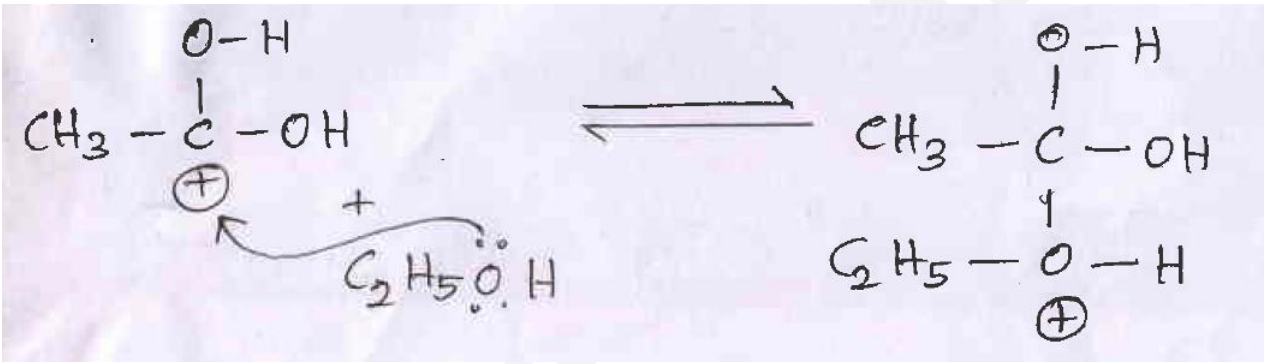
(OR)

Mechanism:

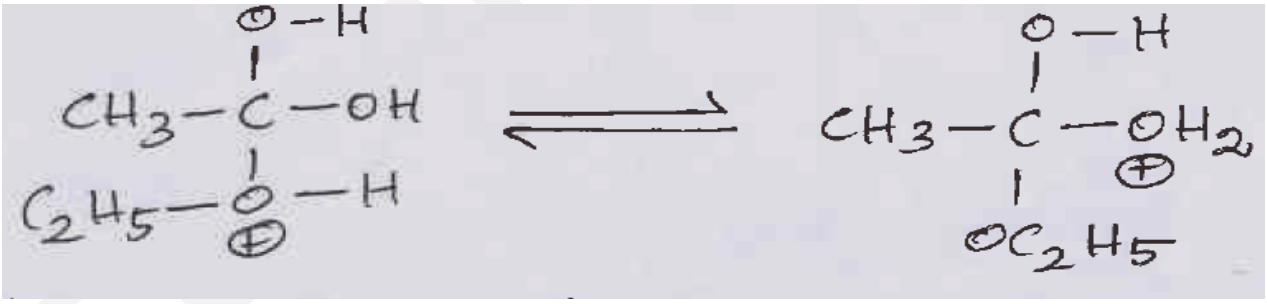
step:1 protonation of carboxylic acid



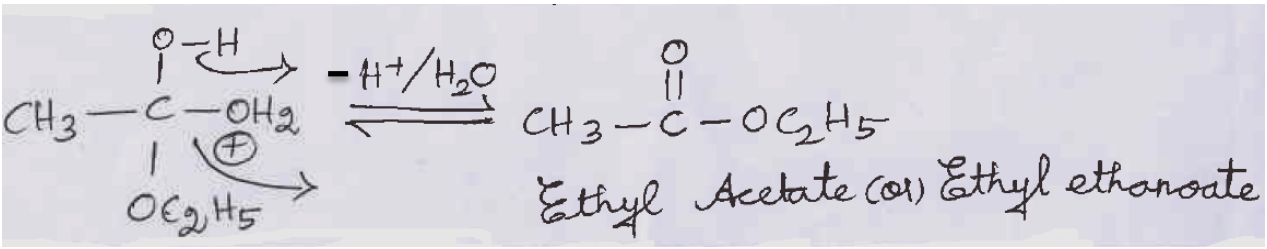
step:2 Attack by nucleophile



step:3 Hydrogen ion transfer

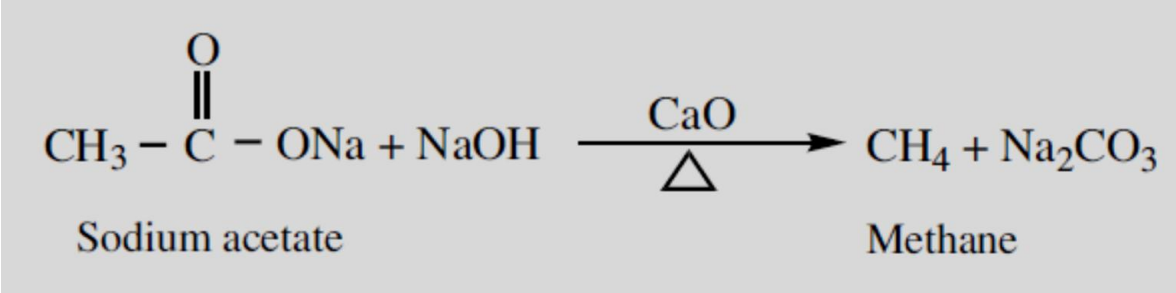


step:4 Elimination of proton and water



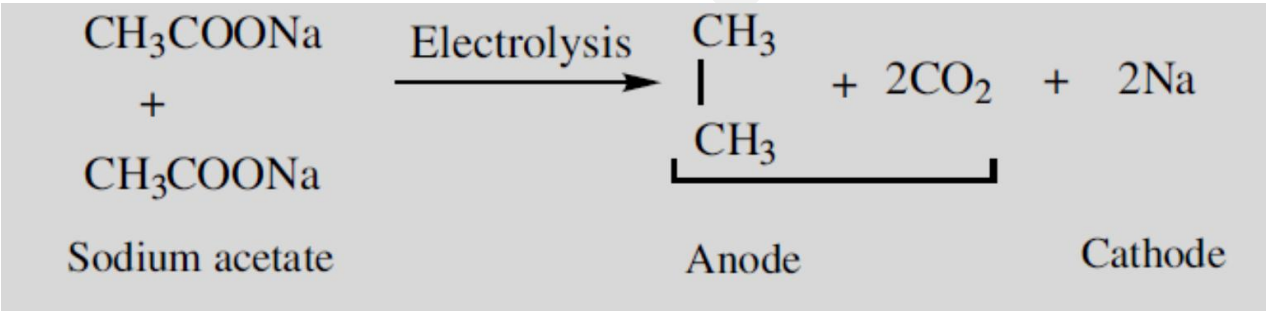
32.DECARBOXYLATION REACTION

Removal of CO_2 from carboxyl group is called as decarboxylation. carboxylic acids lose carbon di oxide to form hydrocarbon when their sodium salts are heated with soda lime (NaOH and CaO in the ratio 3:1)



33.KOLBE'S ELECTROLYTIC DECARBOXYLATION

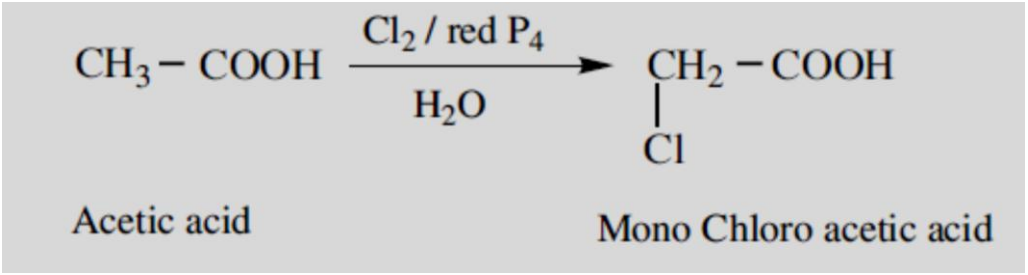
The aqueous solutions of sodium or potassium salts of carboxylic acid on electrolysis gives alkanes at anode. This reaction is called kolbes electrolysis.



Sodium formate solution on electrolysis gives hydrogen.

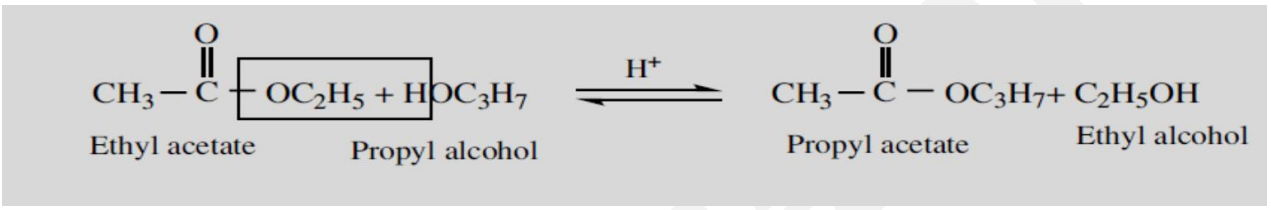
34.HELL-VOLHARD-ZELINSKY(HVZ)REACTION

Carboxylic acids having an α - hydrogen are halogenated at the α-position on treatment with chlorine or bromine in the presence of small amount of red phosphorus to form α halo carboxylic acids. this reaction is known as Hell-Volhard-Zelinsky reaction (HVZ reaction).



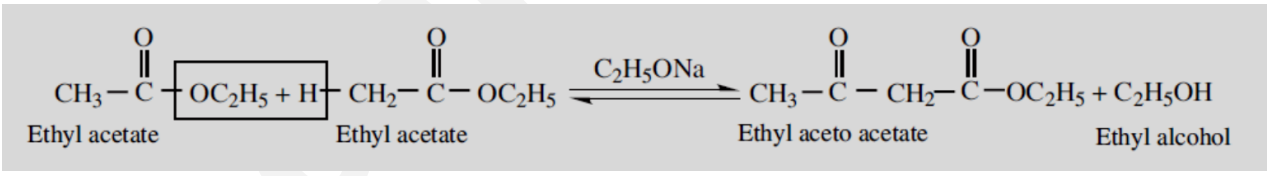
35.TRANSESTERIFICATION

Ester of an alcohol can react with another alcohol in the presence of a mineral acid to give the ester of second alcohol. The interchange of alcohol portions of the esters is termed transesterification.



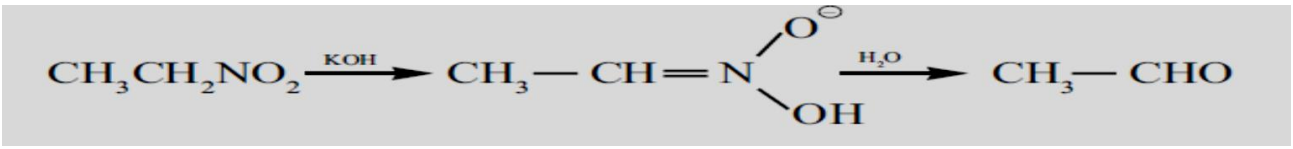
36.CLAISEN CONDENSATION

Esters containing at least one α - hydrogen atom undergo self condensation in the presence of a strong base such as sodium ethoxide to form β – keto ester.



37.NEF REACTION (OR) NEF CARBONYL SYNTHESIS

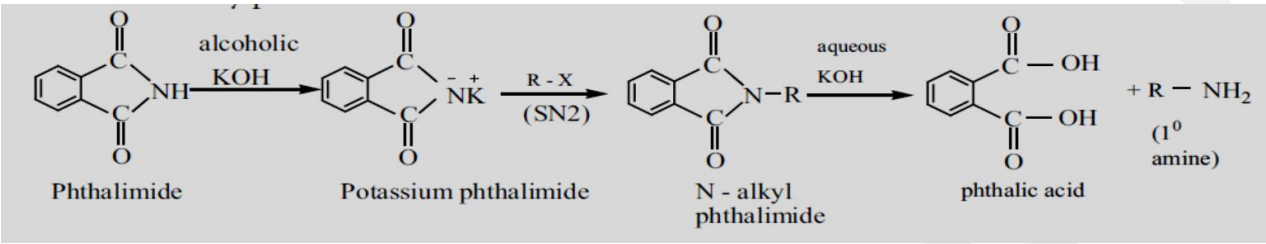
The conversion of nitro compounds into carbonyls is known as nef reaction.



Nitro ethane **ethanal**

38.GABRIEL PHTHALIMIDE SYNTHESIS

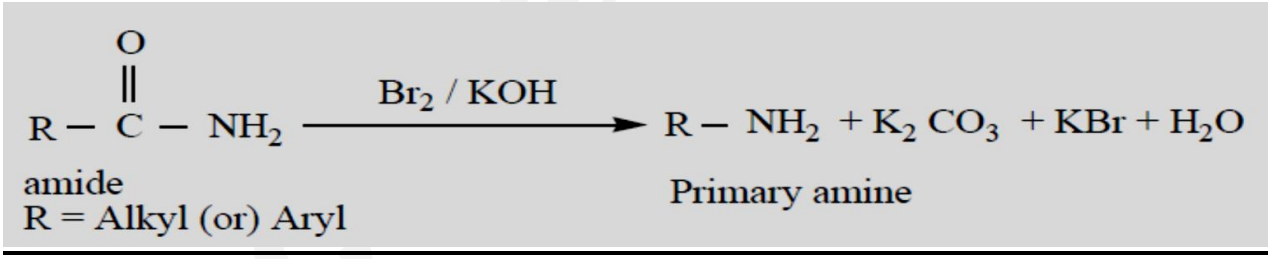
gabriel synthesis is used for the preparation of aliphatic primary amines. Phthalimide on treatment with ethanolic KOH forms potassium salt of phthalimide which on heating with alkyl halide followed by alkaline hydrolysis gives primary amines.



39.HOFFMANN'S DEGRADATION REACTION

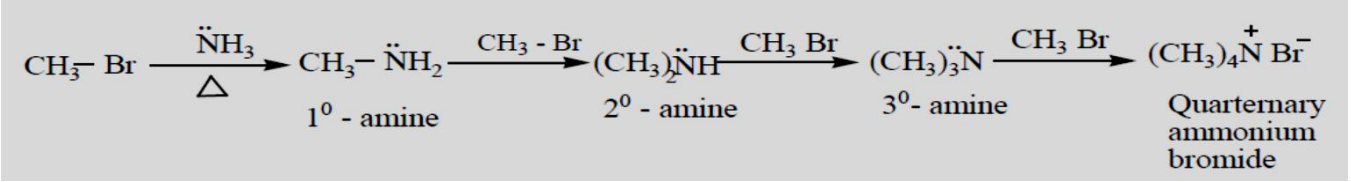
(or) HOFMANN BROMIDE REACTION

When Amide are treated with bromine in the presence of aqueous or ethanolic solution of KOH, primary amines with one carbon atom less than the parent amide are obtained.



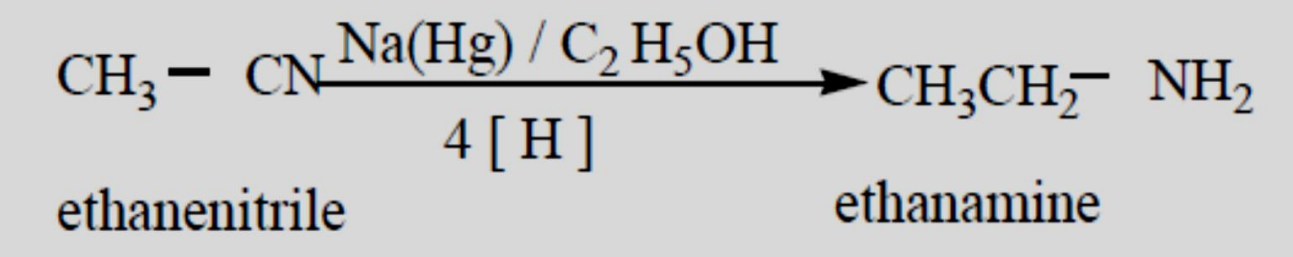
40.HOFFMANN'S AMMONOLYSIS

When alkyl halide or benzylhalides are heated with alcoholic ammonia in a sealed tube , mixture of 1^0 2^0 and 3^0 amines and quaternary ammonium salts are obtained.



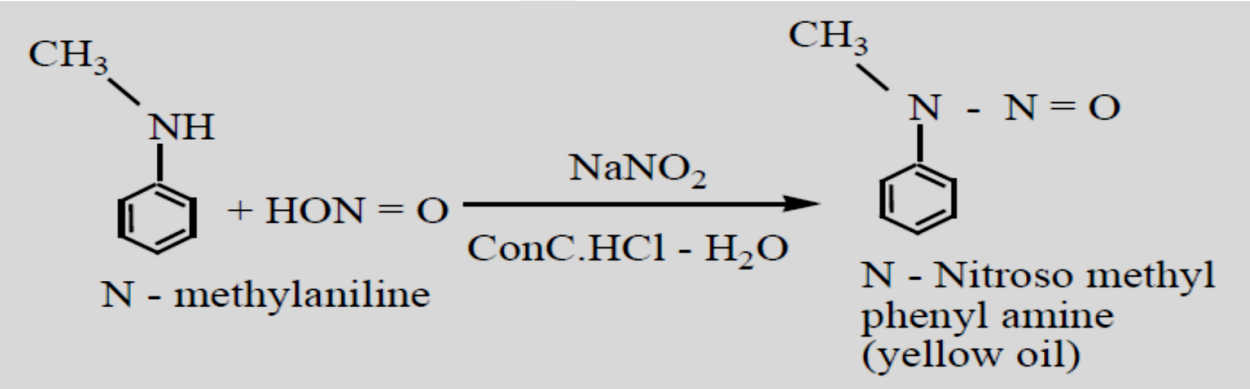
41.MENDIUS REACTION

Reduction of alkyl or aryl Cyanides with H_2/Ni or $LiAlH_4$ or Na / C_2H_5OH gives primary amines. The reduction reaction in which Na / C_2H_5OH is used as a reducing agent is called mendius reaction.



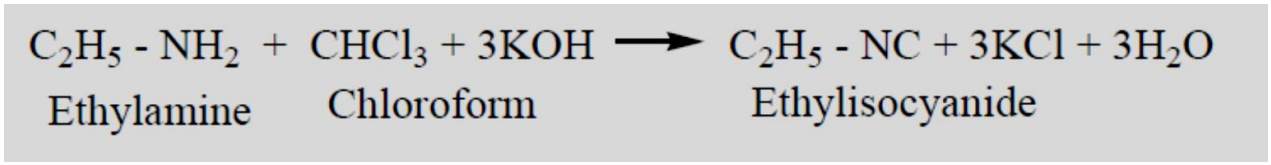
42.LIBERMANN'S NITROSO TEST

Alkyl and aryl secondary amines react with nitrous acid to give N-nitroso amine as yellow oily liquid which is insoluble in water . This reaction is known as Libermann's nitroso test.



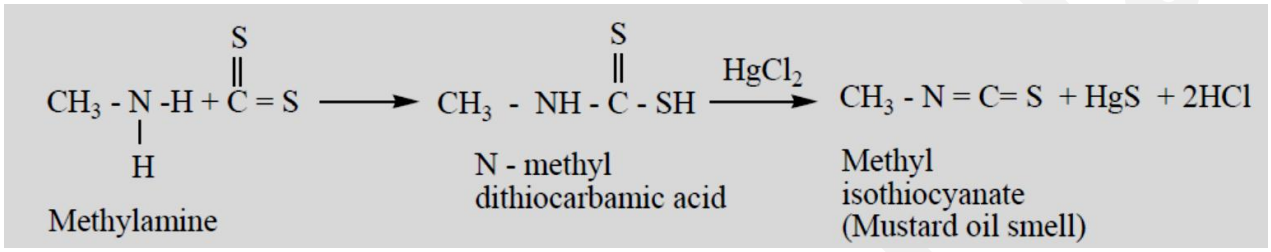
43.CARBYLAMINE REACTION

Aliphatic or aromatic primary amines react with chloroform and alcoholic KOH to give isocyanides (carbylamines), which has an unpleasant smell. This reaction is known as carbylamines test. This test used to identify the primary amines.



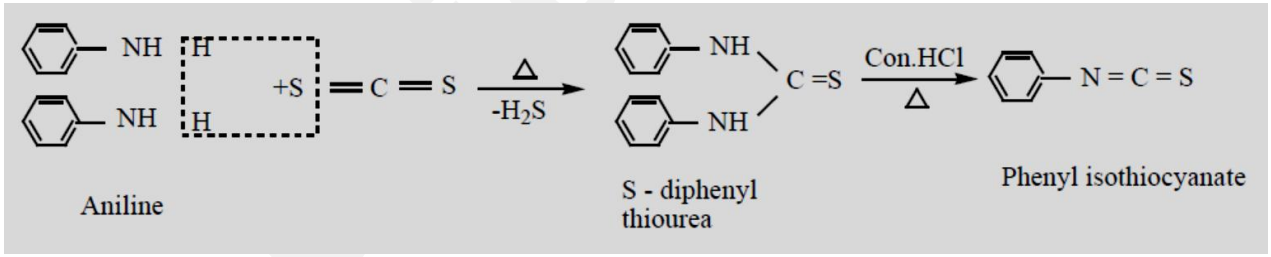
44.MUSTARD OIL REACTION

When primary amines are treated with carbon disulphide (CS_2) , N-alkyldithio carbonic acid is formed which on subsequent treatment with $HgCl_2$, give an alkyl isothiocyanate.



45.HOFMANN- MUSTARD OIL REACTION

when aniline is treated with carbon disulphide , or heated together, S-diphenylthio urea is formed which on boiling with strong HCl, phenyl isothiocyanate(phenyl mustard oil), is formed.

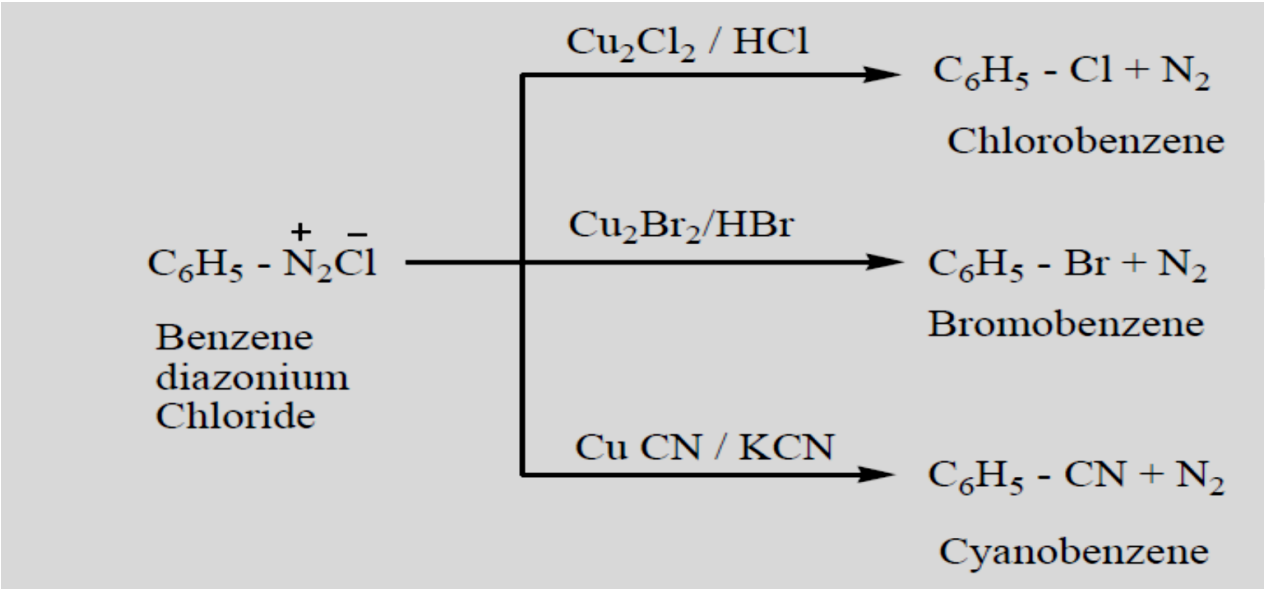


These reactions are known as Hofmann_Mustard oil reaction. This test is used to identify the primary amines.

46.SANDMEYER REACTION

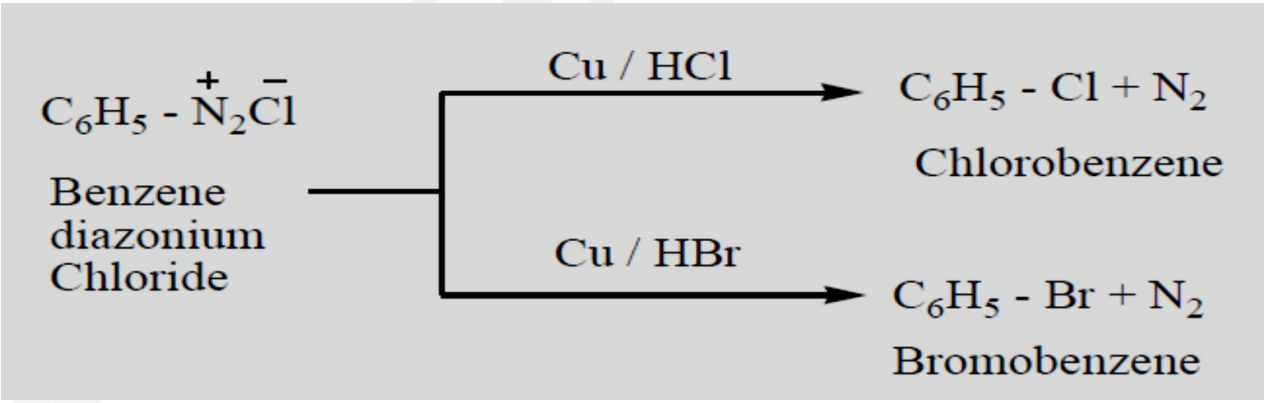
On mixing freshly prepared solution of benzene diazonioum chloride with curprous halides (chlorides and bromides) ,arly halides are obtained .This reaction is called sandmeyer reaction.

When diazonium salts are treated with curpous cyanide, cyanobenzene is obtained.



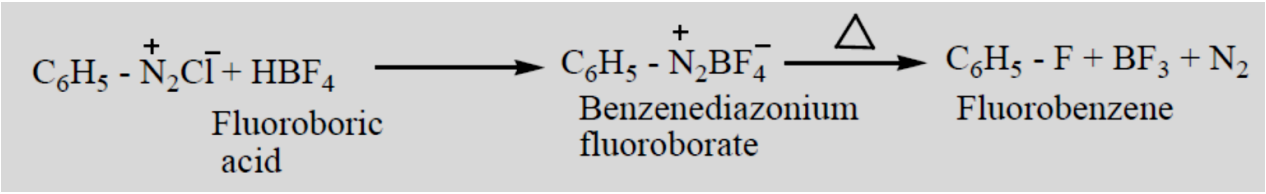
47. GATTERMANN REACTION.

Conversion of benzene diazonium chloride into chloro/bromo arenes can also be effected using hydrochloric/hydrobromic acid and copper powder. This reaction is called gattermann reaction



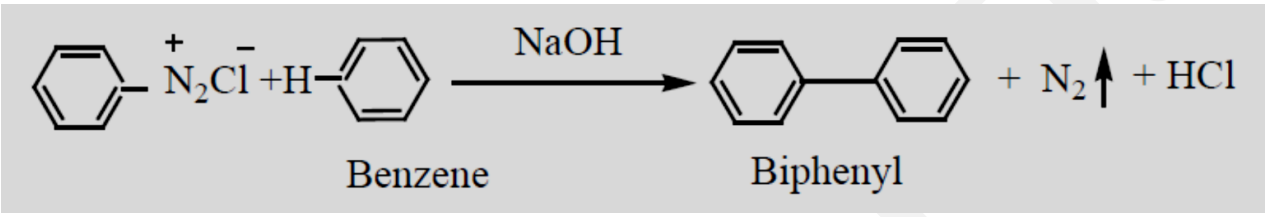
48.BALTZ-SCHIEMANN REACTION

When benzene diazonium chloride is treated with fluoroboric acid,benzene diazonium tetra fluoroborate is precipitated which on heating decomposes to give flourobenzene .



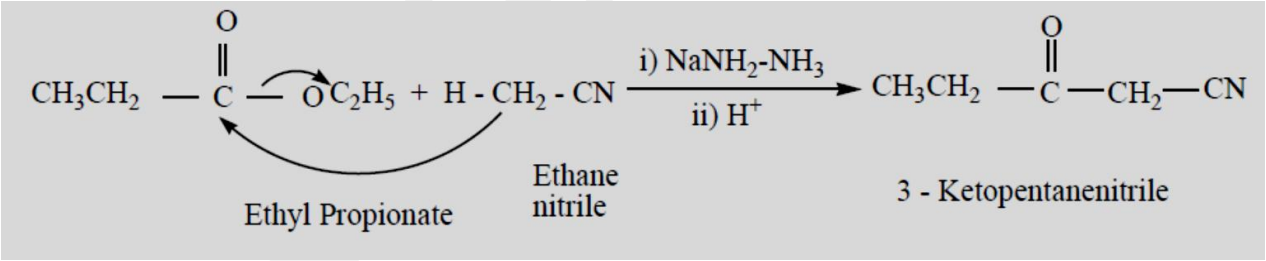
49. GOMBERG REACTION

Benzene diazonium chloride reacts with benzene in the presence of sodium hydroxide to give biphenyl .This reaction in known as the gomberg reaction.



50.LEVINE AND HAUSER ACETYLATION

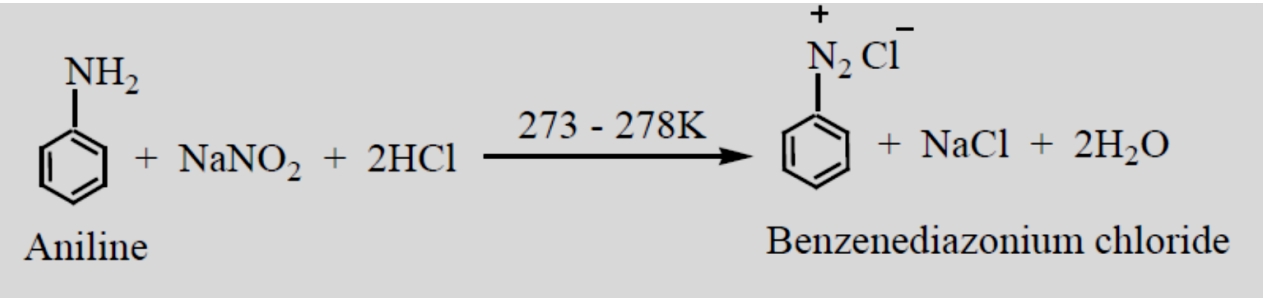
The nitriles containing α- hydrogen also undergo condensation with esters in the presence of sodamide in ether to form ketonitriles. This reaction is known as Levine and hauser acetylation



This reaction involves replacement of ethoxy (OC_2H_5) group by methylnitrile ($-CH_2CN$)group and is called as cyanomethylation reaction.

51.DIAZOTIZATION REACTION

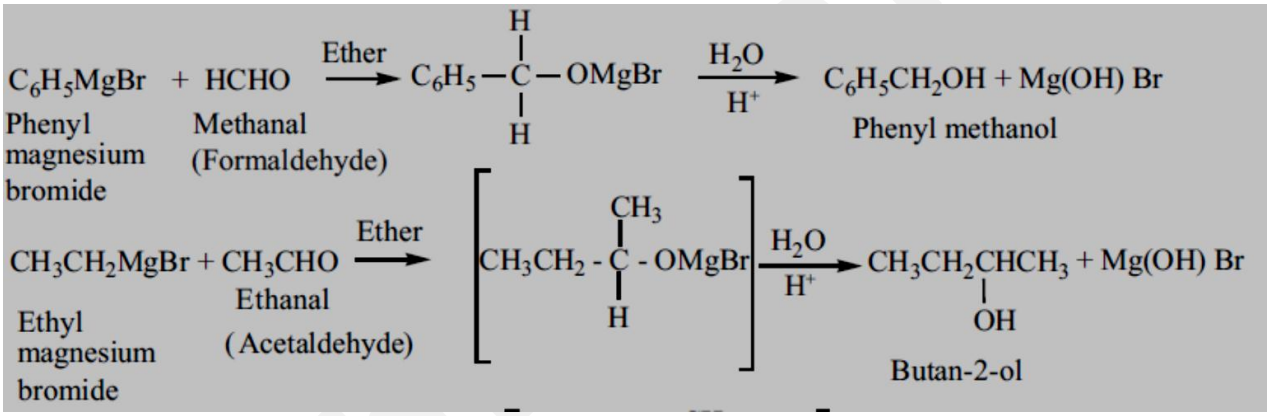
Aniline reacts with nirous acid at low temperature (273-278K) to give benzene diazonium chloride which is stable for a short time and slowly decomposes seven at low temperature. This reaction is known as diazotiation.



52.ALCOHOL FROM RMgX

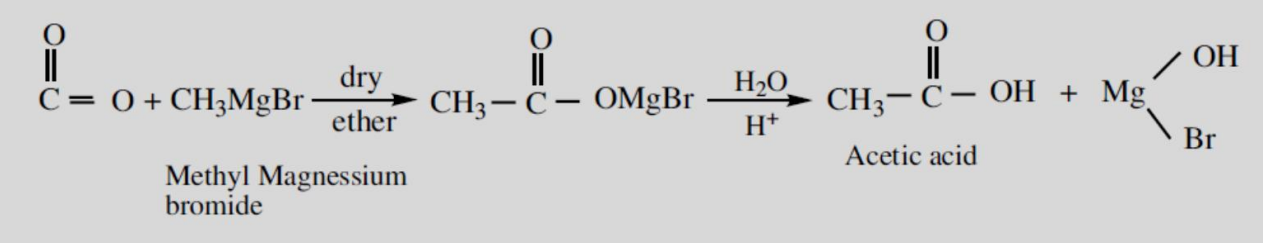
Nucleophilic addition of Grignard reagent(RMgX) to aldehyde /ketones in presence of dry ether followed by the acid hydrolysis gives alcohols. formaldehyde gives primary alcohol and other aldehydes give secondary alcohols Ketones give tertiary alcohols.

.



53.ACID FROM RMgX

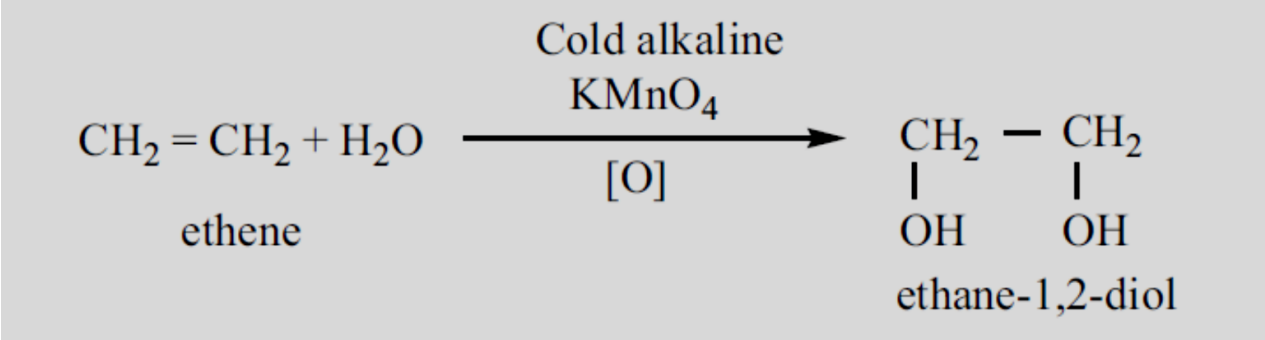
Grignard reagent(RMgX) react with carbon di oxide (dry ice) to forms salts of carboxylic acid which in turn give corresponding carboxylic acid after acidification with mineral acid.



ANOTHER MORE IMPORTANT REACTIONS

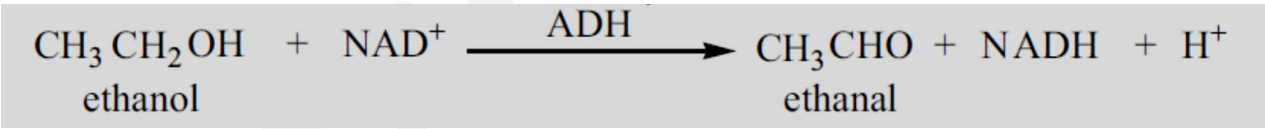
1.USING BAEYER'S REAGENT :

Ethylene using cold alkaline solution of potassium permanganate (baeyer's reagent) gives ethylene glycol.



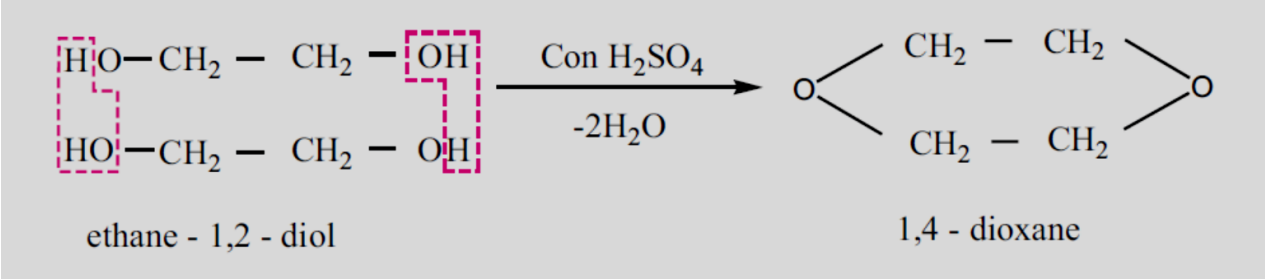
2.BIOLOGICAL OXIDATION :

The fermentation of the food consumed by an animal produces alcohol. To detoxify the alcohol the liver produces an enzyme called alcohol dehydrogenase (ADH). Nicotinamide adenine dinucleotide(NAD) present in the animals act as a oxidizing agent and ADH catalyses the oxidation of toxic alcohol into non-toxic aldehyde.



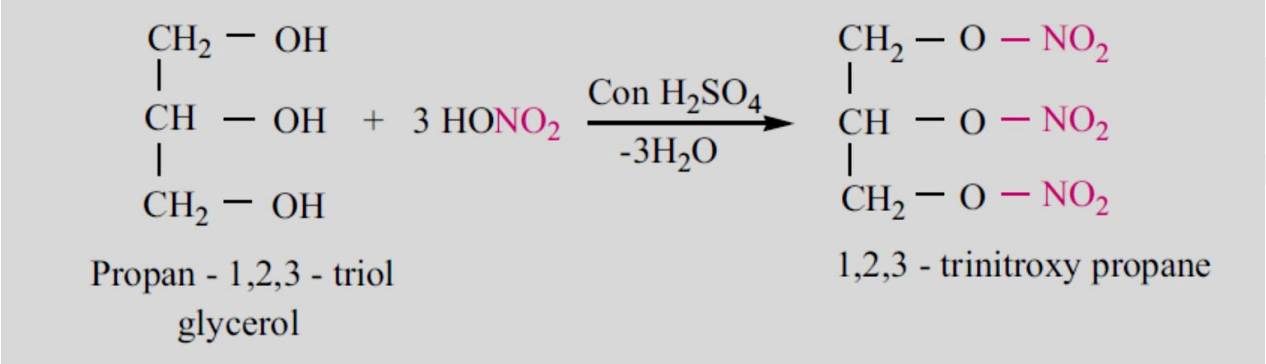
3.1.4 dioxane :

When distilled with conc.H_2SO_4 , glycol forms dioxane.



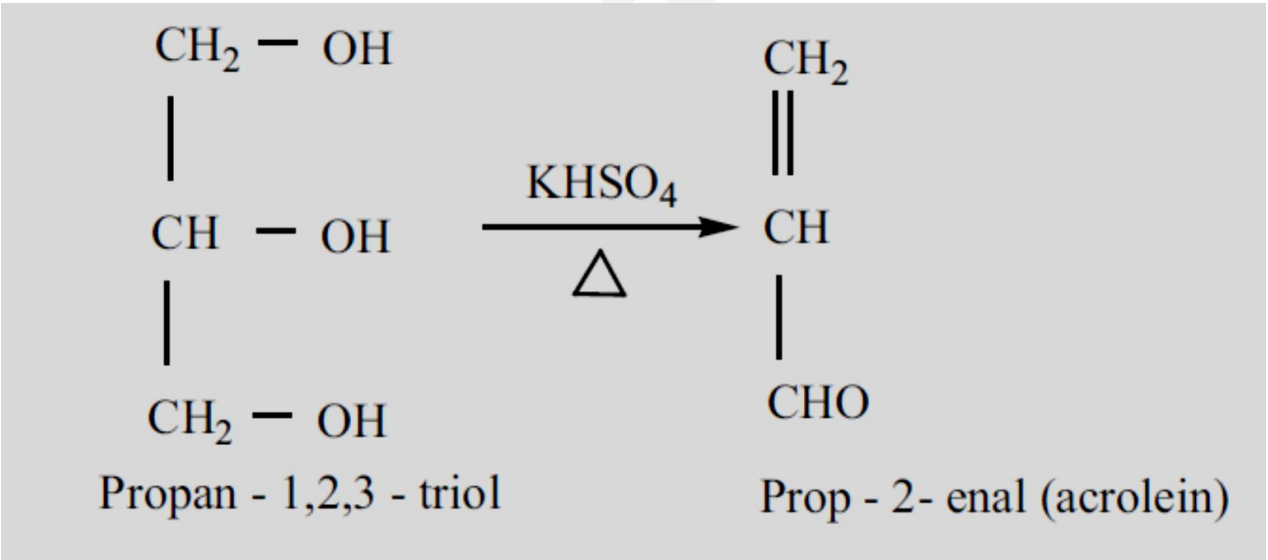
4.TNG(TRINITROGLYCERINE) :

Glycerol reacts with con.HNO_3 in the presence of con.H_2SO_4 to form TNG(nitroglycerine).



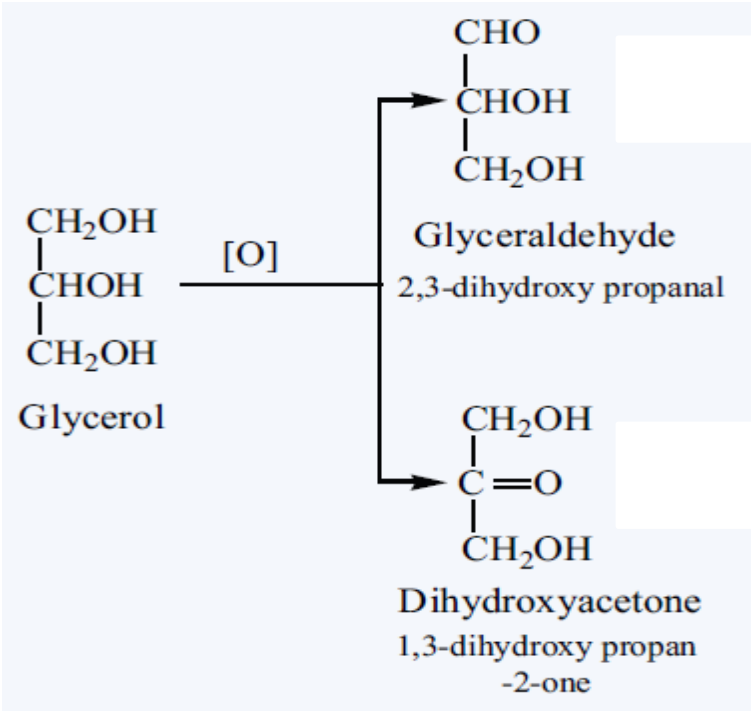
5.AGROLEIN :

When glycerol is heated with dehydrating agents such as con.H_2SO_4 ,$KHSO_4$. It undergoes dehydration to form acrolein.



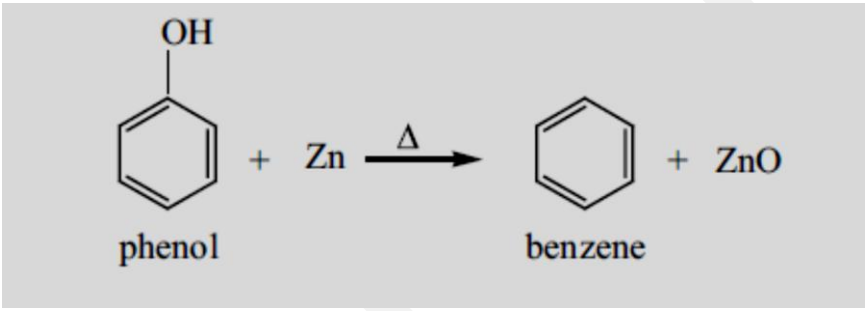
6.GLYCEROSE :

Oxidation of glycerol with Br_2/H_2O or NaOBr or Fenton's reagent ($FeSO_4+H_2O_2$) gives a mixture of glyceraldehyde and dihydroxy acetone(This mixture is named as glycerose).



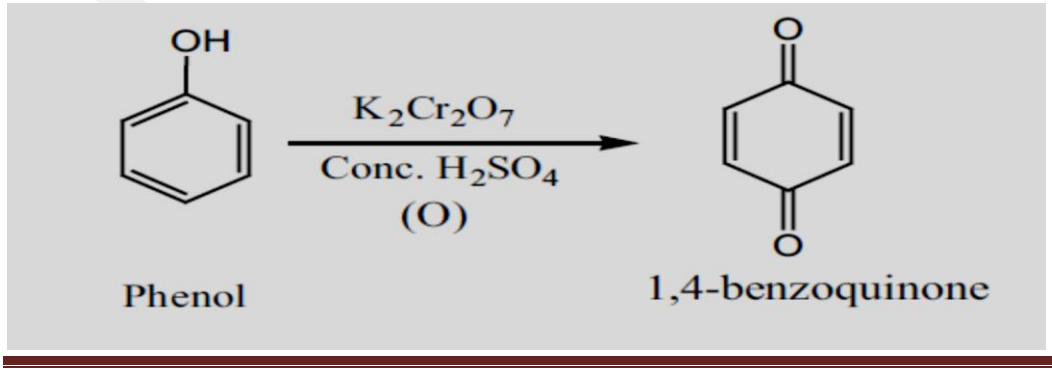
7.PHENOL TO BENZENE :

Phenol is converted to benzene on heating with zinc dust.



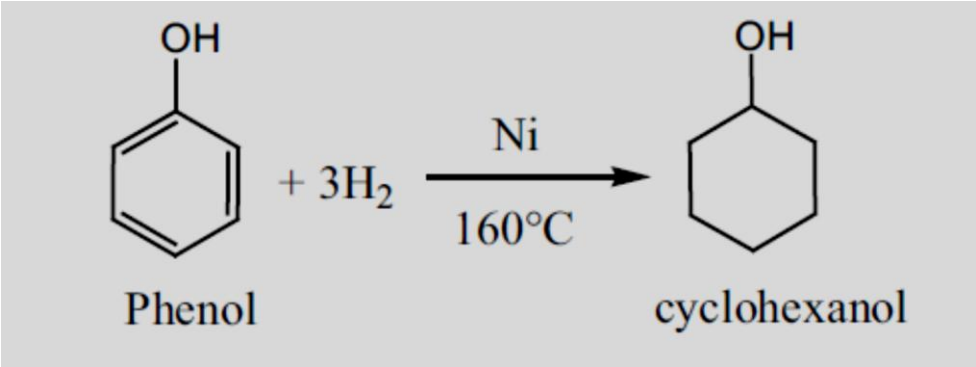
8.PHENOL TO 1,4- BENZOQUINONE :

Phenol undergones oxidation with air or acidified $K_2Cr_2O_7$ with conc.H_2SO_4 to form 1,4-benzoquinone.



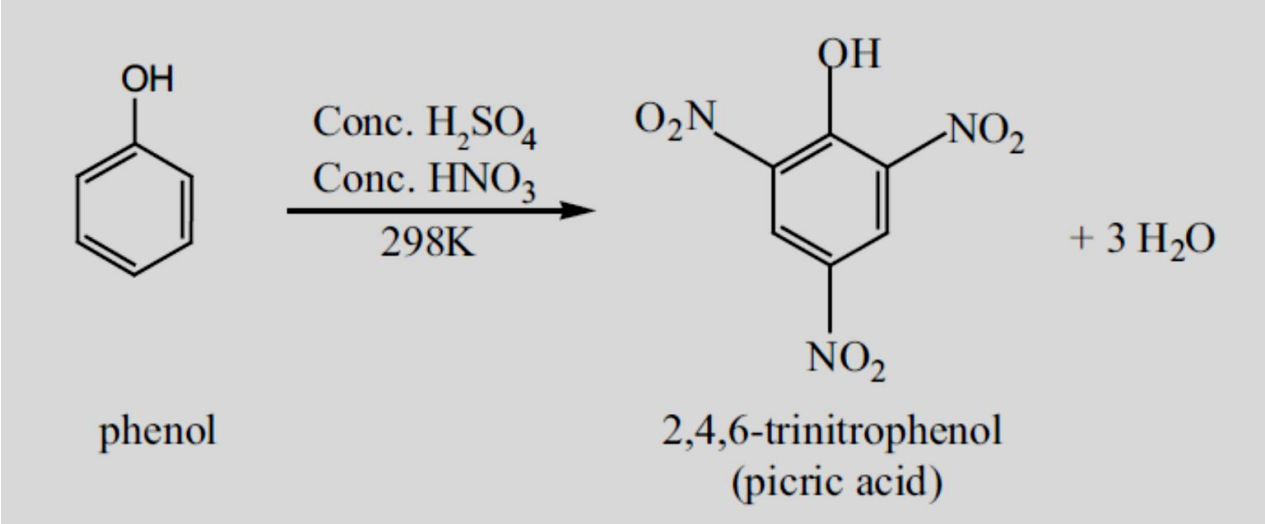
9.PHENOL TO CYCLOHEXANOL :

Phenol on catalytic hydrogenation gives cyclohexanol.

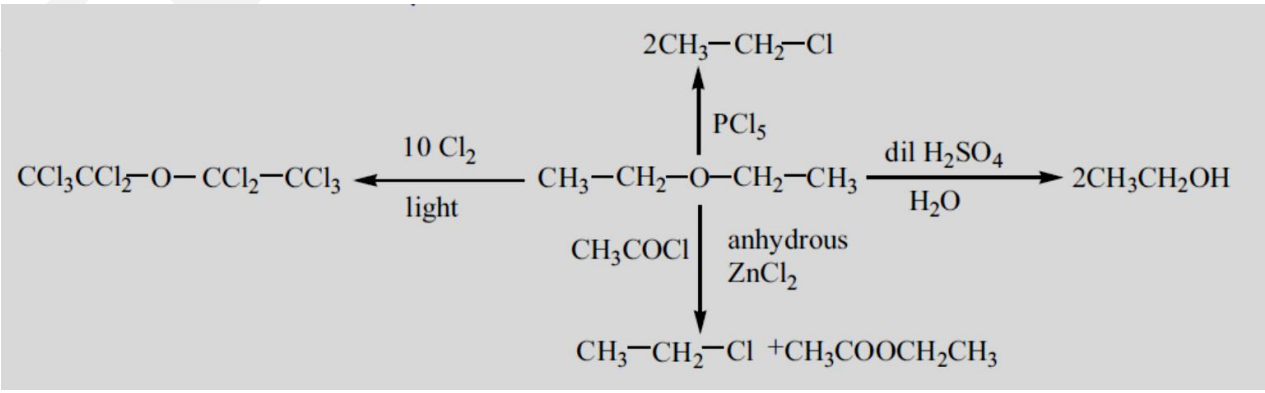


10.PHENOL TO PICRIC ACID :

Phenol can be nitration with conc.HNO_3 + Conc. H_2SO_4 gives picric acid.



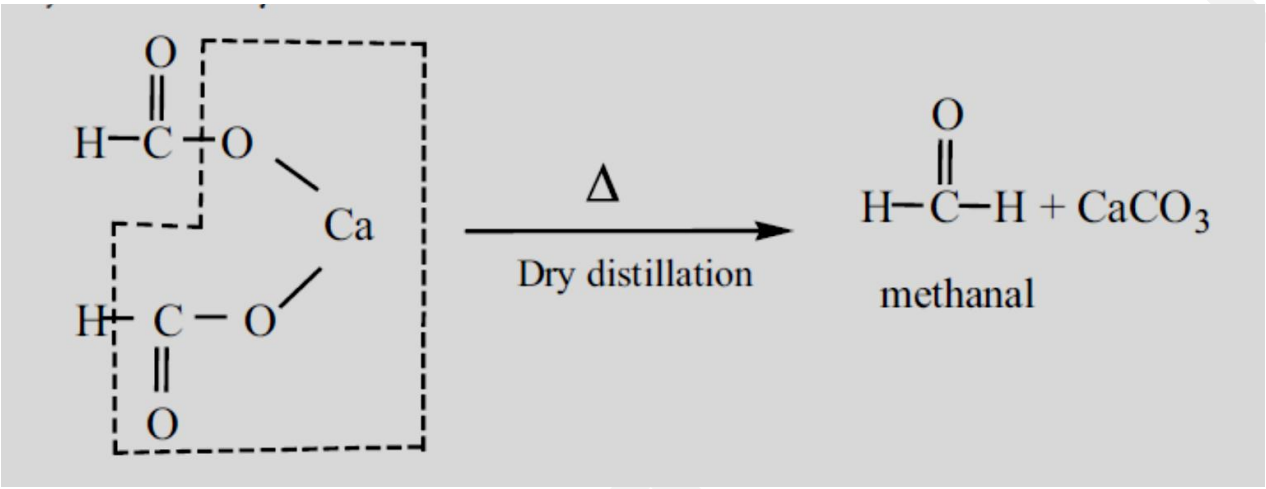
11.DIETHYL ETHER REACT WITH SOME COMPOUNDS :



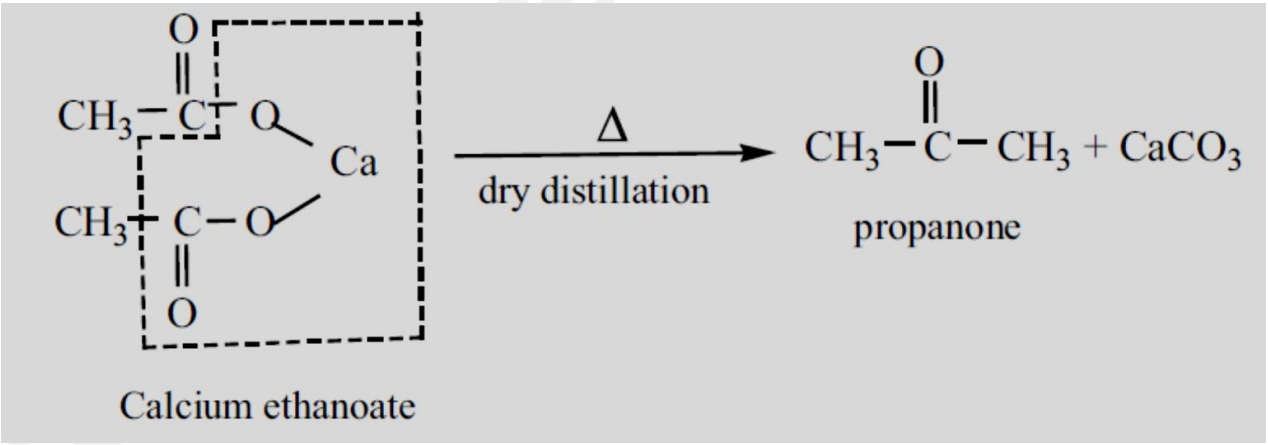
12.CALCIUM SALTS OF CARBOXYLIC ACID :

Aldehyde and ketones may be prepared by the dry distillation of calcium salts carboxylic acids.

Aldehyde are obtained when the mixture of calcium salts of carboxylic acid calcium formate is subjected to dry distillation.

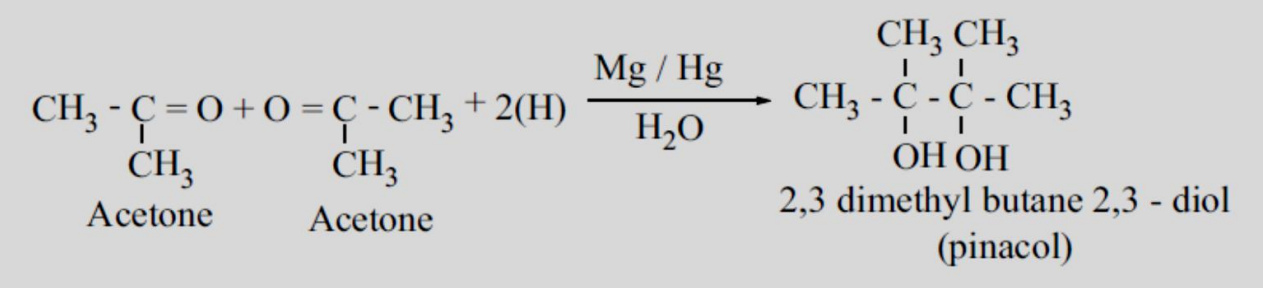


Symmetrical ketone can be obtained by dry distillation of the calcium salt of carboxylic acids.



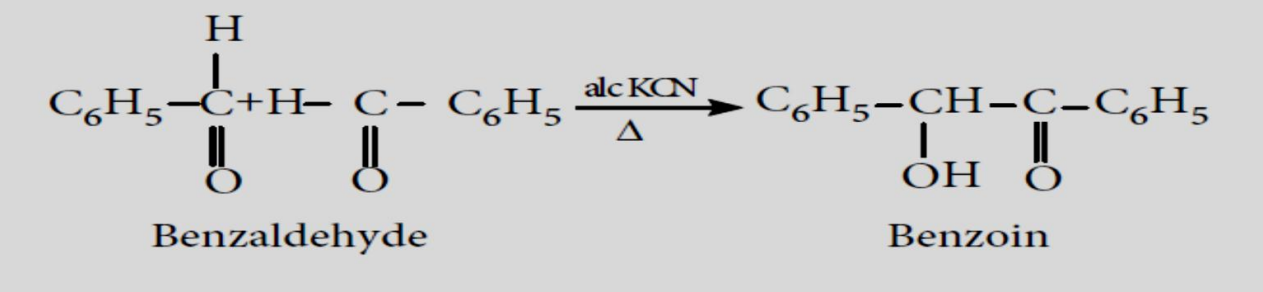
13.KETONE REDUCTION TO PINACOLS :

Ketones on reduction with magnesium amalgam and water, are reduced to symmetrical diols known as pinacol.



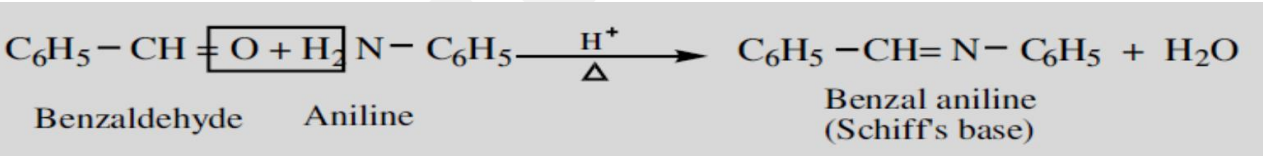
14.BENZOIN CONDENSATION :

Benzaldehyde rects with alcoholic KCN to from benzoin.



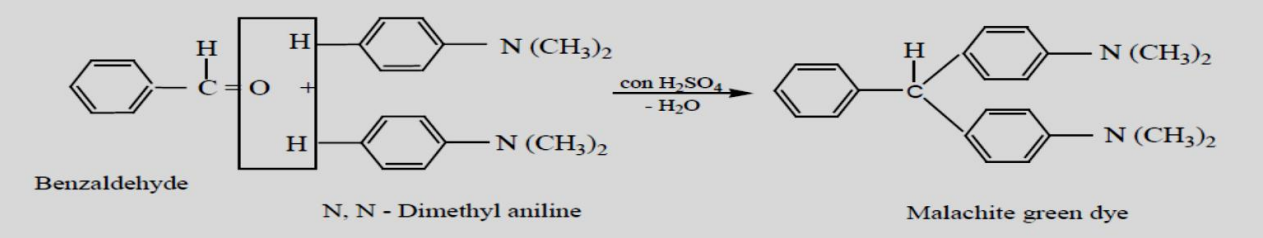
15.SCHIFF'S BASE :

Aromatic aldehydes rect with primary amines (aliphatic or aromatic) in the presence of an acid to form Schiff's base.



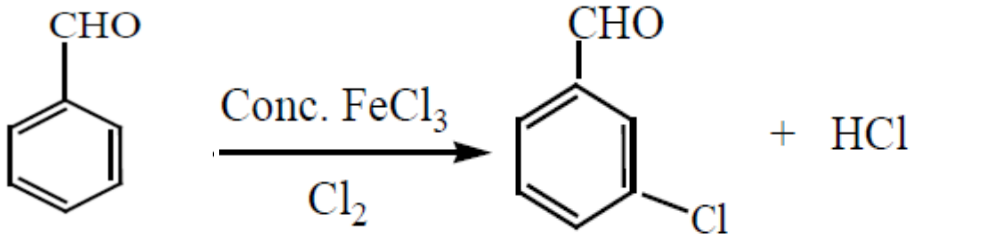
16.MALACHITE GREEN DYE :

Benzaldehyde condenses with tertiary aromatic amines like N,N-dimethyl aniline in the presence of the strong acids to form triphenyl methane dye.



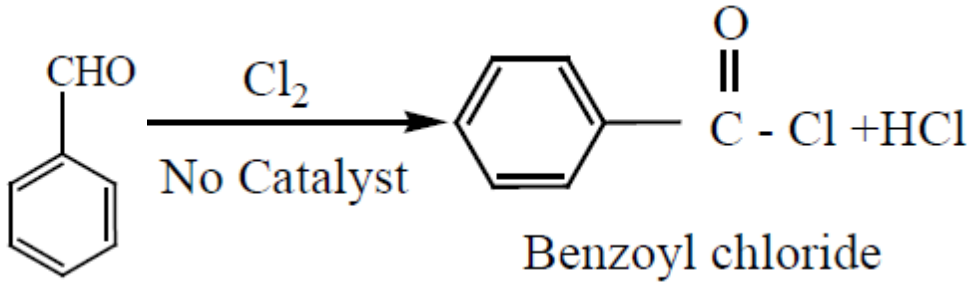
17.BENZALDEHYDE REACT WITH CHLORINE PRESENCE AND ABSENSE OF CATALYST :

Bezaldehyde react with chlorine in presence of catalyst :



m - chlorobenzaldehyde

Benzaldehyde react with chlorine in absence of catalyst :



Benzoyl chloride

18.REDUCING PROPERTY OF FORMIC ACID :

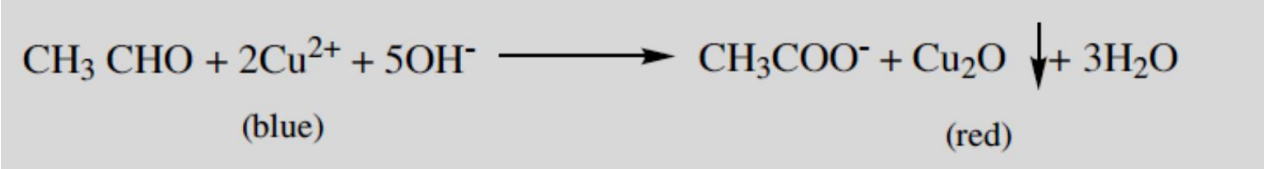
Formic acid contains both an aldehyde as well as an acid group. Hence, like other aldehyde, formic acid can easily be oxidized and therefore acts as a strong reducing agent.

i) Formic acid reduces tollens reagents (ammonical silver nitrate solution) to metallic silver.

$$CH_3CHO + 2\,[Ag(NH_3)_2]^+ + 3OH^- \longrightarrow CH_3COO^- + 4NH_3 + 2Ag + 2H_2O$$

Silver mirror

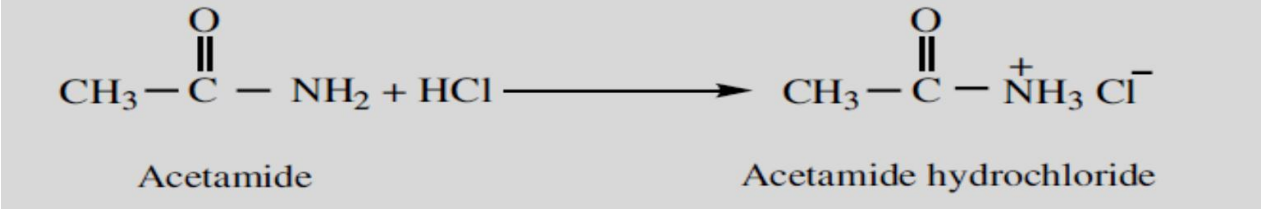
Formic acid reduces Fehlings solution. It reduces blue coloured cupric ions to red coloured cuprous ions.



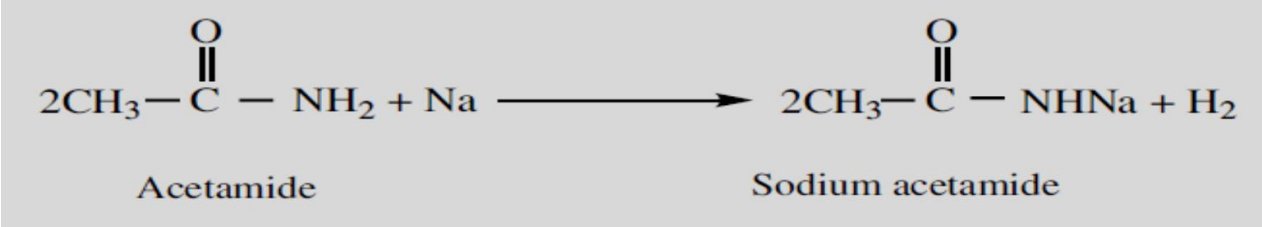
19.AMPHOTERIC CHARACTER OF ACETAMIDE :

Amides behave both as weak acid as well as weak base and thus show amphoteric character.

Acetamide (as base) reacts with hydrochloric acid to form salts.

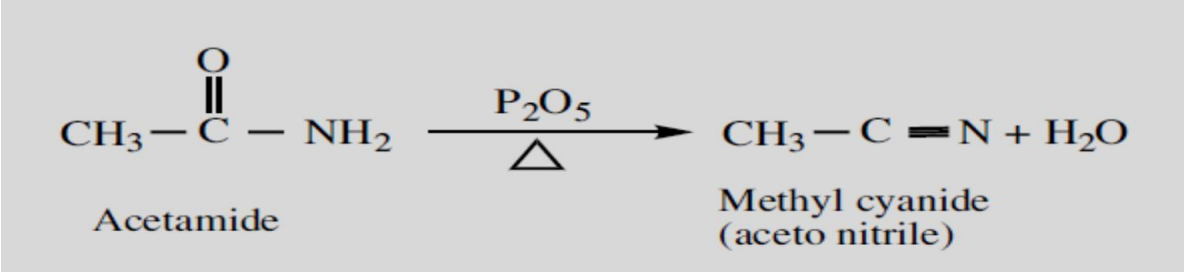


Acetamide (as acid) reacts with sodium to form sodium salt and hydrogen gas is liberated.



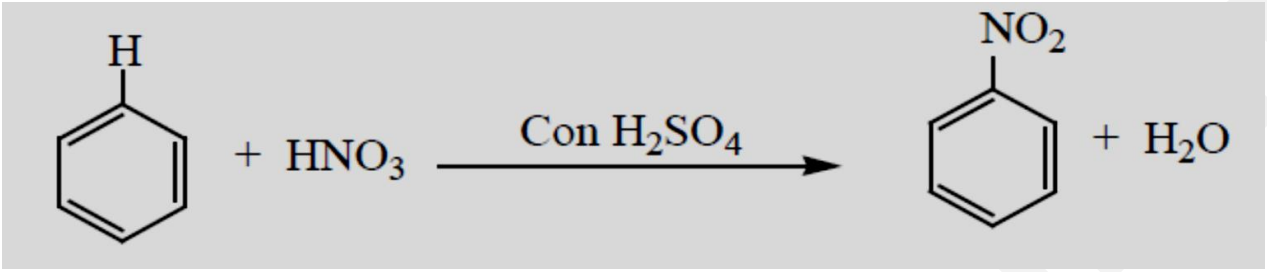
20.DEHYDRATION OF AMIDE :

Amides on heating with strong dehydrating agents like P_2O_5 get dehydrated.



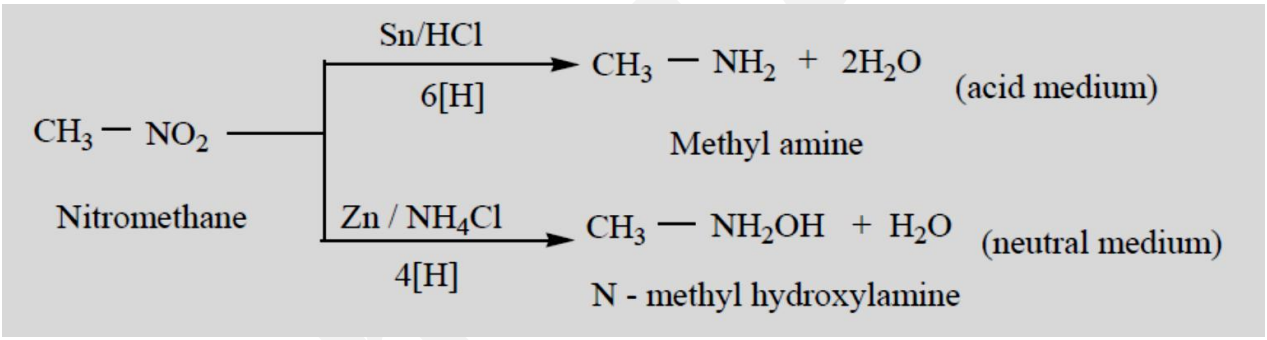
21.PREPARATION OF NITRO BENZENE :

When benzene is heated at 330K with a nitrating (Con.HNO_3 + Con.H_2SO_4) electrophilic substitution takes place to form nitro benzene. (oil of mirbane).



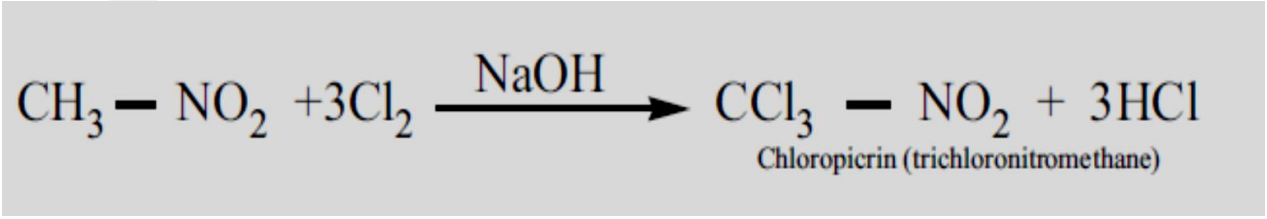
22.REDUCTION OF NITROALKANES :

The final product depends upon the nature of reducing agent as well as the P^H of the medium.

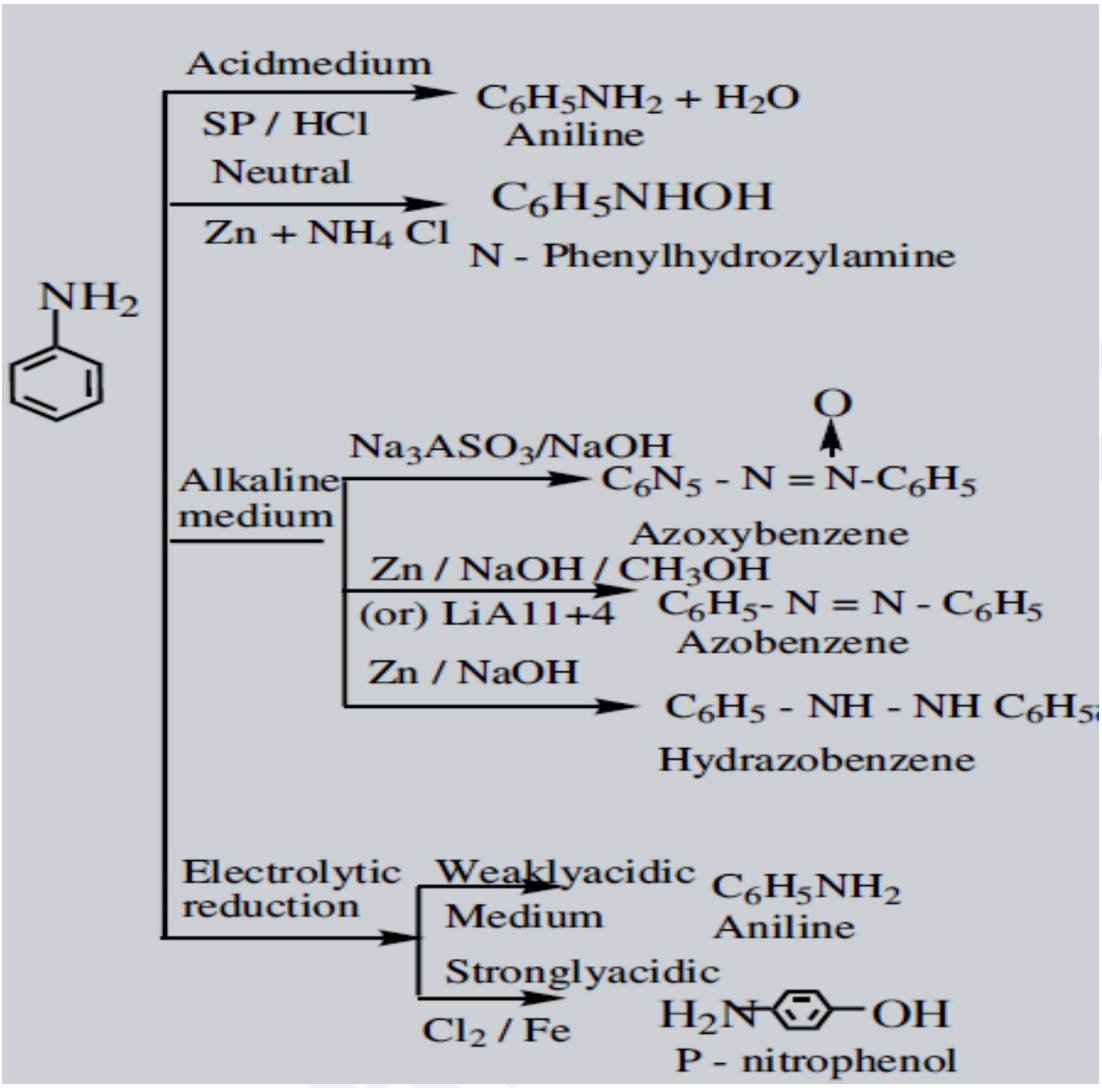


23.CHLOROPICRIN :

Primary and secondary nitroalkanes on treatement with Cl_2 or Br_2 in the presence of NaOH give halonitroalkanes. The α-H atom of nitroalkanes are successively replaced by halogen atoms.



24.REDUCTION OF NITROBENZENE :



25.AMINE REACT WITH NITROUS ACID :

i) PRIMARY AMINE REACT WITH NITROUS ACID :

Ethylamine reacts with nitrous acid to give ethyl diazonium chloride, which is unstable and it is converted to ethanol by liberating N_2.

$$\underset{\text{Ethylamine}}{C_2H_5-NH_2} + HNO_2 \xrightarrow[\text{Conc. HCl}]{NaNO_2} \underset{\text{Unstable}}{[C_2H_5\overset{+}{N_2}Cl^-]} \xrightarrow{H_2O} \underset{\text{Ethanol}}{C_2H_5OH} + N_2$$

ii) SECONDARY AMINE REACT WITH NITROUS ACID :

Alkyl and aryl secondary amines react with nitrous acid to give N-nitroso amine as yellow oily liquid which is insoluble in water.

$$(CH_3)_2\,N\,H + HO - N = O \longrightarrow (CH_3)_2\,N - N = O$$

Secondary amine — N-nitroso dimethyl amine - yellow oil (insoluble in water)

ii) TERTIARY AMINE REACT WITH NITROUS ACID :

Aliphatic tertiary amine reacts with nitrous acid to form trialkyl ammonium nitrite salt, which is soluble in water.

$$(CH_3)_3N + HNO_2 \longrightarrow [(CH_3)_3\overset{+}{N}H]\,NO_2^-$$

trimethylamine — trimethyl ammonium nitrite

26.$C_6H_5N_2Cl$ to IODO BENZENE :

Aqueous solution of benzene diazonium chloride is warmed with KI to form iodobenzene

$$C_6H_5\text{-}\overset{+}{N}_2\,Cl^- + KI \rightarrow \underset{\text{Iodobenzene}}{C_6H_5I} + KCl + N_2$$

27.$C_6H_5N_2Cl$ to PHENOL :

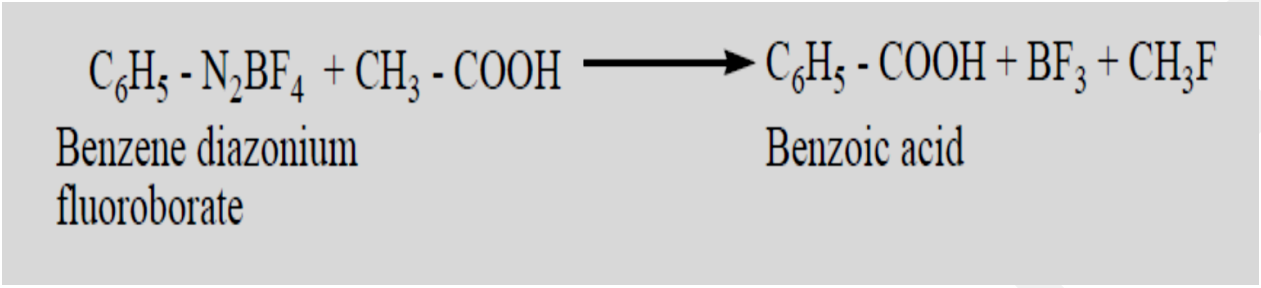
Benzene diazonium chloride solution is added slowly to a large volume of boiling water to get phenol.

$$C_6H_5\text{-}N_2Cl + H_2O \xrightarrow[283K]{\Delta} C_6H_5\text{-}OH + N_2 + HCl$$

Phenol

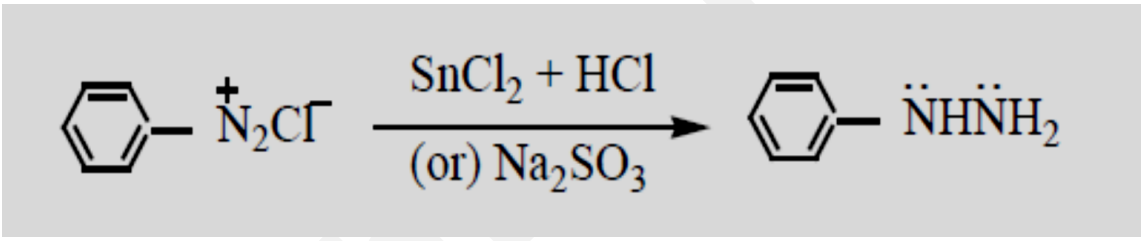
28.$C_6H_5N_2Cl$ to BENZOIC ACID :

When diazonium fluoroborate is heated with acetic acid, benzoic acid is obtained. This reaction is used to convert the of carboxylic acid into aromatic carboxylic acid .



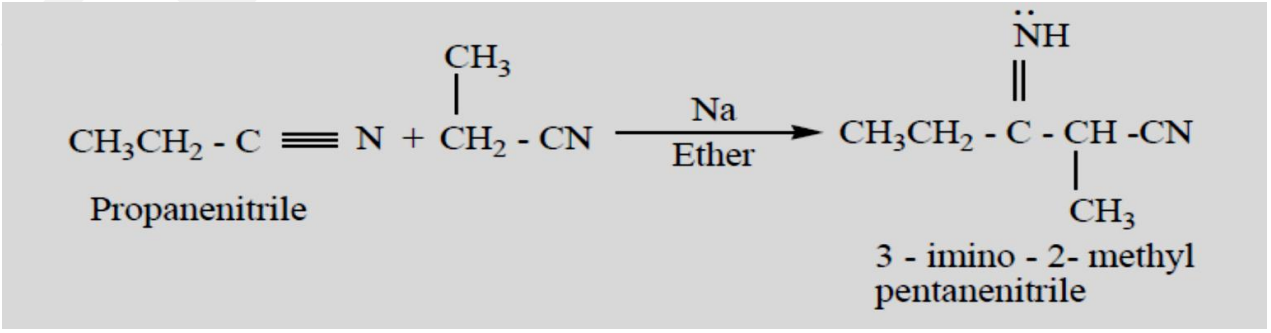
29.$C_6H_5N_2Cl$ to PHENYL HYDRAZINE :

Certain reducing agents like $SnCl_2$/HCl ; Zn dust / CH_3COOH, sodium hydrosulphite, sodium sulphite. Reduce benzene diazonium chloride to phenyl hydrazine.



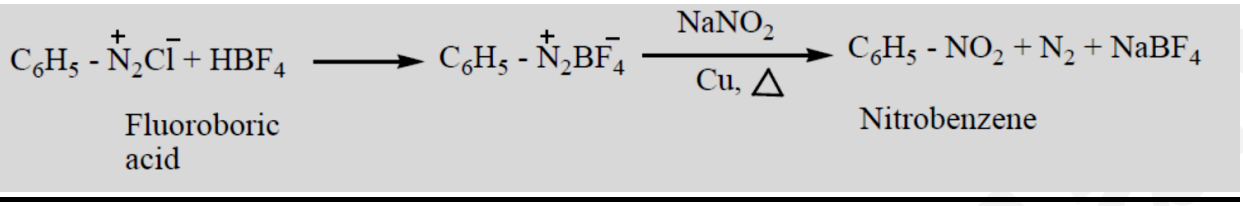
30.THORE NITRILE CONDENSATION :

Self condensation of two molecules of alkyl nitrile (containing α-H atom) in the presence of sodium to form iminonitrile.



31.$C_6H_5N_2Cl$ to NITROBENZENE :

When diazonium fluoroborate is heated with aqueous sodium nitrite solution in the presence of copper, the diazonium group is replaced by – NO_2 group.



S. Manikandan, Msc, B.Ed.,
PG Assitant-7708543401
Department of Chemistry
Mount Carmel Mission Mat. Hr. Sec. School,
Kallakurichi

"Life is nothing without chemistry.

All are made up of atoms and molecules"