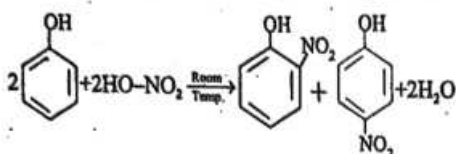


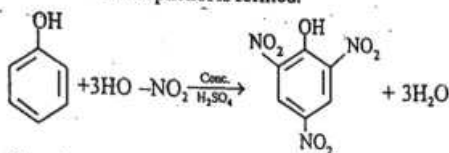
Phenol 2, 4, 6-Tribromophenol

iii) Dil. HNO_3 : Phenol, when treated with dil. nitric acid at room temperature gives a mixture of ortho and para -nitrophenols.



dil. o-Nitro phenol p-Nitro phenol

iv) Conc. HNO_3 : When phenol is treated with conc. nitric acid in the presence of conc. H_2SO_4 (nitrating mixture), 2, 4, 6-trinitrophenol is formed.

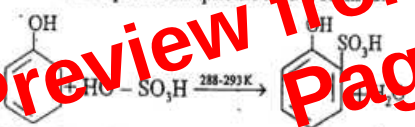


Phenol 2, 4, 6-Trinitrophenol (Picric acid)

33. What is the action of conc. H_2SO_4 on phenol at different temperatures ?

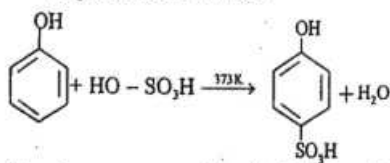
Ans: Action of conc. H_2SO_4 on phenol :

i) At 288 to 293 K : When phenol is treated with conc. H_2SO_4 at about 288-293 K, ortho-phenol sulphonic acid is formed.



Phenol Conc. o-Phenol sulphonic acid

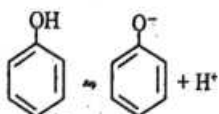
ii) At 373 K : When phenol is treated with conc. H_2SO_4 at about 373 K, para-phenol sulphonic acid is formed.



Phenol p-Phenol sulphonic acid

34. Why does phenol behave as an acid although it contains OH group ?

Ans: Phenol dissociates in its aqueous solution as follows.

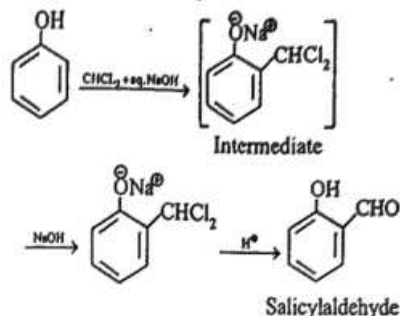


Phenoxide (phenate) ion is stabilised by resonance. Thus its aqueous solution contains H^+ ions (protons). Hence, phenol behaves as an acid.

35. How will you convert phenol into salicylaldehyde ? (Reimer-Tiemann reaction)

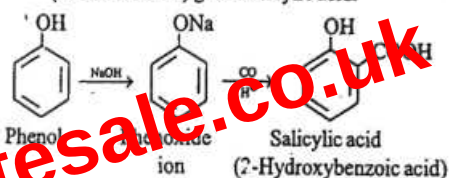
Ans: On treating phenol with chloroform in the presence of sodium hydroxide (NaOH), a -CHO group is introduced at 'ortho' position of benzene ring.

This reaction is known as 'Reimer - Tiemann reaction.' The intermediate substituted benzal chloride is hydrolysed in the presence of alkali to produce salicylaldehyde.



36. How will you prepare salicylic acid from phenol ? (Kolbe reaction)

Ans: Phenoxide ion is generated by treating phenol with sodium hydroxide then treated with CO_2 (carbon dioxide) gives salicylic acid.



37. How will you distinguish between phenol and alcohol ?

Distinction between phenol and an alcohol: Phenol gives violet colouration when treated with neutral ferric chloride solution. But alcohol does not give any colouration with neutral ferric chloride solution.

38. Distinguish between phenol and alcohol .

Ans:

Phenol	Alcohol
i) It is acidic	i) It is neutral.
ii) It gives white ppt with bromine water.	ii) No reaction with bromine water.
iii) It gives sodium phenoxide with NaOH .	iii) No reaction with NaOH .
iv) Phenol gives violet colouration when treated with neutral ferric chloride solution.	iv) Alcohol does not give any colouration with neutral ferric chloride solution.

39. Give the important uses of phenol.

Ans: Uses of phenol :

- Phenol is used as an antiseptic.
- It is used as a disinfectant.
- It is used in the preparation of drugs, dyes, resins etc.
- It is used in the manufacture of bakelite.