### METHODS OF PREPARATION OF PHENOL

## 1. From chlorobenzene (Dow process): Lab method

In this process, the hydrolysis of chlorobenzene with aqueous NaOH at high temperature and pressure followed by treatment with dilute HCl.

**Note:** This process was first introduced in 1928 by the Dow Chemical Company of U.S.A..

## 2. From Cumene (Cumene process)

This involves three reactions-

(a) Friedel-Craft alkylation reaction

(b) Cumene is oxidised using air to give cumene hydroperoxide (auto-oxidation).

$$\begin{array}{c} \text{CH(CH}_3)_2 \\ \hline \\ \text{O}_2 \\ \hline \\ \text{100}^0\text{C} \\ \end{array}$$
 Cumene Cumene hydroperoxide

(c)

# 3. From sodium benzene sulphonate

$$\begin{array}{c|c} SO_3Na & O^{-}Na^{+} & OH \\ \hline & aq NaOH & H^{+}/H_2O \\ \hline & & & & \\ \hline \end{array}$$

Sodium benzene sulphonate

Sodium phenoxide

Phenol

## 4. From benzene diazonium salt

Nitration
HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>

Nitrobenzene

Nitrobenzene

NaNO<sub>2</sub> + HCl, 
$$0^0$$
C

OH

NaNO<sub>2</sub> + HCl,  $0^0$ C

Phenol

Benzene diazonium chloride

Note: The liquid form of phenol containing about 5% water is known as Carbolic acid.