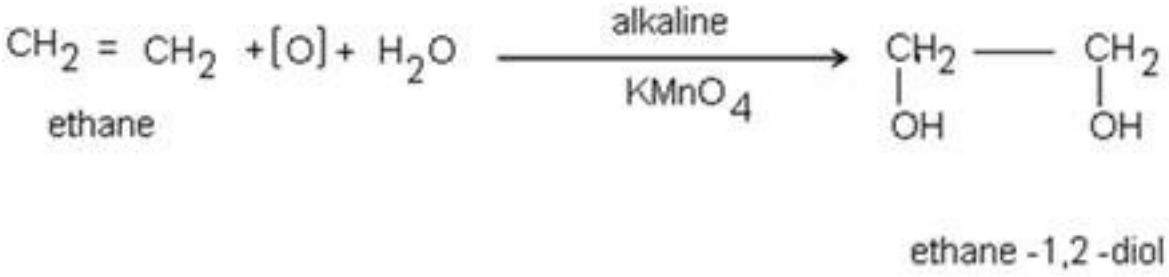
CBSE Class 12 physics
Important Questions
Chapter 11
Alcohols Phenols and Ethers

2 Mark Questions

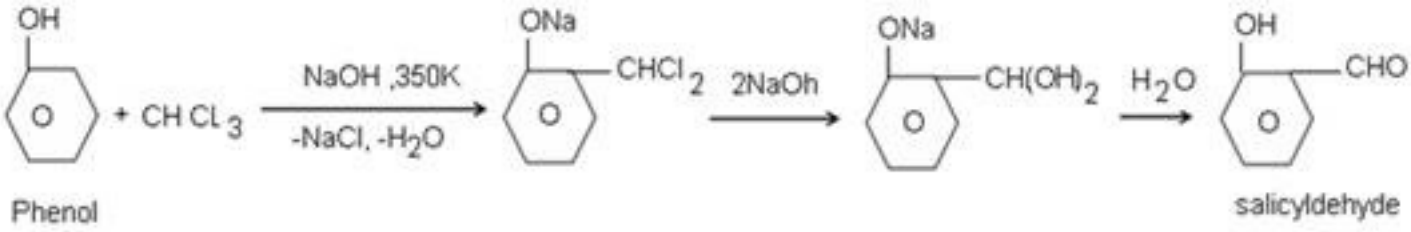
1. Ethene to 1,2 -ethanediol

Ans.



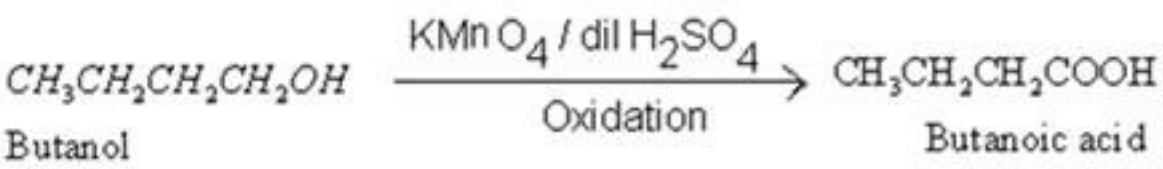
2. Phenol to Salicyldehyde

Ans.



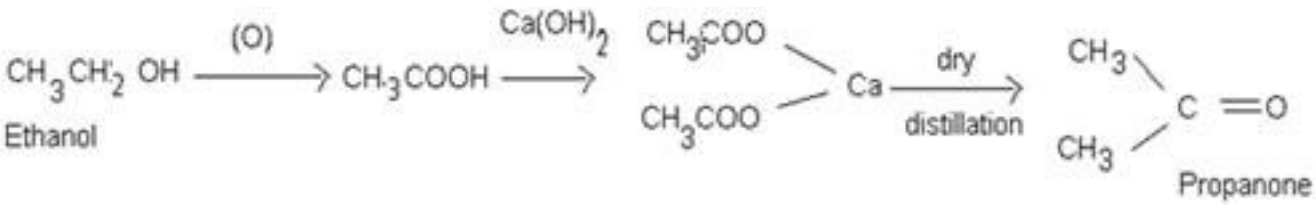
3. Butanol to Butanoic acid

Ans.



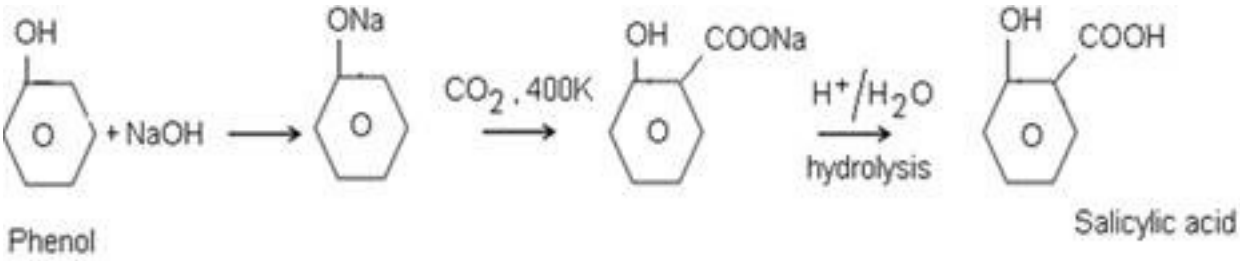
4. Ethanol to propanone

Ans.



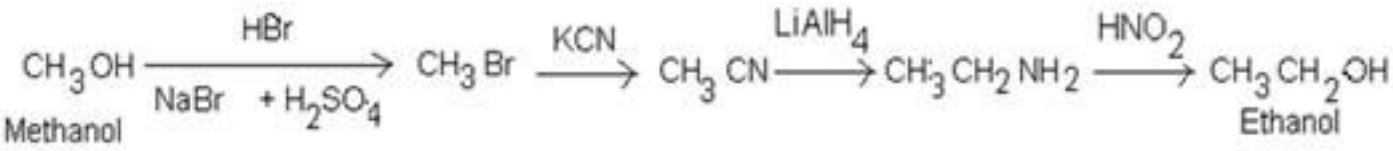
5. Phenol to salicylic acid

Ans.



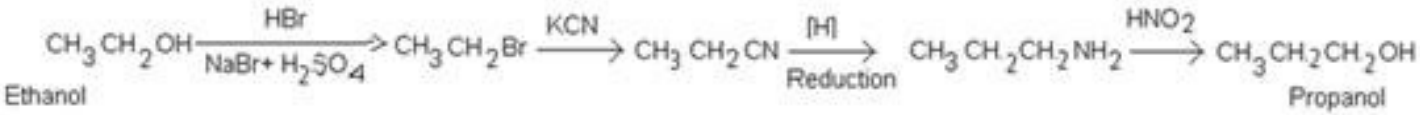
6. Methanol to Ethanol

Ans.



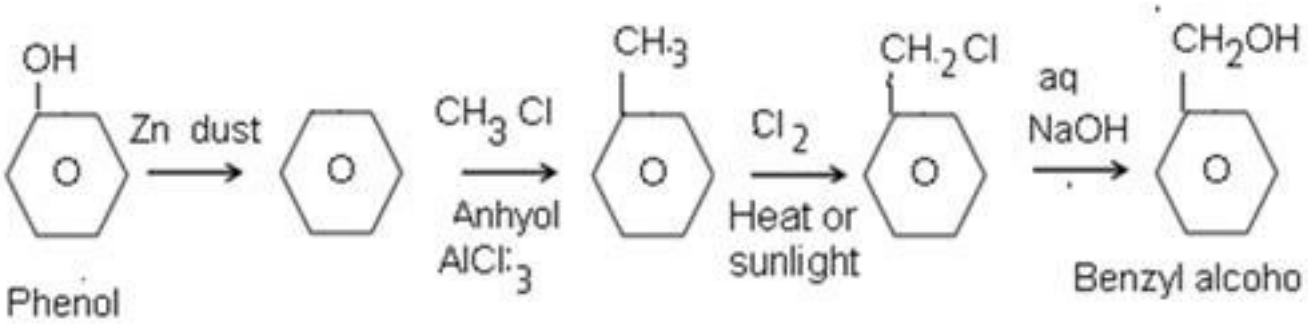
7. Ethanol to propanol

Ans.



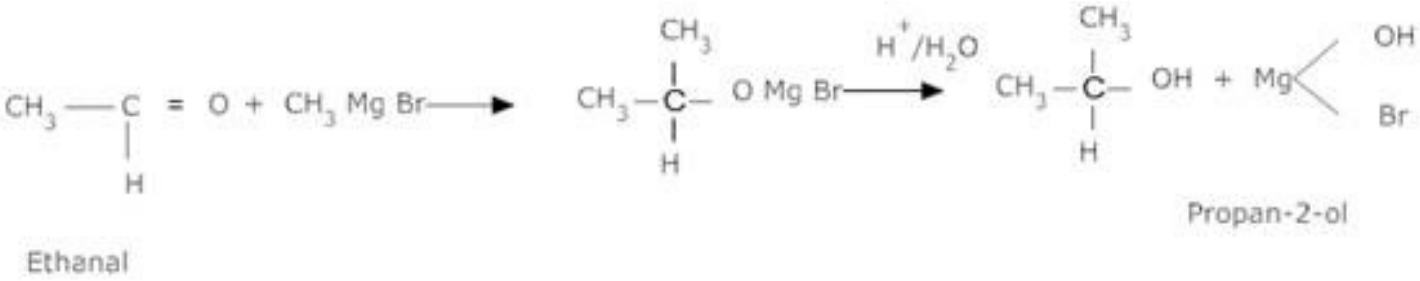
8. Phenol to Benzyl Alcohol

Ans.



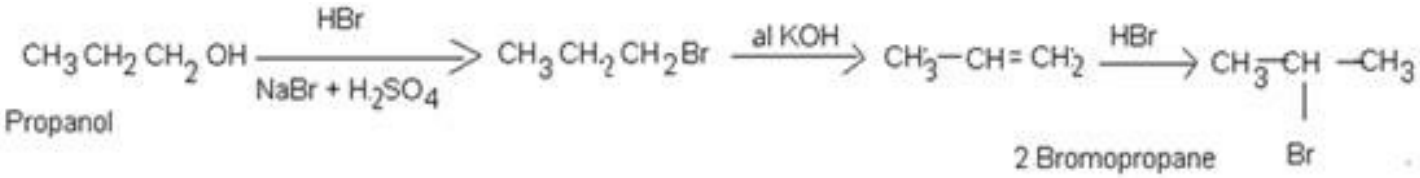
9. Ethanal to propan -2- ol

Ans.



10. l – propanol to 2 – bromo propane

Ans.



11. How is the presence of peroxides in ethers detected? How are peroxides removed from Ethers?

Ans. Presence of peroxides in ethers is detected by addition of freshly prepared $FeSO_4$ and KCNS. Appearance of blood red colour confirms the presence of peroxide. They can be removed by shaking ethers well with $FeSO_4$ solution.

12. Explain a chemical test to distinguish between primary, secondary and tertiary alcohols.

Ans. Primary tertiary and secondary alcohols can be distinguished by oxidation reaction.

Primary alcohols give aldehyde with CrO_3

$$RCH_2OH \xrightarrow{CrO_3} RCHO$$

Secondary alcohols give ketone with CrO_3.

$$R_2CHOH \xrightarrow{CrO_3} R_2CO$$

Tertiary alcohol do not get oxidized with CrO_3

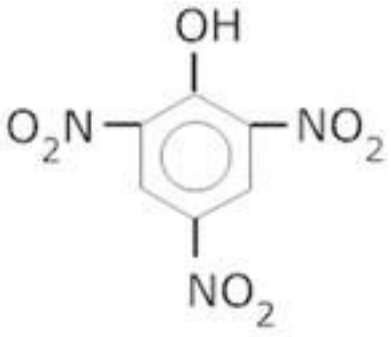
$$R_3COH \xrightarrow{CrO_3} \text{No reaction}$$

13. What is Lucas test?

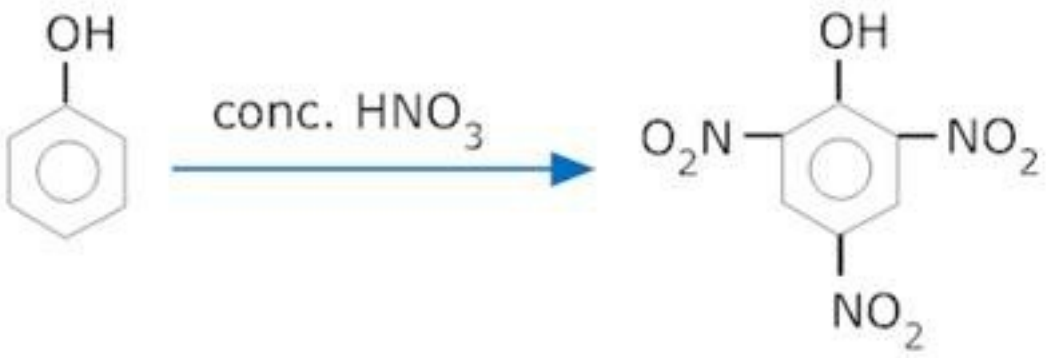
Ans. Lucas test is used for distinguishing between primary secondary and tertiary alcohols. When a tertiary alcohol is dissolved in Lucas reagent $(Conc.HCl + ZnCl_2)$ it produces turbidity immediately where as secondary alcohols produce turbidity after some time and primary alcohols do not react at all and no turbidity is product.

14. What is Picric acid? How is it prepared from phenol?

Ans. Picric acid is 2,4,6 – trinitrophenol



It is prepared from phenol by nitration with conc. HNO_3.



15. Give equations for preparation of ethanol by fermentation.

Ans. Ethanol can be prepared by fermentation of sugar –

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow[enzymes]{Invertase} C_6H_{12}O_6 + C_6H_{12}O_6$$

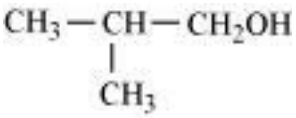
Sugar — Glucose — fructose

$$C_6H_{12}O_6 \xrightarrow[enzymes]{Zymase} 2C_2H_5OH + 2CO_2$$

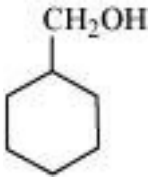
Ehanol

16. Show how are the following alcohols prepared by the reaction of a suitable Grignard reagent on methanal?

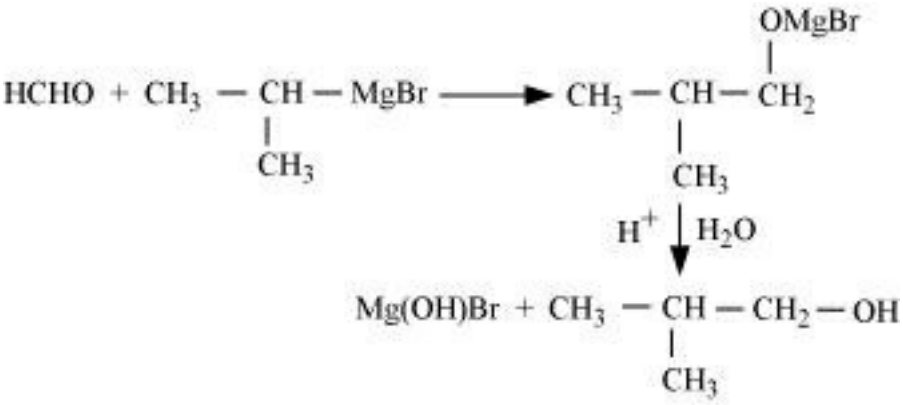
(i)



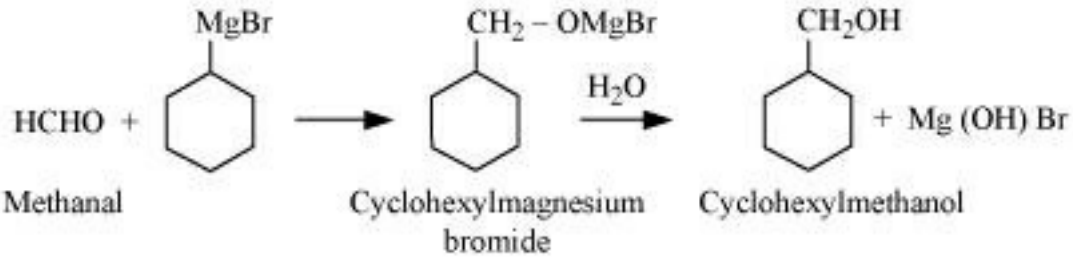
(ii)



Ans. (i)



(ii)

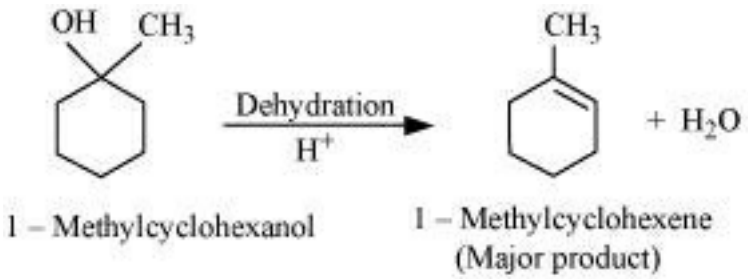


17. Predict the major product of acid catalysed dehydration of

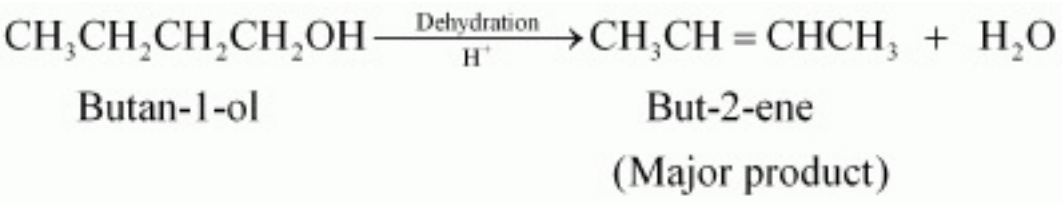
(i) 1-Methylcyclohexanol and

(ii) Butan-1-ol

Ans. (i)



(ii)

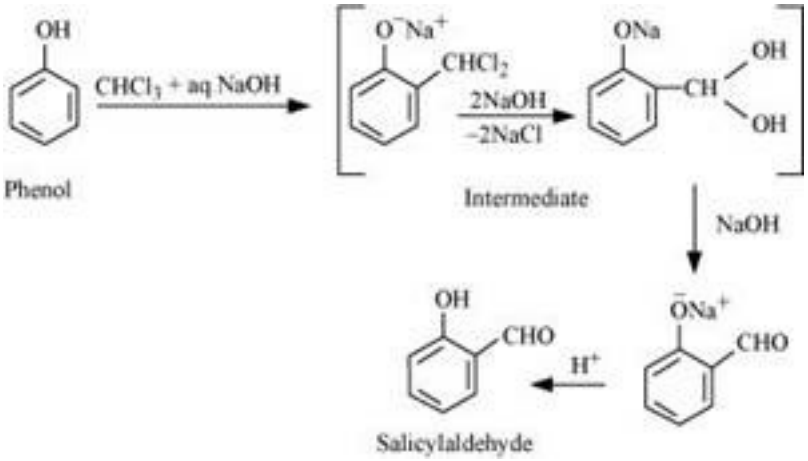


18. Write the equations involved in the following reactions:

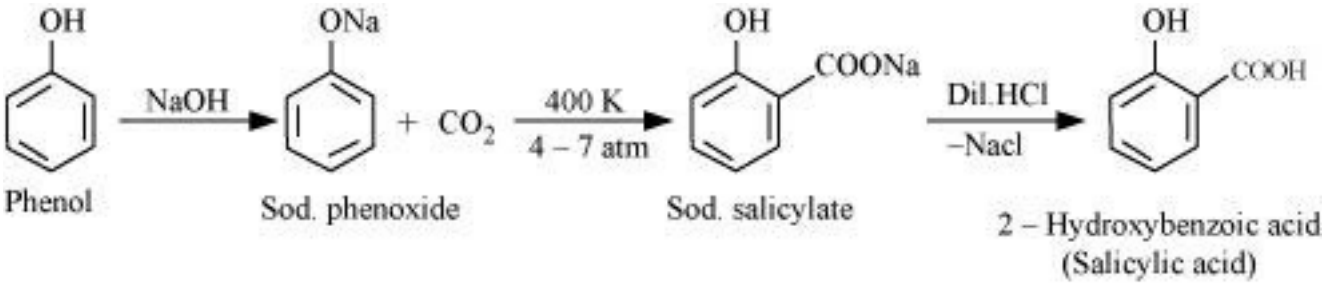
(i) Reimer-Tiemann reaction

(ii) Kolbe's reaction

Ans. (i) Reimer-Tiemann reaction

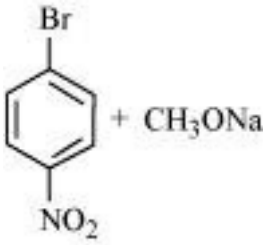


(ii) Kolbe's reaction



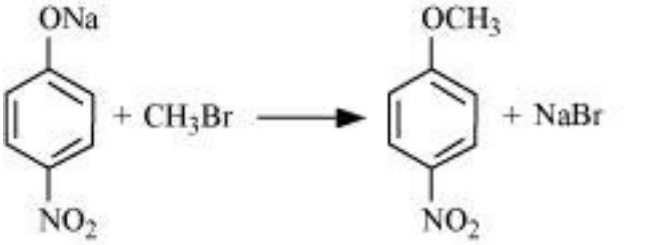
19. Which of the following is an appropriate set of reactants for the preparation of 1-methoxy-4-nitrobenzene and why?

(i)



(ii)

Ans. Set (ii) is an appropriate set of reactants for the preparation of 1-methoxy-4-nitrobenzene.

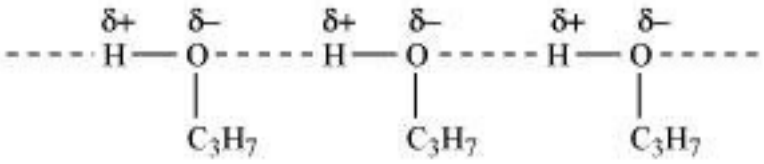


1 – Methoxy – 4 – nitrobenzene

In set (i), sodium methoxide (CH_3ONa) is a strong nucleophile as well as a strong base. Hence, an elimination reaction predominates over a substitution reaction.

20. Explain why propanol has higher boiling point than that of the hydrocarbon, butane?

Ans. Propanol undergoes intermolecular H-bonding because of the presence of -OH group. On the other hand, butane does not

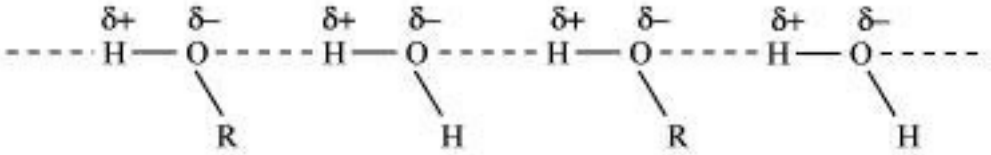


Therefore, extra energy is required to break hydrogen bonds. For this reason, propanol has a

higher boiling point than hydrocarbon butane.

21. Alcohols are comparatively more soluble in water than hydrocarbons of comparable molecular masses. Explain this fact.

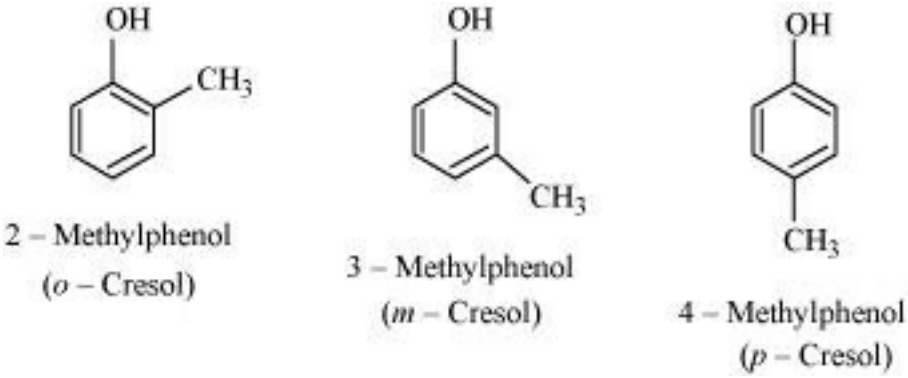
Ans. Alcohols form H-bonds with water due to the presence of -OH group. However, hydrocarbons cannot form H-bonds with water.



As a result, alcohols are comparatively more soluble in water than hydrocarbons of comparable molecular masses.

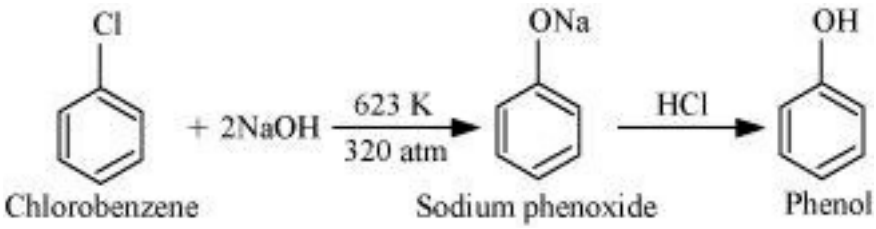
22. Give the structures and IUPAC names of monohydric phenols of molecular formula, C_7H_8O .

Ans.



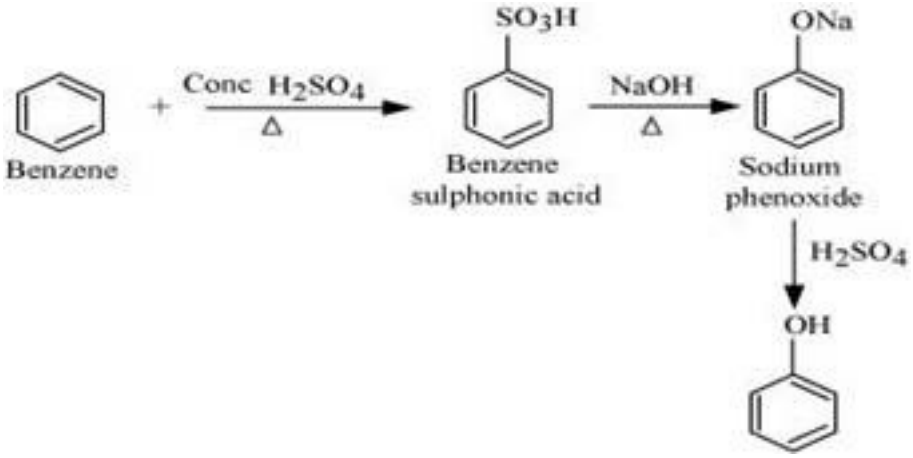
23. Write chemical reaction for the preparation of phenol from chlorobenzene.

Ans. Chlorobenzene is fused with NaOH (at 623 K and 320 atm pressure) to produce sodium phenoxide, which gives phenol on acidification.



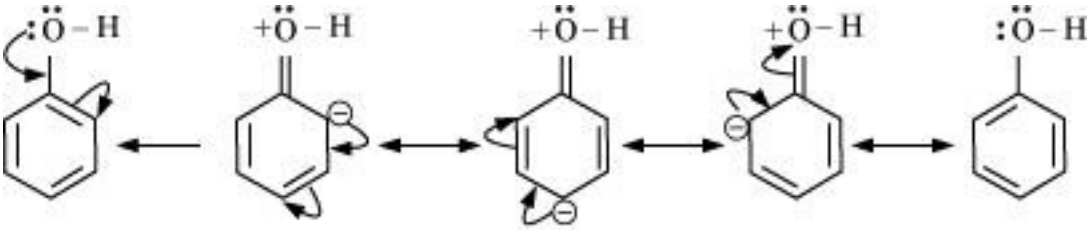
24. You are given benzene, conc. H_2SO_4 and NaOH. Write the equations for the preparation of phenol using these reagents.

Ans.



25. Explain how does the -OH group attached to a carbon of benzene ring activate it towards electrophilic substitution?

Ans. The -OH group is an electron-donating group. Thus, it increases the electron density in the benzene ring as shown in the given resonance structure of phenol.

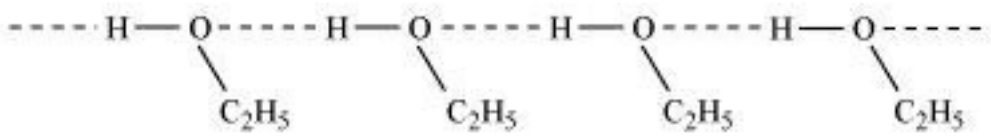


As a result, the benzene ring is activated towards electrophilic substitution.

26. Give reason for the higher boiling point of ethanol in comparison to methoxymethane.

Ans. Ethanol undergoes intermolecular H-bonding due to the presence of -OH group, resulting in the association of molecules. Extra energy is required to break these hydrogen

bonds. On the other hand, methoxymethane does not undergo H-bonding. Hence, the boiling point of ethanol is higher than that of methoxymethane.



27. Preparation of ethers by acid dehydration of secondary or tertiary alcohols is not a suitable method. Give reason.

Ans. The formation of ethers by dehydration of alcohol is a bimolecular reaction (S_N^2) involving the attack of an alcohol molecule on a protonated alcohol molecule. In the method, the alkyl group should be unhindered. In case of secondary or tertiary alcohols, the alkyl group is hindered. As a result, elimination dominates substitution. Hence, in place of ethers, alkenes are formed.

28. Explain the fact that in aryl alkyl ethers

(i) The alkoxy group activates the benzene ring towards electrophilic substitution and

(ii) It directs the incoming substituents to ortho and para positions in benzene ring.

Ans. (i) In aryl alkyl ethers, due to the +R effect of the alkoxy group, the electron density in the benzene ring increases as shown in the following resonance structure.

Thus, benzene is activated towards electrophilic substitution by the alkoxy group.

(ii) It can also be observed from the resonance structures that the electron density increases more at the ortho and para positions than at the meta position. As a result, the incoming substituents are directed to the ortho and para positions in the benzene ring.