

CBSE Class 12 Chemistry Chapter 11 Alcohols, Phenols, and Ethers Worksheet with Answer– Set 4

Q1. What is the chemical name of picric acid?

- (a) 2, 4, 6-tribromo phenol
- (b) 2, 4, 6-trinitro phenol
- (c) 2, 4, 6-trifluoro phenol
- (d) None of the above

Answer:

(b) The chemical name of picric acid is 2, 4, 6-trinitro phenol.

Q2. Acid-catalysed dehydration of tertiary butanol is more rapid than n-butanol because

- (a) Primary carbocation is more stable than the tertiary carbocation
- (b) Tertiary carbocation is more stable than the primary carbocation
- (c) Rearrangement takes place in tertiary butanol dehydration
- (d) Rearrangement takes place in n-butanol dehydration

Answer:

(b) Acid-catalysed dehydration of tertiary butanol is more rapid than n-butanol because tertiary carbocation is more stable than the primary carbocation.

Q3. What happens when phenol reacts with bromine in CS_2 at low temperatures?

- (a) ortho and para Bromo phenols are formed
- (b) para and meta Bromo phenols are formed
- (c) ortho Bromo phenol is formed
- (d) meta Bromo phenol is formed

Answer:

(a) When phenol reacts with bromine in CS_2 at low temperatures, ortho and para Bromo phenols are formed.

Q4. What is the IUPAC name of $\text{CH}_2 = \text{CH}-\text{CH}_2\text{OCH}_3$?

- (a) 3- Methoxy -1- propene
- (b) 1- Methoxy -2- propene
- (c) Vinyl dimethyl ether

(d) None of the above

Answer:

(a) The IUPAC name of $\text{CH}_2 = \text{CH}-\text{CH}_2\text{OCH}_3$ is 3-Methoxy-1-propene.

Q5. What happens when ethylene reacts with Baeyer's reagent?

- (a) Ethyl chloride
- (b) Ethylene glycol
- (c) Ethyl bromide
- (d) None of the above

Answer:

(b) When ethylene reacts with Baeyer's reagent, ethylene glycol is formed.

Q6. Organise the following hydrocarbons in increasing ranking of their boiling point.

$\text{CH}_3\text{CH}_2\text{OH}$, $\text{CH}_3\text{-O-CH}_3$ and CH_3CHO .

Answer:

We can arrange the above hydrocarbons as $\text{CH}_3\text{-O-CH}_3 < \text{CH}_3\text{CHO} < \text{CH}_3\text{CH}_2\text{OH}$.

Q7. Organise the following hydrocarbons in increasing order of their acidic character.

$\text{CH}_3\text{CH}_2\text{OH}$, $\text{C}_6\text{H}_5\text{OH}$ and H_2O .

Answer:

We can arrange the above hydrocarbons as $\text{CH}_3\text{CH}_2\text{OH} < \text{H}_2\text{O} < \text{C}_6\text{H}_5\text{OH}$.

Q8. Why is alkoxide a more potent base than hydroxide?

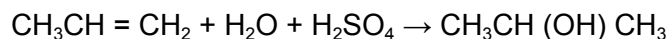
Answer:

Alkoxide is a more potent base than hydroxide because the alkoxide ion has an electron-donating alkyl group, due to which there is an increased electron density in the alkoxide ion than in the hydroxide ion. Therefore, the alkoxide ion is more basic than the hydroxide ion.

Q9. Convert propene to propan-2-ol.

Answer:

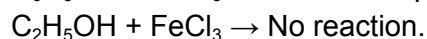
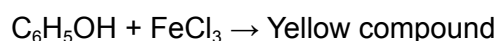
We can convert propene to propan-2-ol by hydrolysing it in the acidic medium, i.e. in the presence of the concentrated sulphuric acid.



Q10. How can you distinguish between ethanol and phenol?

Answer:

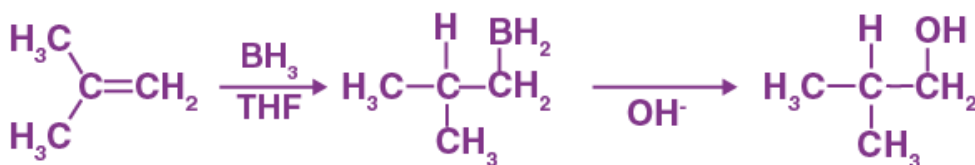
We can distinguish between ethanol and phenol by treating it with neutral ferric chloride. Phenol reacts with neutral ferric chloride to give a yellow colour compound. In contrast, ethanol does not react with neutral ferric chloride.



Q11. What is the hydroboration-oxidation reaction?

Answer:

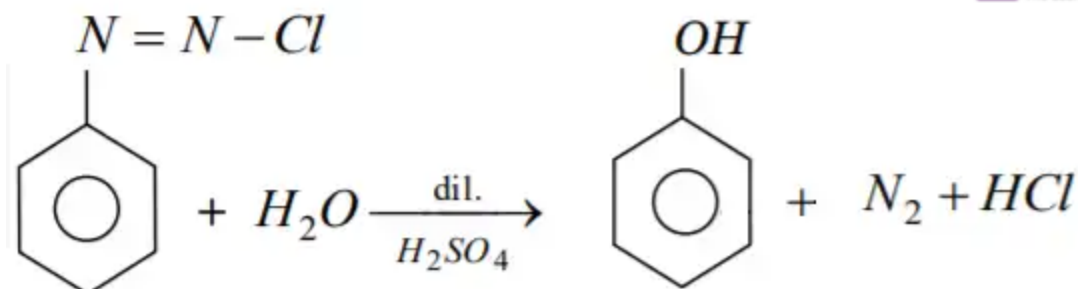
Hydroboration–oxidation reaction is a two-step hydration reaction used to prepare alcohol from an alkene. It is an anti-Markovnikov reaction in which the hydroxyl group is attached to the less-substituted carbon.



Q12. What will happen when benzene diazonium chloride is heated with water?

Answer:

When benzene diazonium chloride is heated with water phenol, dinitrogen and hydrochloric acid are formed.



Q13. Why is the dipole moment of phenol lesser than the methanol?

Answer:

The dipole moment of phenol is less than the methanol because phenol carbon is sp^2 hybridised, and the benzene ring produces an electron-withdrawing effect.

On the other hand, methanol carbon is sp^3 hybridised and produces an electron releasing effect (+I effect). Thus, the C – O bond in phenol is less polar than the C – O bond in methanol; therefore, the dipole moment of phenol (1.54 D) is less than that of methanol (1.71 D).

Q14. Why is para nitrophenol more acidic than phenol?

Answer:

Para nitrophenol is more acidic than phenol because the nitro group produces the – I and – R effect. And because of these two effects, the $-NO_2$ group is electron-withdrawing in nature. So, the electron density in the O-H bond of p – nitrophenol decreases relative to the O-H bond of phenol making para nitrophenol more acidic than phenol.

Q15. Why is ortho nitrophenol more acidic than ortho methoxy phenol?

Answer:

Ortho nitrophenol is more acidic than ortho methoxy phenol because $-NO_2$ (nitro group) is an electron-withdrawing group, and it will increase the positive charge on the oxygen, making it more acidic. On the other hand, the $-OCH_3$ (methoxy group) is an electron-releasing group and will decrease the oxygen's positive charge, making it less acidic as the O-H bond will not break easily.

Q16. Why is the boiling point of ether less than the corresponding isometric alcohol?

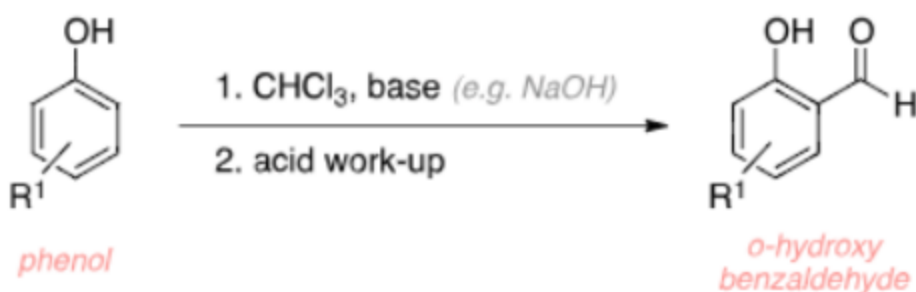
Answer:

The boiling point of ether is less than the corresponding isomeric alcohol because ethers have low polarity and, therefore, do not show any association by intermolecular hydrogen bonding. On the other hand, their isomeric alcohols have strong intermolecular hydrogen bonding, so their boiling points are high.

Q17. Describe the Reimer Tiemann reaction.

Answer:

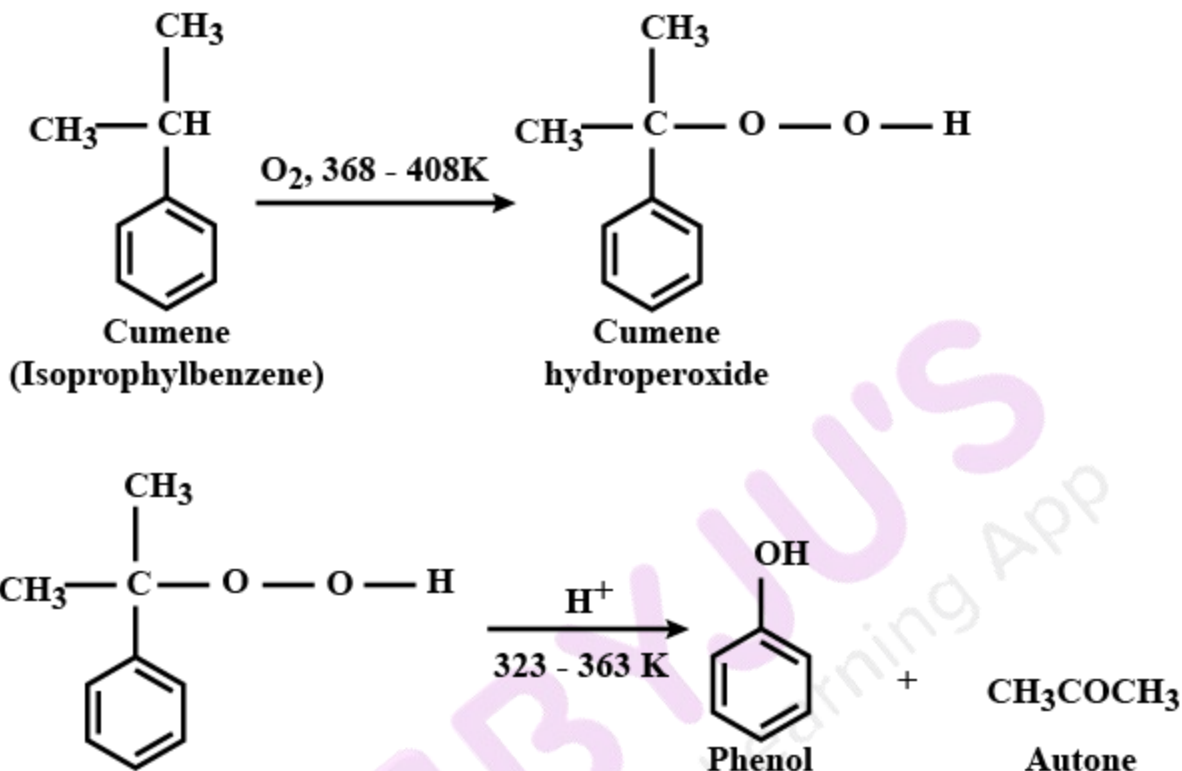
Reimer Tiemann reaction is a substitution reaction used for the ortho formylation of phenol with chloroform in the presence of aqueous NaOH at 340K, followed by hydrolysis.



Q18. Give the equations of reactions for the preparation of phenol from cumene.

Answer:

We can prepare phenol from cumene by reacting it with dilute acid.

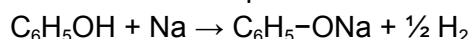


Q19. Present two reactions that display the acidic character of phenol. Analogue the acidity of phenol with ethanol.

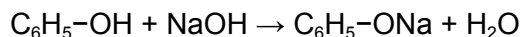
Answer:

Reaction that displays the acidic character of phenol:

1. The reaction of phenol with sodium to form sodium phenoxide with the liberation of hydrogen gas.



2. The reaction of phenol with sodium hydroxide to give sodium phenoxide and water.



Phenol is more acidic than ethanol because deprotonation of phenol gives phenoxide ion, which is resonance stabilised. At the same time, no resonance stabilisation exists for the deprotonation of ethoxide ion (obtained by deprotonation of ethanol). Thus, phenol is more acidic than ethanol.

Q20. Why does aniline not undergo Friedel- Crafts reaction?

Answer:

Aniline does not undergo Friedel craft's reactions because the reagent AlCl_3 , being electron-deficient, acts as a Lewis base. It attacks the lone pair of nitrogen in aniline to form an insoluble complex that precipitates out, and the reaction does not proceed.

