Assignment - Chemistry
Chapter - 7
Alcohol,phenols and ethers
Case study based questions

Case Study:1

Phenol, also known as carbolic acid, is a significant organic compound with various industrial and medicinal
applications. Its chemical properties allow it to undergo several reactions, making it a valuable chemical in
multiple processes. A student conducted an experiment where phenol was reacted with bromine water, and theproduct formed was a white precipitate of 2,4,6-tribromophenol. The student also tested the acidic nature of
phenol by comparing its reaction with sodium hydroxide to that of ethanol.

Questions:

1. Identify the product formed when phenol reacts with bromine water. (1 mark)
2. Explain why phenol is more acidic than ethanol. (1 mark)
3. Write the balanced chemical equations for the reaction of phenol with bromine water and for the
reaction of phenol with sodium hydroxide. Explain the observations in each case. (2 marks)

Case Study:2

A chemistry class conducted an experiment to compare the acidic nature of phenol and acetic acid by titrating
both with a strong base, sodium hydroxide (NaOH). They observed that phenol required more NaOH to
neutralize compared to an equivalent amount of acetic acid. The students also tested the reactions of phenol
and ethanol with NaOH to compare their acidic strengths.

Questions:

1. Why does phenol require more NaOH to neutralize compared to acetic acid? (1 mark)
2. Write the balanced chemical equation for the reaction between phenol and sodium hydroxide. (1 mark)
3. Compare the acidic strengths of phenol and ethanol by describing their reactions with sodium hydroxide. (2 marks)

Case Study:3

In an organic chemistry lab, students observed the nitration of phenol using dilute nitric acid. They noted the
formation of two major products: ortho-nitrophenol and para-nitrophenol. They also performed the

bromination of phenol with bromine water and observed the formation of a white precipitate.

Questions:

1. What are the two major products formed during the nitration of phenol with dilute nitric acid? (1 mark)
2. Write the balanced chemical equation for the bromination of phenol with bromine water. (1 mark)
3. Explain why phenol undergoes electrophilic substitution reactions more readily than benzene. (2 marks)

Case Study:4

A group of students studied the physical and chemical properties of phenol. They noted that phenol is a white crystalline solid with a distinct odor and slightly soluble in water. In a separate experiment, they reacted phenol with zinc dust, which resulted in the formation of benzene.

Questions:

1. What are the physical properties of phenol observed by the students? (1 mark)
2. Write the balanced chemical equation for the reaction of phenol with zinc dust. (1 mark)3. Describe the significance of phenol's chemical property observed in the reaction with zinc dust. (2 marks)