

Chemguide – questions

PHENOL: RING REACTIONS

1. The OH group in phenol is *activating* and *2,4-directing*.
 - a) Explain what is meant by an *activating group*, and (briefly) how the OH group activates the ring.
 - b) What is meant by a *2,4-directing group*?
2. Bromine water can be used as a test for phenol as well as a test for carbon-carbon double bonds.
 - a) State what you would observe if you added bromine water to a solution of phenol, and explain how this would differ from what you would see if you were adding bromine water to an alkene.
 - b) Draw the structure, and give the name, of the main organic product of the reaction between bromine water and phenol.
3.
 - a) Phenol reacts with dilute nitric acid at room temperature. Draw the structure of the two main organic products of this reaction.
 - b) Reactions of phenol with nitric acid are always complicated by the formation of tarry products as well as what you want to make. Explain briefly why.
 - c) Draw the nitration product of the reaction between concentrated nitric acid and phenol.