**Student worksheet**

**Practical 5: The reactions of amines**

**Equipment/materials**

* 2 cm3 butylamine (highly flammable, corrosive and has an offensive odour – dispense from a fume cupboard)
* 5 cm3 phenylamine (toxic)
* 2 cm3 concentrated ammonia solution (corrosive and toxic – DO NOT inhale it directly)
* 5 cm3 concentrated hydrochloric acid (corrosive)
* Phenol (toxic and corrosive)
* Six standard test tubes and stoppers
* Three boiling tubes and stoppers
* Distilled/deionised water
* Universal indicator solution
* Dropping pipettes
* Glass rods
* Spatulas
* Five 10 cm3 measuring cylinders

**Data/diagram**

**Analysis of results**

* What does the pH tell you about the acid/base character of the amines?
* Write equations for the reactions between water and the amines.
* What type of reaction occurs between the amines and HCl?
* Write equations for the reactions with HCl.
* Arrange the amines and ammonia in ascending order of basic strength.

**Questions**

1. Why are the amines able to act as bases?
2. Explain why butylamine is a stronger base than phenylamine.

**From the examiner**

* Make and record valid observations and organise your results suitably.
* Demonstrate safe practical techniques.
* Pay full regard to all essential safety precautions.

**Objective**

* Be able to understand the simple reactions of amines.



Flammable



Toxic Corrosive





Oxidising Harmful

**Safety**

* Perform the experiment in a well-ventilated room.
* Wear a lab coat and nitrile disposable gloves, tie long hair back.
* Wear safety goggles.

**Procedure**

1. Put 1 cm3 of distilled/deionised water into each of three test tubes.
2. Add five drops of butylamine to the first tube, five to six drops of phenylamine to the second tube and five to six drops of concentrated ammonia to the third tube. Stopper and shake each tube. Keep each bottle with a pipette on a bench mat.
3. Test the pH of each solution by spotting out onto squares of universal indicator paper on a bench mat. Record your observations.
4. Put 3 cm3 of the conc. dilute hydrochloric acid solution into each of the three remaining clean test tubes.
5. Add five to six drops of butylamine to the first tube, five to six drops of phenylamine to the second tube and five to six drops of concentrated ammonia to the third tube. Record your observations.