

# Acids, Bases and Salts

## Question Paper 6

|                   |                          |
|-------------------|--------------------------|
| <b>Level</b>      | IGCSE                    |
| <b>Subject</b>    | Chemistry                |
| <b>Exam Board</b> | CIE                      |
| <b>Topic</b>      | Acids, Bases and Salts   |
| <b>Sub-Topic</b>  |                          |
| <b>Paper Type</b> | Alternative to Practical |
| <b>Booklet</b>    | Question Paper 6         |

**Time Allowed:** 41 minutes

**Score:** /34

**Percentage:** /100

1 The information in the box is about the preparation of zinc nitrate crystals.

Step 1: Add a small amount of zinc oxide to some hot dilute nitric acid, and stir.

Step 2: Keep adding zinc oxide until it is in excess.

Step 3: Remove the excess zinc oxide to leave colourless zinc nitrate solution.

Step 4: Evaporate the zinc nitrate solution until it is *saturated*.

Step 5: Leave the *saturated solution* to cool. White crystals form on cooling.

Step 6: Remove the crystals from the remaining solution.

Step 7: Dry the crystals on a piece of filter paper.

(a) Suggest a reason for using excess zinc oxide in Step 2.

.....  
..... [1]

(b) Suggest how the excess zinc oxide can be removed from the solution in Step 3.

..... [1]

(c) (i) What is meant by the term *saturated solution*?

.....  
..... [2]

(ii) What practical method could show the solution to be saturated?

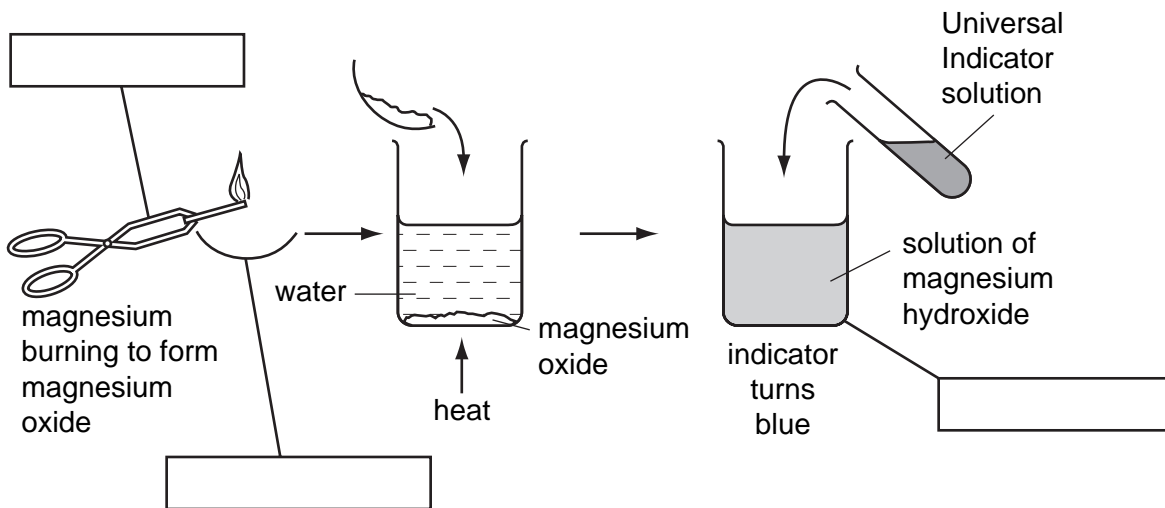
.....  
..... [1]

(d) Why are the crystals dried in Step 7 using filter paper instead of by heating?

.....  
..... [1]

[Total: 6]

2 The diagram shows the formation of a solution of magnesium hydroxide from magnesium.



(a) Complete the empty boxes to name the pieces of apparatus. [3]

(b) What type of chemical reaction is the burning of magnesium?

..... [1]

(c) Suggest a pH for the solution of magnesium hydroxide.

..... [1]

6

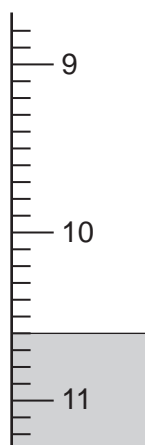
- 3 A student investigated an aqueous solution of calcium hydroxide and water.

Two experiments were carried out.

Experiment 1

By using a measuring cylinder  $25 \text{ cm}^3$  of the aqueous solution of calcium hydroxide was placed in a flask. Phenolphthalein indicator was added to the flask. A burette was filled to the  $0.0 \text{ cm}^3$  mark with solution **M** of hydrochloric acid.

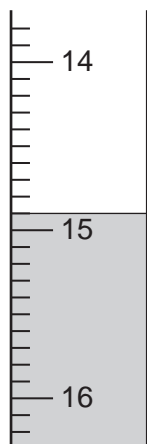
Solution **M** was added slowly to the flask until the colour just disappeared. Use the burette diagram to record the volume in the table and complete the column.



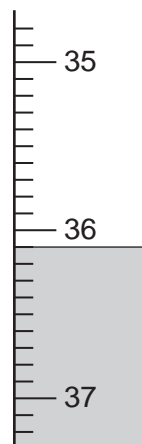
Experiment 2

Experiment 1 was repeated using a different solution, **N**, of hydrochloric acid.

Use the burette diagrams to record the volumes in the table and complete the table.



initial



final

Table of results

| burette readings/cm <sup>3</sup> | Experiment 1 | Experiment 2 |
|----------------------------------|--------------|--------------|
| final reading                    |              |              |
| initial reading                  | 0.0          |              |
| difference                       |              |              |

[4]

(a) What type of chemical reaction occurs when hydrochloric acid reacts with calcium hydroxide?

..... [1]

(b) (i) In which experiment was the greater volume of hydrochloric acid used?

..... [1]

(ii) Compare the volumes of acid used in Experiments 1 and 2.

.....  
 ..... [2]

(iii) Suggest an explanation for the difference in volumes.

.....  
 ..... [2]

(c) Predict the volume of hydrochloric acid **M** that would be needed to react completely if Experiment 1 was repeated with 50 cm<sup>3</sup> of calcium hydroxide solution?

volume of solution .....

explanation .....

..... [3]

(d) Suggest **one** change you could make to the **apparatus** used in the experiments to obtain more accurate results.

.....

..... [1]

4 A sample of a solution of acid **A** was analysed.

The tests on **A**, and some of the observations are in the following table.

Complete the observations in the table.

| tests   | observations  |        |
|---|---|--------|
| <b>(a)</b> The pH of the solution was tested using indicator paper  | colour  | orange |
|   | pH  | 4      |
| <p><b>(b)</b> The solution was divided into three test-tubes</p> <p><b>(i)</b> To the first portion was added a piece of magnesium ribbon. The gas was tested with a lighted splint.</p> <p><b>(ii)</b> To the second portion of <b>A</b> was added sodium carbonate. The gas was tested with limewater.</p> <p><b>(iii)</b> To the third portion of liquid <b>A</b> was added a spatula measure of solid <b>B</b>. The mixture was boiled gently. By using a teat pipette the solution was transferred to another test tube. Excess aqueous ammonia was added.</p> | <p>.....</p> <p>..... [2]</p> <p>.....</p> <p>..... [2]</p> <p style="text-align: right;">green solution formed</p> <p style="text-align: right;">dark blue solution formed</p> |        |

**(c)** What does test **(a)** tell you about the type of acid in solution **A**?

..... [1]

**(d) (i)** Name the gas given off in test **(b)(i)**.

..... [1]

**(ii)** Name the gas given off in test **(b)(ii)**.

..... [1]

**(e)** Explain the observations in test **(b)(iii)**.

.....

..... [2]