Cambridge IGCSE

**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

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|---|---|---|---|---|---|---|---|---|---|
| CANDIDATE NAME | | | | | | | | | |
| CENTRE NUMBER | | | | | | CANDIDATE NUMBER | | | |

**CHEMISTRY** **0620/63**

Paper 6 Alternative to Practical **May/June 2016**

**1 hour**

Candidates answer on the Question Paper.

No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.



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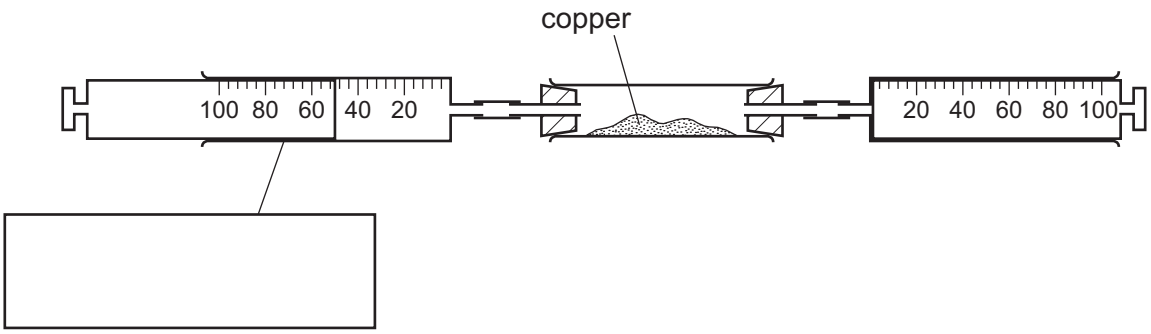
**1** Air is a mixture of gases. The diagram shows the apparatus used to find the percentage of oxygen in air.
50 $cm^3$ of air were passed backwards and forwards over excess heated copper until there was no further change. The apparatus was left to cool and the volume of gas remaining was 40 $cm^3$.




View solution

**(a)** Complete the box to name the apparatus. [1]

View solution

**(b)** Use an arrow to indicate where heat is applied. [1]

**(c)** The colour of the copper changed from ..... to ..... . [2]

View solution

**(d)** From the results, work out the percentage of oxygen in the air.

View solution

..... % [2]

[Total: 6]

**2** A student investigated what happens when dilute hydrochloric acid and copper(II) sulfate solution react with different metals.

Five experiments were carried out.

View solution

**(a)** *Experiment 1*

A measuring cylinder was used to pour 10 $cm^3$ of dilute hydrochloric acid into a boiling tube.
The temperature of the hydrochloric acid was measured.
1 g of zinc was added to the boiling tube and the mixture stirred with a thermometer.
The maximum temperature reached by the mixture was measured.

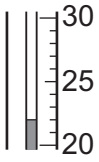
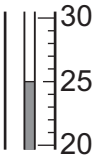
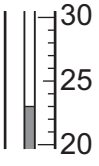
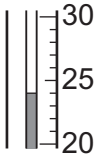
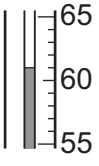
*Experiment 2*

Experiment 1 was repeated using 1 g of iron instead of zinc.

*Experiment 3*

Experiment 1 was repeated using 1 g of magnesium instead of zinc.

Use the thermometer diagrams to record the results in the table. Complete the final column in the table.

| experiment | thermometer diagram | initial temperature of acid / °C | thermometer diagram | maximum temperature reached / °C | temperature rise / °C |
|---|---|---|---|---|---|
| 1 |   | |   | | |
| 2 |   | |   | | |
| 3 |   | |   | | |

[3]

View solution

**(b)** The gas produced in experiment 3 was tested with a lighted splint and the result recorded below.

test ...lighted splint.....

result ...popped.....

Name the gas given off in experiment 3.

..... [1]

**(c)** *Experiment 4*

A measuring cylinder was used to pour 10 $cm^3$ of copper(II) sulfate solution into a boiling tube.
The temperature of the solution was measured.
1 g of magnesium was added to the boiling tube and the mixture stirred with a thermometer.
The maximum temperature reached by the mixture was measured.

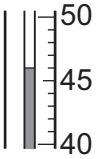
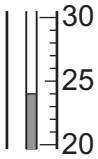
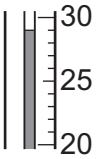
View solution

*Experiment 5*

Experiment 4 was repeated using 1 g of iron instead of magnesium.
The observation was recorded below.

.....The solution turned colourless and a brown deposit formed.....

Use the thermometer diagrams to record the results in the table. Complete the final column in the table.

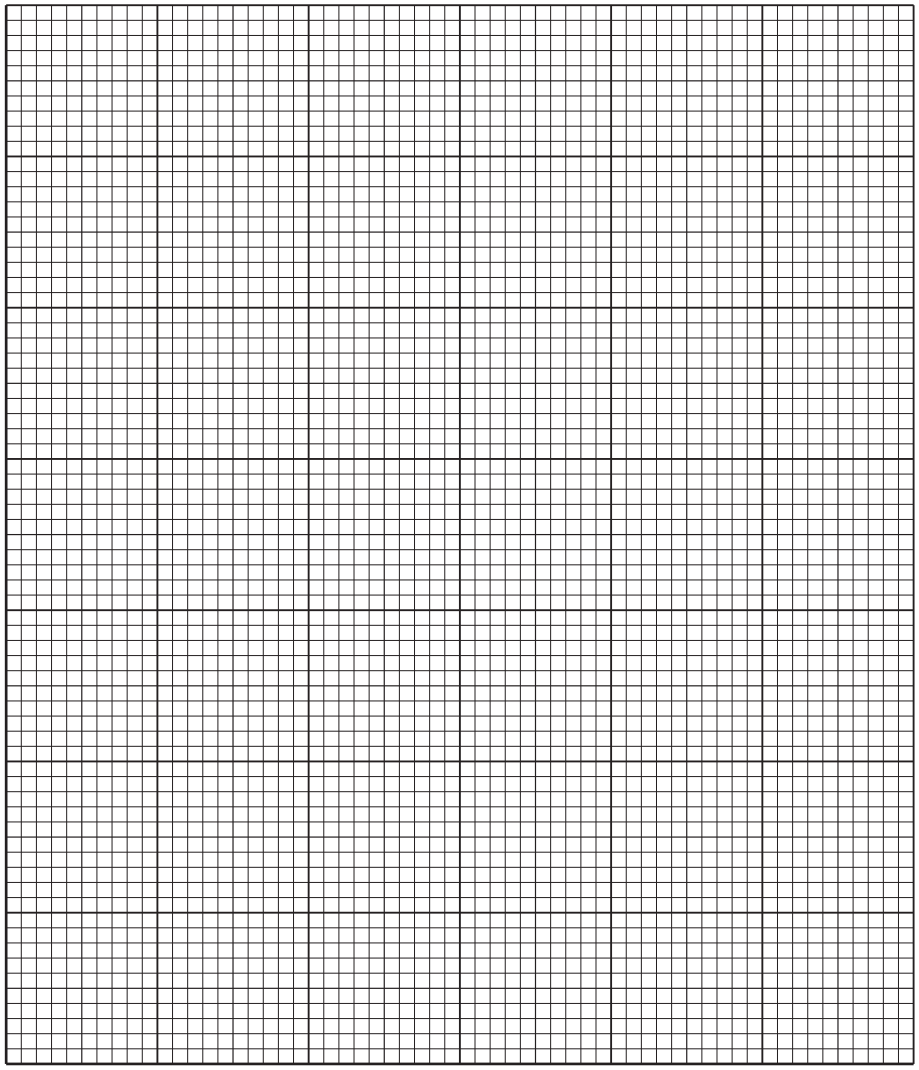
| experiment | thermometer diagram | initial temperature of acid / °C | thermometer diagram | maximum temperature reached / °C | temperature rise / °C |
|---|---|---|---|---|---|
| 4 |   | |   | | |
| 5 |   | |   | | |

[2]

**(d)** Draw a labelled bar chart for the results of experiments 1, 2, 3, 4 and 5 on the grid below.

View solution

temperature rise / °C



[3]

**(e)** Use the results for experiments 1, 2 and 3 to answer the following questions.

View solution

**(i)** Which experiment, 1, 2 or 3, produced the largest temperature rise?

..... [1]

**(ii)** Suggest why this experiment produced the largest temperature rise.

View solution

.....

..... [1]

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**(f)** Explain the observations in experiment 5.

.....

.....

..... [2]

**(g)** Suggest why potassium was **not** used as one of the metals in these experiments.

View solution

..... [1]

**(h)** Give **one** advantage of using a measuring cylinder to add the hydrochloric acid to the boiling tube.

..... [1]

**(i)** Suggest and explain **one** improvement to increase the accuracy of these experiments.

View solution

.....

.....

..... [2]

[Total: 17]

**3** A mixture of two solids, **G** and **H**, was analysed. Solid **G** was zinc nitrate, which is water soluble, and solid **H** is insoluble in water.
The tests on the mixture, and some of the observations, are shown.

Distilled water was added to the mixture in a boiling tube and shaken. The contents of the boiling tube were filtered keeping the filtrate and the residue.

**tests on filtrate**

View solution

**(a)** The filtrate was divided into four test-tubes and the following tests carried out.

**(i)** Drops of aqueous sodium hydroxide were added to the first portion of the solution.
Excess aqueous sodium hydroxide was then added to the test-tube.

observations .....

.....

..... [3]

**(ii)** Using the second portion of the solution, the test in **(a)(i)** was repeated using aqueous ammonia instead of aqueous sodium hydroxide.

observations .....

..... [2]

**(iii)** Dilute nitric acid was added to the third portion of the solution followed by aqueous silver nitrate.

observations ..... [1]

**(iv)** Aqueous sodium hydroxide and aluminium foil were added to the fourth portion of the solution.
The mixture was warmed and the gas given off was tested.

observations .....

.....

..... [3]

**tests on residue**

Two tests are carried out and the following observations made.

| tests | observations |
|---|---|
| A spatula was used to transfer some of the residue into a test-tube.<br><br>Dilute hydrochloric acid was added to the residue. The gas given off was tested. | rapid effervescence,<br>limewater turned milky |
| A flame test was carried out on the residue. | red flame colour |

**(b)** Identify solid **H**.

.....

..... [2]

[Total: 11]

View solution

**4** Nickel sulfate-6-water, $NiSO_4.6H_2O$, is a blue crystalline salt.

Plan an experiment to obtain a sample of pure water from this salt. Your answer should include a diagram of the apparatus, any expected observations and a test to show the presence of pure water.
You are provided with common laboratory apparatus.

View solution

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 6]

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