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

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

*7208760726*

**CHEMISTRY** **0620/62**

Paper 6 Alternative to Practical **October/November 2018**

**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.

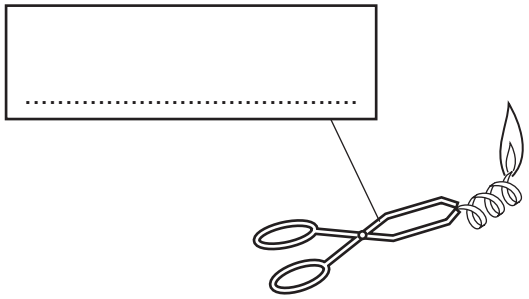
Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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.

This document consists of **9** printed pages and **3** blank pages.

**1** Magnesium ribbon was burned in air.




magnesium burning

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

**(b)** Suggest the appearance of the product formed when the magnesium ribbon was burned in air.

..... [1]

**(c)** Name the product formed when the magnesium ribbon was burned in air.

..... [1]

The product from burning the magnesium ribbon in air was added to water and heated. The solution formed was tested with Universal Indicator solution.

**(d)** Suggest why the product was heated after it had been added to water. Explain your answer.

.....

..... [2]

**(e)** Suggest the pH value shown when Universal Indicator was added to the mixture.

..... [1]

**(f)** State **one** safety precaution that should be taken when magnesium is burned in air.

..... [1]

[Total: 7]

**2** A student investigated the rate of reaction between solution **L**, solution **M** and hydrochloric acid. When these chemicals react they form iodine. Sodium thiosulfate solution and starch solution were used to show how fast the reaction proceeded.

Five experiments were done.

*Experiment 1*

- A measuring cylinder was used to add 10 $cm^3$ of solution **L** to a conical flask.
- 10 $cm^3$ of dilute hydrochloric acid, 10 $cm^3$ of sodium thiosulfate solution and 1 $cm^3$ of starch solution were then added to the conical flask.
- The reaction was started by using a measuring cylinder to add 10 $cm^3$ of solution **M** to the conical flask. A timer was started immediately and the mixture was swirled.
- The time taken for the mixture to turn blue-black was measured.
- The conical flask was emptied and rinsed with distilled water.

*Experiment 2*

- A measuring cylinder was used to add 8 $cm^3$ of solution **L** and 2 $cm^3$ of distilled water to the conical flask.
- 10 $cm^3$ of dilute hydrochloric acid, 10 $cm^3$ of sodium thiosulfate solution and 1 $cm^3$ of starch solution were then added to the conical flask.
- The reaction was started by using a measuring cylinder to add 10 $cm^3$ of solution **M** to the conical flask. The timer was started immediately and the mixture was swirled.
- The time taken for the mixture to turn blue-black was measured.
- The conical flask was emptied and rinsed with distilled water.

*Experiment 3*

- Experiment 2 was repeated but 6 $cm^3$ of solution **L** and 4 $cm^3$ of distilled water were added to the conical flask before adding the other reagents.

*Experiment 4*

- Experiment 2 was repeated but 5 $cm^3$ of solution **L** and 5 $cm^3$ of distilled water were added to the conical flask before adding the other reagents.

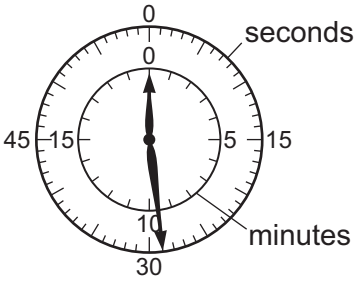
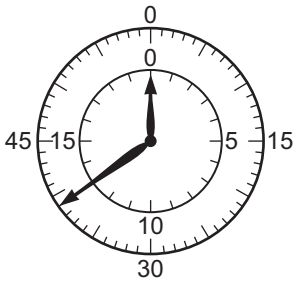
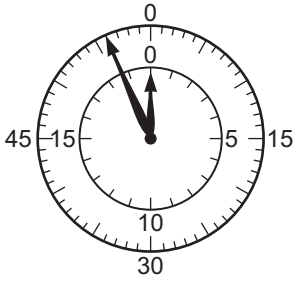
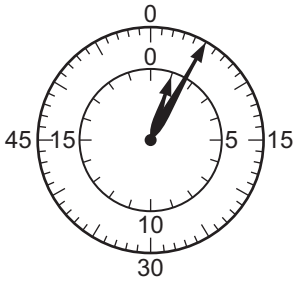
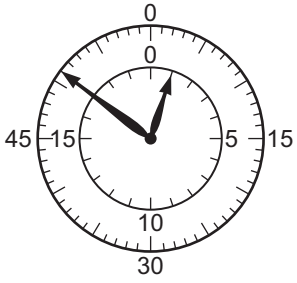
*Experiment 5*

- Experiment 2 was repeated but 3 $cm^3$ of solution **L** and 7 $cm^3$ of distilled water were added to the conical flask before adding the other reagents.



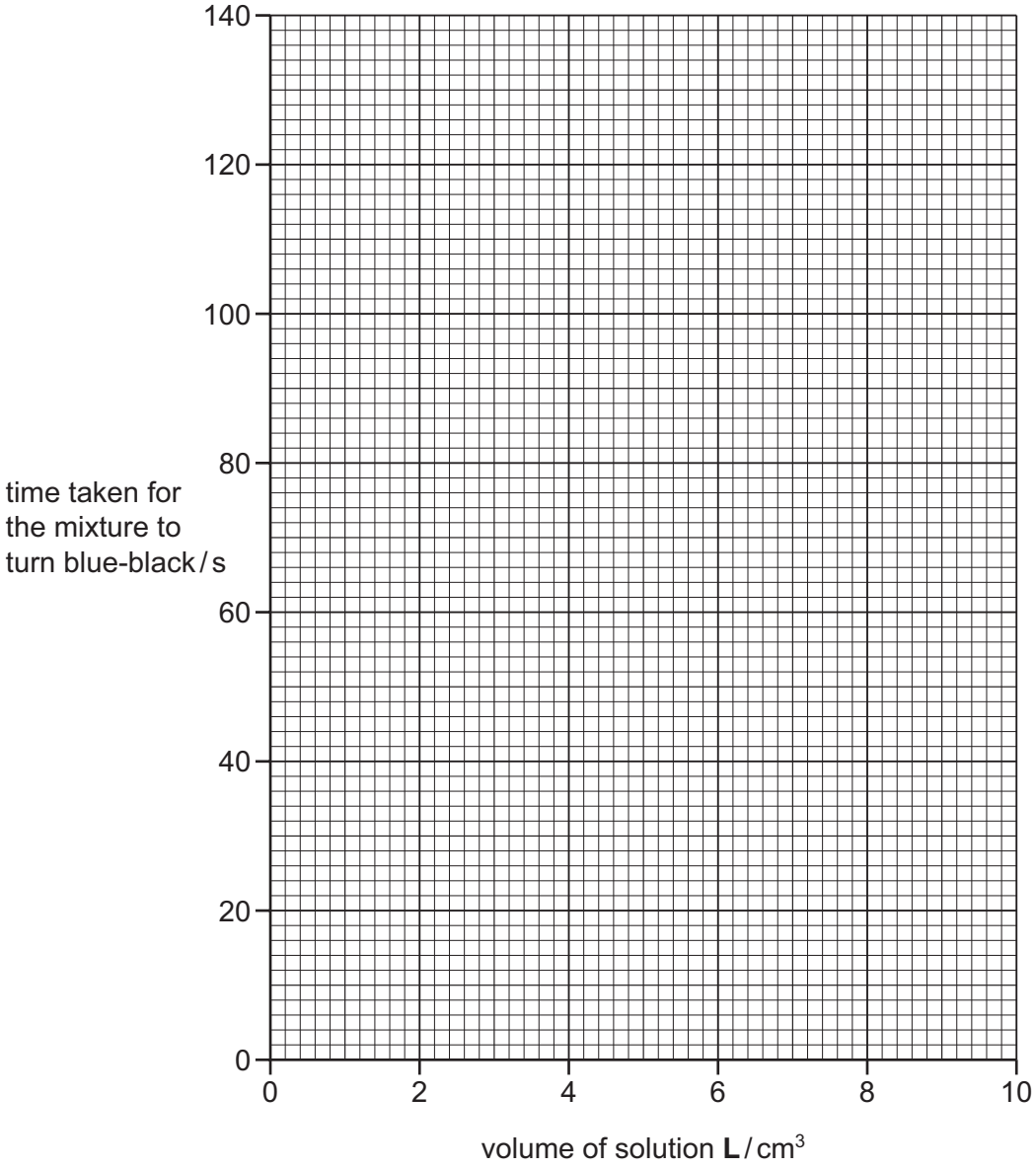
**[Turn over**

**(a)** Use the stop-clock diagrams to record the time taken for each experiment in the table.

| experiment number | volume of solution **L** / $cm^3$ | volume of distilled water / $cm^3$ | stop-clock diagram | time taken for the mixture to turn blue-black / s |
|---|---|---|---|---|
| 1 | 10 | 0 |   | |
| 2 | 8 | 2 |   | |
| 3 | 6 | 4 |   | |
| 4 | 5 | 5 |   | |
| 5 | 3 | 7 |   | |

[4]

**(b)** Plot the results for Experiments 1–5 on the grid. Draw a smooth line graph.




[4]

**(c)** **From your graph**, deduce the time taken for the mixture to turn blue-black if Experiment 2 were repeated using 4 cm$^3$ of solution **L** and 6 cm$^3$ of distilled water.

Show clearly **on the grid** how you worked out your answer.

..... [3]

**(d) (i)** In which experiment, 1, 2, 3, 4 or 5, was the rate of reaction greatest?

..... [1]

**(ii)** Explain, in terms of particles, why the rate of reaction was greatest in this experiment.

.....

.....

..... [2]

**(e) (i)** Suggest an advantage of using a graduated pipette instead of a measuring cylinder to measure solution **L**.

..... [1]

**(ii)** Suggest and explain a disadvantage of using a graduated pipette instead of a measuring cylinder to measure solution **M**.

.....

..... [2]

**(f)** Suggest **one** way to improve the reliability of the results of these experiments.

..... [1]

[Total: 18]

**3** Solid **N** and solid **O** were analysed. Solid **N** was ammonium sulfate. Tests were done on each solid.

**tests on solid N**

Complete the expected observations.

**(a)** Describe the appearance of solid **N**.

..... [1]

Solid **N** was dissolved in distilled water to form solution **N**. Solution **N** was divided into two portions in two test-tubes.

**(b)** Dilute nitric acid and aqueous barium nitrate were added to the first portion of solution **N**.

observations ..... [2]

**(c)** Aqueous sodium hydroxide was added to the second portion of solution **N**. The mixture was heated and the gas produced was tested.

observations .....

..... [2]

**(d)** Name the gas produced in **(c)**.

..... [1]



**[Turn over**

**tests on solid O**

Some of the tests and observations are shown.

| tests on solid **O** | observations |
|---|---|
| The appearance of solid **O** was studied. | white crystals |
| Distilled water was added to some of solid **O** to form solution **O**.<br><br>Solution **O** was divided into two equal portions in two test-tubes.<br><br>**test 1**<br><br>An excess of aqueous sodium hydroxide was added to the first portion of solution **O**. | no reaction |
| **test 2**<br><br>Dilute nitric acid and aqueous silver nitrate were added to the second portion of solution **O**. | white precipitate |
| **test 3**<br><br>A flame test was done on the rest of solid **O**. | lilac colour |

**(e)** What conclusion can you draw about the identity of solid **O** from **test 1**?

..... [1]

**(f)** Identify solid **O**.

..... [2]

[Total: 9]

**4** When solid **C** and solid **D** separately react with dilute hydrochloric acid, one reaction is exothermic and one reaction is endothermic.

Plan an investigation to determine:

- which reaction is exothermic and which reaction is endothermic
- which energy change is greater.

You are provided with solid **C** and solid **D**, dilute hydrochloric acid and common laboratory apparatus.

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..... [6]

[Total: 6]

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