Cambridge IGCSE

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

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

* 7 9 9 1 6 8 1 2 0 9 *

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

Paper 6 Alternative to Practical **May/June 2017**

**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.

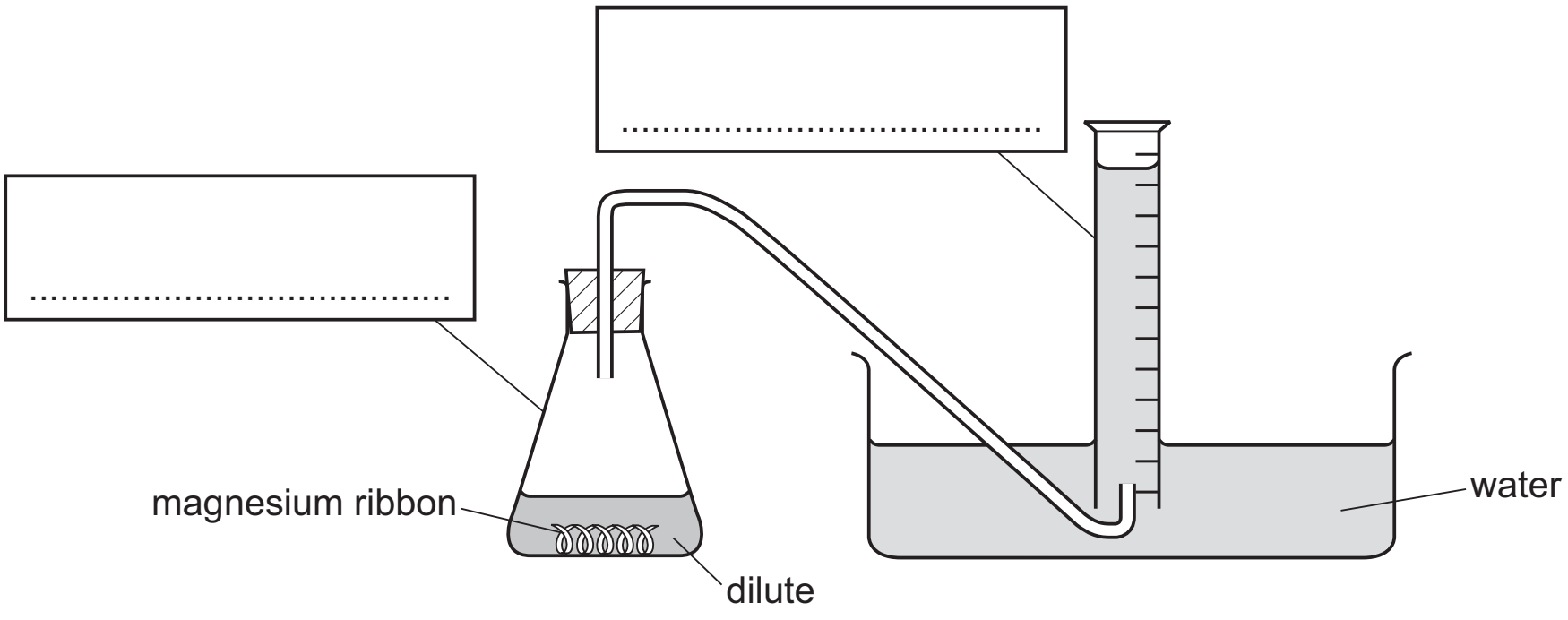
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

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



IB17 06_0620_62/FP
© UCLES 2017

**1** A student investigated the rate of reaction between an excess of dilute hydrochloric acid and magnesium ribbon. The apparatus is shown.



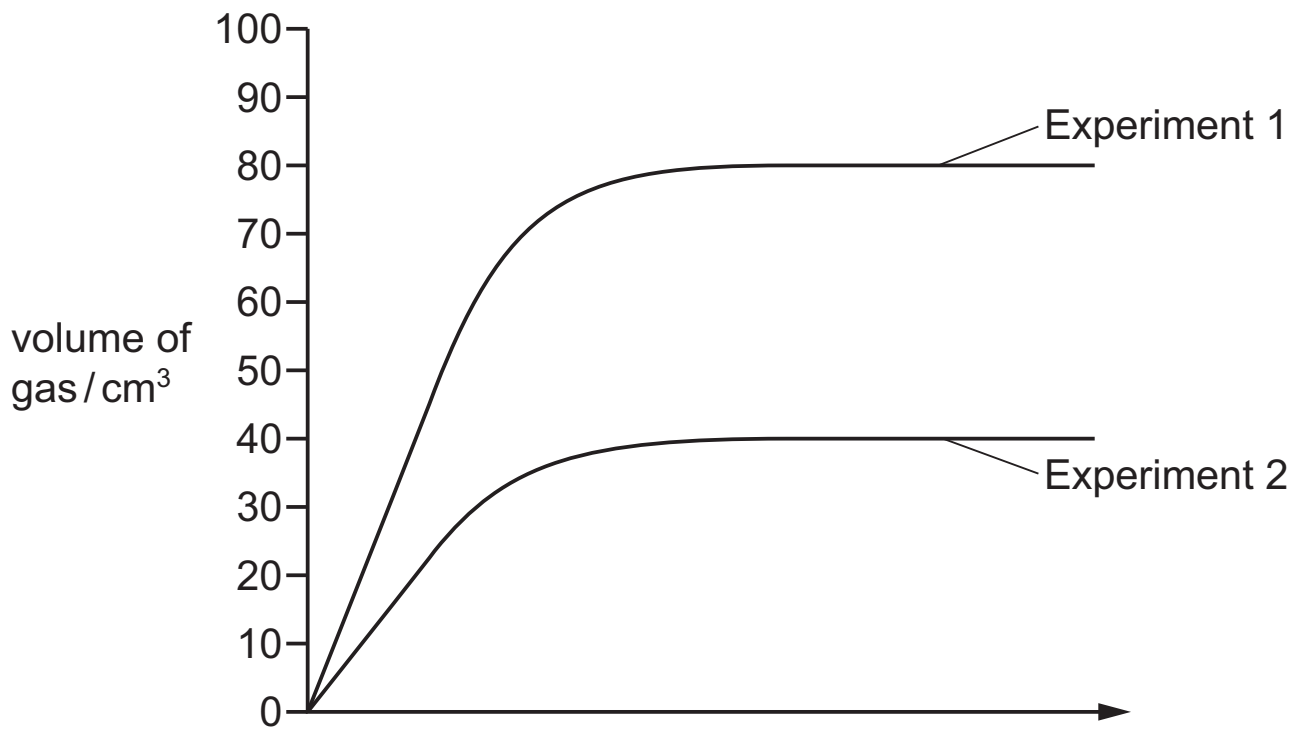

Two experiments were carried out. The temperature was the same in each case.

**(a)** Complete the boxes to identify the apparatus. [2]

**(b)** Give **one** observation expected during this reaction.

..... [1]

Graphs were drawn from the results for each experiment as shown.




**(c)** Label the *x*-axis of the graph. [2]

© UCLES 2017

**(d) (i)** Give the volumes of gas at which the **two** graphs level out and compare these values.

.....

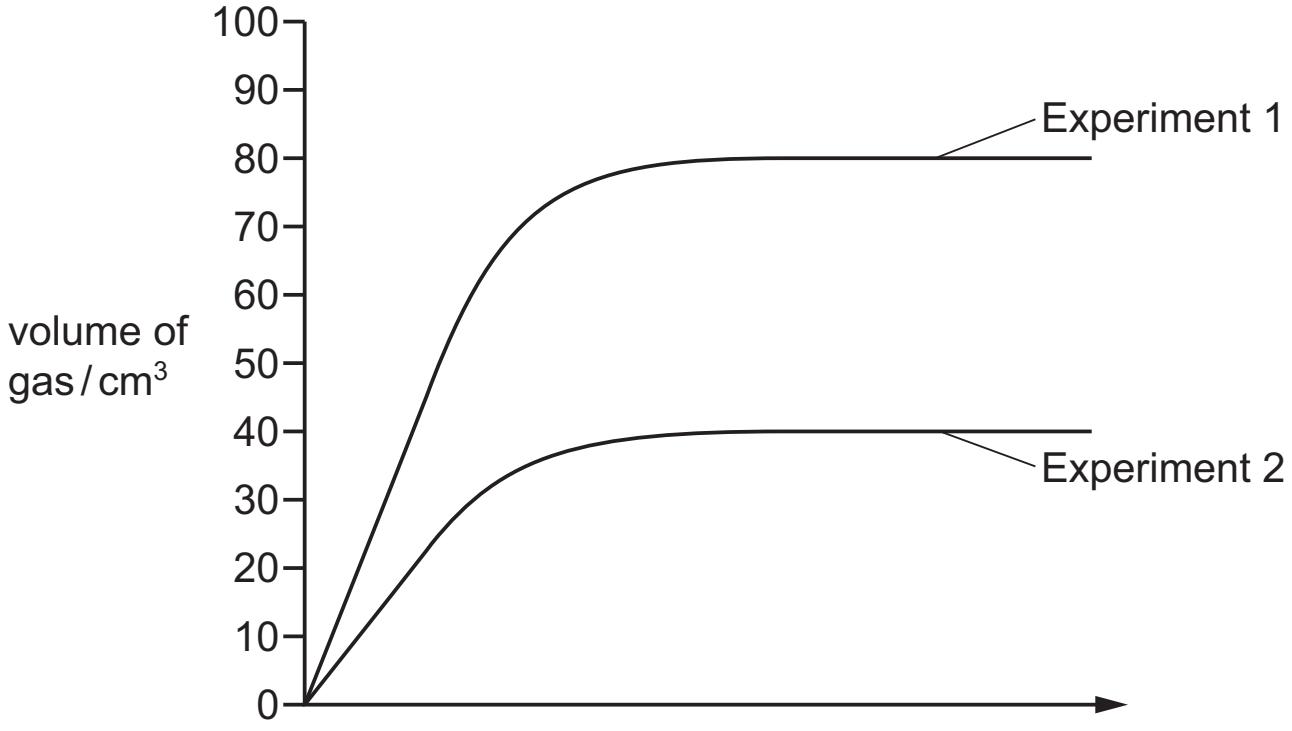
..... [2]

**(ii)** Suggest why the graphs level out at different volumes.

..... [1]

**(iii)** The graph has been drawn again.

Draw the curve expected if Experiment 1 were repeated using the same mass of magnesium powder instead of magnesium ribbon.




[2]

[Total: 10]

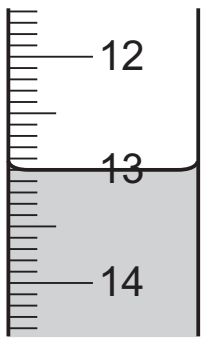
**2** A student investigated the reaction between aqueous potassium manganate(VII), solution **A**, and two solutions of iron(II) sulfate, solution **B** and solution **C**, of different concentrations.

Two experiments were carried out.

*Experiment 1*

- A burette was filled with solution **A** to the 0.0 $cm^3$ mark.
- A measuring cylinder was used to pour 25 $cm^3$ of solution **B** into a conical flask.
- Solution **A** was added to the flask, while the flask was swirled, until the mixture just turned permanently pink. The burette reading was recorded.

**(a)** Use the burette diagram to record the reading in the table and complete the table.




final reading

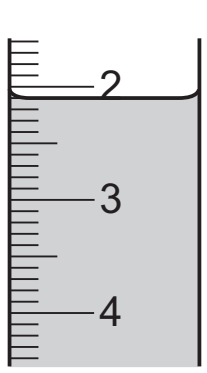
| | |
|---|---|
| final burette reading / $cm^3$ | |
| initial burette reading / $cm^3$ | |
| difference / $cm^3$ | |

[2]

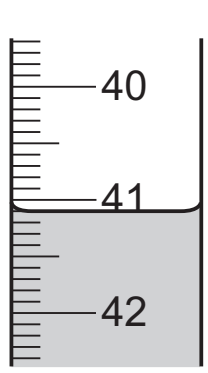
*Experiment 2*

- Experiment 1 was repeated using 25 $cm^3$ of solution **C** instead of solution **B**. In Experiment 2 the burette was not filled to the 0.0 $cm^3$ mark.

**(b)** Use the burette diagrams to record the readings in the table and complete the table.




initial reading




final reading

| | |
|---|---|
| final burette reading / $cm^3$ | |
| initial burette reading / $cm^3$ | |
| difference / $cm^3$ | |

[2]

© UCLES 2017

**(c)** Why is an indicator **not** added to the conical flask?

..... [1]

**(d) (i)** Which solution of iron(II) sulfate, solution **B** or solution **C**, is the more concentrated? Explain your answer.

.....

..... [2]

**(ii)** How many times more concentrated is this solution of iron(II) sulfate?

..... [1]

**(e) (i)** If Experiment 2 were repeated using 50 $cm^3$ of solution **C**, what volume of solution **A** would be needed? Explain your answer.

.....

..... [2]

**(ii)** Suggest a practical problem that using 50 $cm^3$ of solution **C** in this investigation would cause. Suggest a practical solution to the problem.

problem .....

solution .....
[2]

**(f)** Give **one** advantage and **one** disadvantage of using a measuring cylinder instead of a 25 $cm^3$ pipette for solution **B**.

advantage .....

disadvantage .....
[2]

**(g)** How would the results be improved by taking repeated measurements?

.....

..... [1]

[Total: 15]

**3** Two solids, **E** and **F**, which are both salts, were analysed. Solid **F** was lithium chloride.
Tests were carried out on each solid.
Some of the tests and observations are shown.

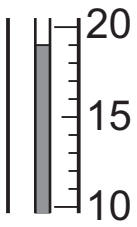
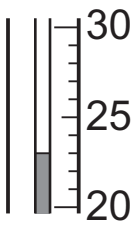
**tests on solid E**

| tests on solid **E** | observations |
|---|---|
| **test 1**<br><br>A flame test was carried out on solid **E**. | yellow colour |

**test 2**

10 $cm^3$ of distilled water were poured into a boiling tube. The initial temperature of the water was measured.
Solid **E** was added to the boiling tube and the boiling tube was shaken to dissolve solid **E**. The temperature of the solution was measured after 1 minute.

**(a)** Use the thermometer diagrams in the table to record the temperatures and complete the table.

| | | |
|---|---|---|
| temperature of the solution after 1 minute / °C |  | |
| initial temperature of the water / °C |  | |
| temperature difference / °C | | |

[2]

The solution was divided into two equal portions in two test-tubes and the following tests carried out.

| tests on solid **E** | observations |
|---|---|
| **test 3**<br><br>Dilute hydrochloric acid was added to the first portion of the solution. The gas given off was tested with filter paper dipped into acidified aqueous potassium manganate(VII). | filter paper turned from purple to colourless |
| **test 4**<br><br>An excess of aqueous sodium hydroxide was added to the second portion of the solution. | no change |

© UCLES 2017

**(b)** What does the temperature change tell you about the process occurring in **test 2**?

..... [1]

**(c)** Name the gas given off in **test 3**.

..... [1]

**(d)** Identify solid **E**.

..... [2]

**tests on solid F**

Complete the expected observations.

**(e)** A flame test was carried out on solid **F**.

observations ..... [1]

Solid **F** was added to distilled water in a test-tube and the test-tube shaken to dissolve solid **F**.

**(f)** Dilute nitric acid and aqueous silver nitrate were added to the solution.

observations ..... [2]

[Total: 9]

**4** Calcium carbonate and kaolinite are both white solids found in sedimentary rocks.

Calcium carbonate reacts with dilute hydrochloric acid to form aqueous calcium chloride. Kaolinite does **not** react with dilute acids.

You are provided with a mixture of calcium carbonate and kaolinite and access to dilute hydrochloric acid.

Plan an experiment to determine the percentage by mass of calcium carbonate in the mixture.

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 6]

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.