Cambridge IGCSE

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

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

*9115087705*

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

Paper 6 Alternative to Practical **May/June 2014**

**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.

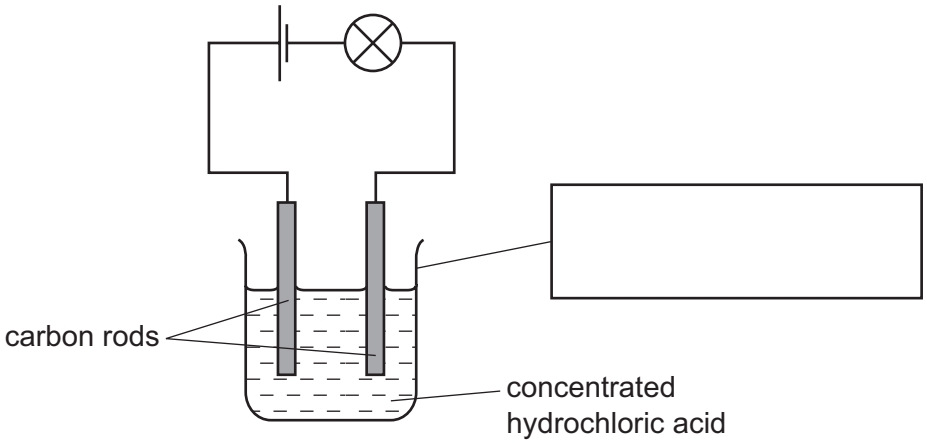
Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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 **12** printed pages.

**1** A student investigated the effect of using electricity to break down a solution of concentrated hydrochloric acid using the apparatus shown.




During the experiment, bubbles were observed at both carbon rods.

**(a)** Complete the box to identify the piece of apparatus used. [1]

**(b) (i)** Name the process that occurs when electricity is passed through concentrated hydrochloric acid.

..... [1]

**(ii)** What is the purpose of the carbon rods?

..... [1]

**(c)** Name **one** of the gases formed and state a test for this gas.

name .....

test .....

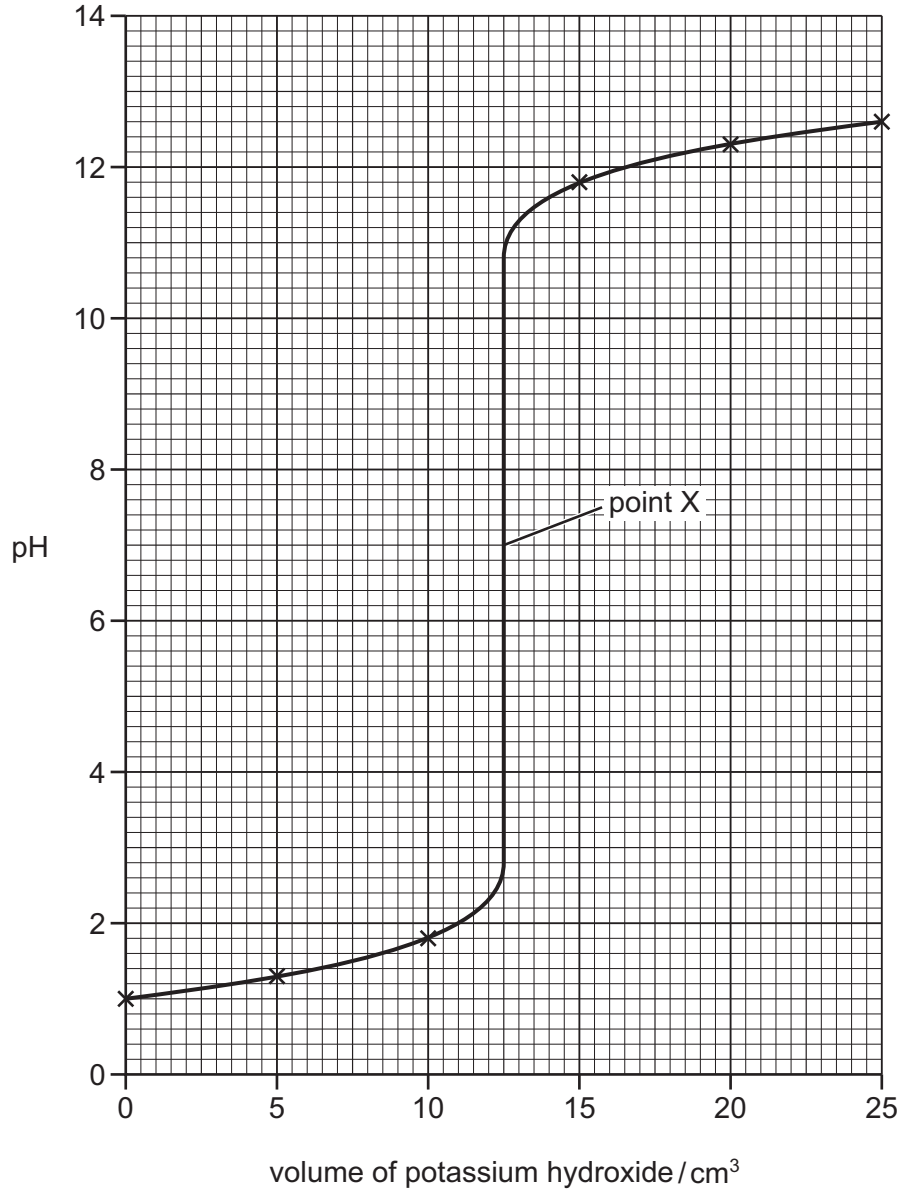
result ..... [2]

**(d)** Draw a diagram of different apparatus that could be used to collect the gases formed at the carbon rods.

[2]

[Total: 7]

**2** The graph shows the change in the pH when aqueous potassium hydroxide is added to 25.0 $cm^3$ of dilute nitric acid to form a solution of potassium nitrate. A pH meter was used.




**(a)** Name a suitable piece of apparatus to measure 25.0 $cm^3$ of dilute nitric acid.

..... [1]

**(b)** What could be used instead of a pH meter in this experiment?

..... [1]

**(c)** Describe how the pH of the mixture changes as the potassium hydroxide is added.

.....

.....

..... [2]



**[Turn over**

**(d) (i)** What has happened at point X?

..... [1]

**(ii)** What volume of aqueous potassium hydroxide had been added to the mixture at point X?

..... [2]

**(iii)** What conclusion can you draw about the concentrations of the dilute nitric acid and the aqueous potassium hydroxide? Explain your answer.

.....

.....

..... [3]

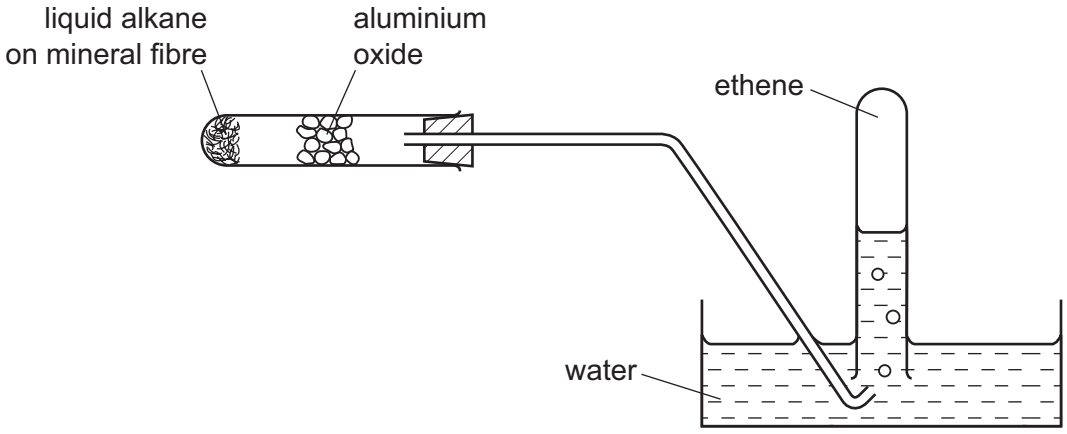
**(e)** Suggest the effect of heating the solution of potassium nitrate to boiling point and then heating for a further ten minutes.

.....

..... [2]

[Total: 12]

**3** Long-chain alkanes can be cracked to form short-chain alkenes. The apparatus below was used to produce ethene.




**(a)** Which piece of apparatus is missing from the diagram?

..... [1]

**(b)** Suggest why the first tube of gas that is collected should be discarded.

.....

..... [2]

**(c)** What is the function of the aluminium oxide?

..... [1]

**(d)** Describe a chemical test to distinguish an alkane from an alkene.

.....

..... [2]

[Total: 6]



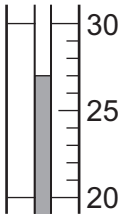
**[Turn over**

**4** A student investigated the temperature rises produced when different lengths of magnesium ribbon reacted with excess dilute sulfuric acid.
Five experiments were carried out.

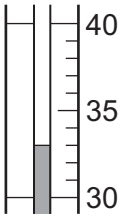
**(a)** *Experiment 1*

Using a measuring cylinder, 20 $cm^3$ of dilute sulfuric acid was added to a beaker. The initial temperature of the solution was measured. A 2 cm length of magnesium ribbon was added to the acid in the beaker and the mixture stirred with a thermometer. The highest temperature reached was measured.

Use the thermometer diagrams to record the initial and highest temperatures in the table on page 7.




initial temperature



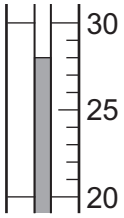
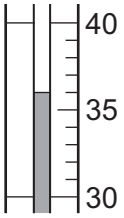
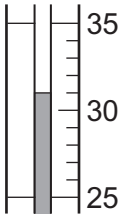
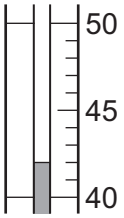
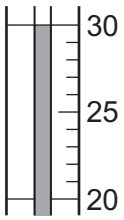
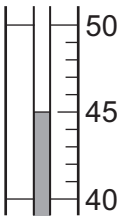
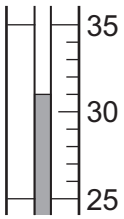
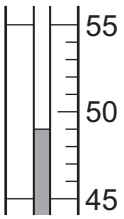

highest temperature

**(b)** *Experiment 2*

Experiment 1 was repeated, using a 3 cm length of magnesium ribbon. Use the thermometer diagrams to record the initial and highest temperatures in the table.

**(c)** *Experiments 3, 4 and 5*

Experiment 1 was repeated, using a 4 cm length, a 6 cm length and a 7 cm length of magnesium ribbon. Use the thermometer diagrams to record the temperatures in the table.
Complete the table of results.

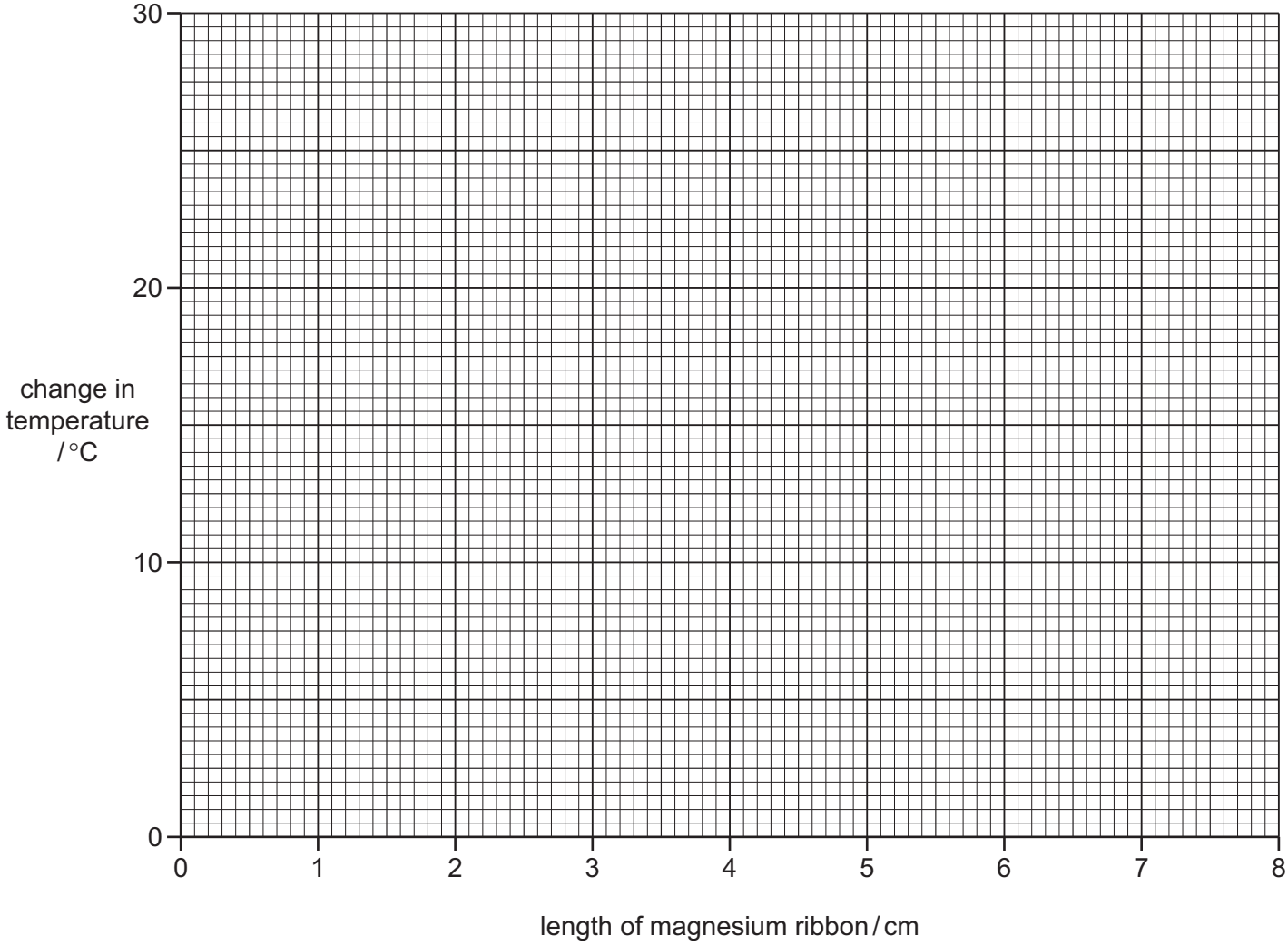
| Experiment | thermometer diagram | initial temperature / °C | thermometer diagram | highest temperature / °C | change in temperature / °C |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 |  | |  | | |
| 3 |  | |  | | |
| 4 |  | |  | | |
| 5 |  | |  | | |

[5]



**[Turn over**

**(d)** Plot the results on the grid below. Draw a best fit straight line graph.




[4]

**(e)** **From your graph**, deduce the temperature change expected if Experiment 1 was repeated using an 8 cm length of magnesium ribbon.
Show clearly **on the grid** how you worked out your answer.

..... [3]

**(f)** Give **one** expected observation, other than temperature rise, when magnesium reacts with dilute sulfuric acid.

..... [1]

**(g) (i)** Which experiment gave the greatest change in temperature?

..... [1]

**(ii)** Suggest why the change in temperature was greatest in this experiment.

.....

..... [1]

**(h)** What difference would be observed if Experiment 1 was repeated using an equal mass of magnesium powder? Explain your answer.

.....

..... [2]

**(i)** Suggest the temperature change expected if Experiment 1 was repeated using 40 $cm^3$ of dilute sulfuric acid.

..... [1]

**(j)** Draw a diagram of apparatus you could use to collect and measure the volume of gas given off in the reaction.

[2]

**(k)** State **one** source of error in the results obtained in the experiments. Give **one** improvement to reduce this source of error.

error .....

improvement ..... [2]

[Total: 22]

**5** A mixture **E** was analysed. **E** consisted of two solids, **F** and **G**. Solid **F** was ammonium chloride which is water-soluble and solid **G** was insoluble.
The tests on **E** and some of the observations are in the following table.
Complete the observations in the table.

| tests | observations |
|---|---|
| <u>tests on mixture **E**</u><br><br>**(a)** Appearance of mixture **E**. | white solid |
| **(b)** Mixture **E** was heated gently then strongly.<br>The gas was tested with damp pH indicator paper and the test-tube left to cool. | .....<br>..... [1] |
| Mixture **E** was added to distilled water in a boiling tube and shaken. The contents of the boiling tube were filtered.<br><br><u>tests on the filtrate</u><br><br>**(c) (i)** Aqueous sodium hydroxide was added to the filtrate.<br>The mixture was heated. The gas given off was tested with damp pH indicator paper.<br><br>**(ii)** Silver nitrate solution was added to the filtrate followed by about 1 $cm^3$ of dilute nitric acid. | .....<br>..... [2]<br><br>..... [2] |

| tests | observations |
|---|---|
| <u>tests on the residue</u><br><br>**(d)** The residue was transferred from the filter paper into a test-tube. Dilute hydrochloric acid was added to the residue. | rapid effervescence |
| The gas given off was tested. | limewater turned milky |
| The solution in the test-tube was divided into two portions.<br><br>**(e) (i)** Several drops of aqueous sodium hydroxide were added to the first portion of the solution. | white precipitate |
| Excess aqueous sodium hydroxide was then added to the mixture. | precipitate dissolved |
| **(ii)** Several drops of aqueous ammonia were added to the second portion of the solution. | white precipitate |
| Excess aqueous ammonia was then added to the mixture. | precipitate dissolved |

**(f)** What conclusions can you draw about solid **G**?

.....

..... [2]

[Total: 7]

**6** Cerussite is an ore of lead. Cerussite is lead carbonate, $PbCO_3$.

In the reactivity series, lead is between iron and copper.

Plan an investigation to obtain a sample of lead from a large lump of cerussite.

You are provided with common laboratory apparatus and chemicals.

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.....

.....

..... [6]

[Total: 6]