Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

1093878163

CHEMISTRY **0620/52**

Paper 5 Practical Test **May/June 2014**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As listed in the Confidential Instructions

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.
Practical notes are provided on page 8.

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.

For Examiner's Use	
Total	

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 **7** printed pages and **1** blank page.

CAMBRIDGE International Examinations

[Turn over

1 You are going to investigate the temperature rise produced when different lengths of magnesium ribbon react with excess dilute sulfuric acid.

Read all the instructions below carefully before starting the experiments.

Instructions
You are going to carry out five experiments.

(a) *Experiment 1*

Using a measuring cylinder, pour 20 cm^3 of dilute sulfuric acid into the beaker. Measure the initial temperature of the acid and record it in the table below. Add the 2 cm length of magnesium ribbon to the acid in the beaker, and stir the mixture with the thermometer.
Measure the highest temperature reached and record it in the table.
Remove the thermometer and rinse out the beaker with water.

(b) *Experiment 2*

Repeat Experiment 1, using the 3 cm length of magnesium ribbon. Record the initial and highest temperatures in the table.

(c) *Experiment 3*

Repeat Experiment 1, using the 4 cm length of magnesium ribbon. Record the temperatures in the table.

(d) *Experiment 4*

Repeat Experiment 1, using the 6 cm length of magnesium ribbon. Record the temperatures in the table.

(e) Experiment 5

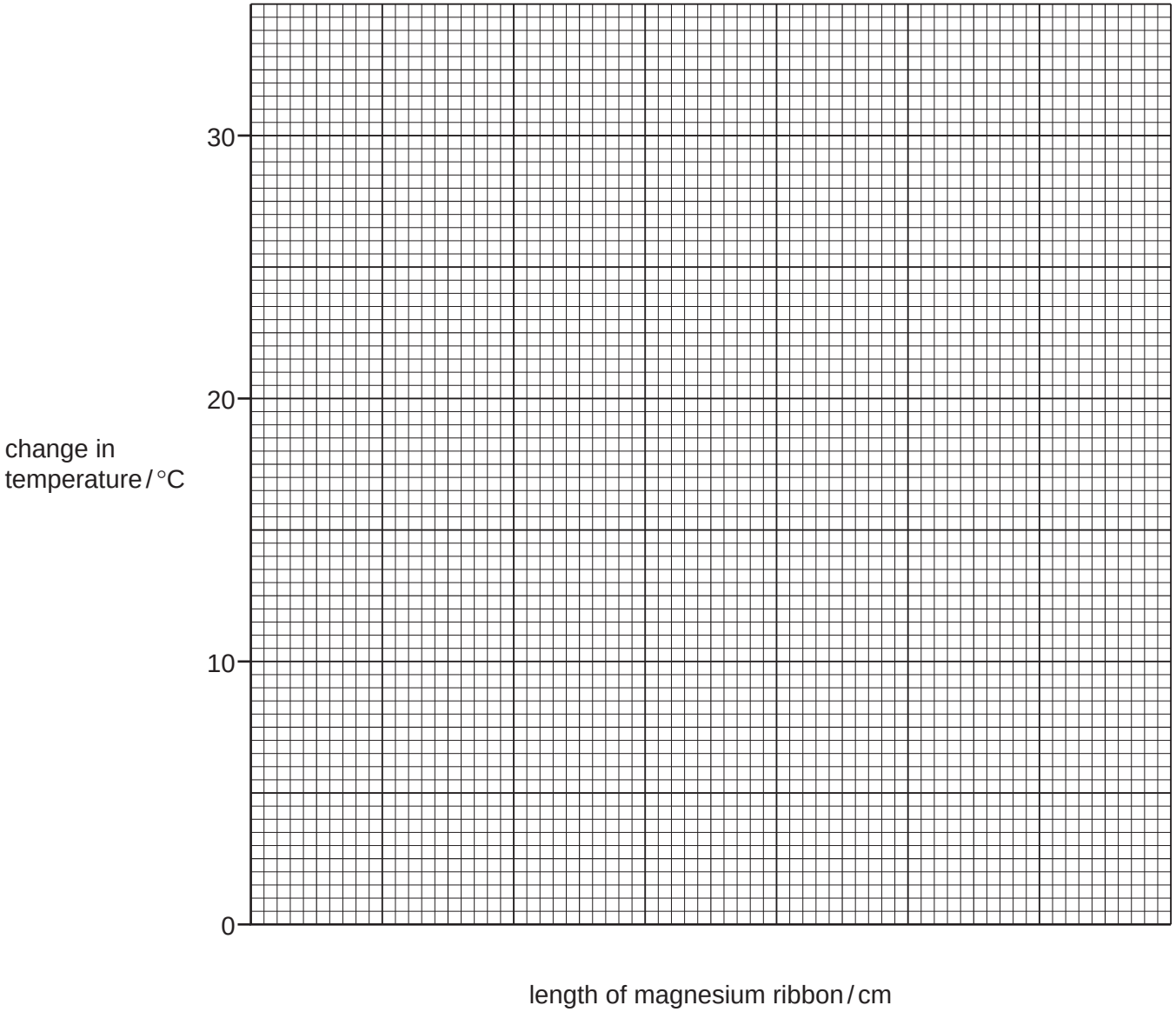
Repeat Experiment 1, using the 7 cm length of magnesium ribbon. Record the temperatures in the table.

Complete the table.

Experiment	initial temperature / °C	highest temperature / °C	change in temperature / °C
1			
2			
3			
4			
5			

[5]

(f) Plot the results you have obtained on the grid below. Draw a straight line of best fit through the points.



[4]

(g) **From your graph**, deduce the expected change in temperature if Experiment 1 was repeated using a 5 cm length of magnesium ribbon.
Show clearly **on the graph** how you worked out your answer.

..... [2]

(h) Give **two** observations when magnesium reacts with dilute sulfuric acid.

1 .....

2 ..... [2]

[Turn over

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

..... [1]

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

.....

..... [1]

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

.....

..... [2]

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

[2]

(l) State **one** source of error in the results obtained in Experiments 1-5. Give **one** improvement to reduce this source of error.

error .....

improvement ..... [2]

[Total: 21]

2 You are provided with mixture **E**. **E** consists of two solids, **F** and **G**. Solid **F** is water-soluble and solid **G** is insoluble.
Carry out the following tests on **E**, recording all of your observations in the table.
Conclusions must **not** be written in the table.

tests	observations
<u>tests on the mixture **E**</u> **(a)** Describe the appearance of the mixture.	..... [1]
(b) Place a little of mixture **E** in a test-tube. Heat the mixture gently at first then more strongly for about 1 minute. After 1 minute, test the gas given off with damp pH indicator paper. Leave the test-tube to cool.	.... [3]
Add the rest of mixture **E** to about 10 cm^3 of distilled water in a boiling tube. Stopper the boiling tube and shake the contents for about a minute. Filter the contents of the boiling tube. Keep the residue and the filtrate for the following tests. <u>tests on the filtrate</u> **(c) (i)** To about 1 cm^3 of the filtrate, add about 1 cm^3 of aqueous sodium hydroxide. Gently heat the mixture. Test the gas given off with damp pH indicator paper. **(ii)** Add about 1 cm^3 of silver nitrate solution to the second portion of the filtrate followed by about 1 cm^3 of dilute nitric acid.	.... [1] .... [1]

tests	observations
<u>tests on the residue</u> **(d)** Using a spatula, transfer a little of the residue from the filter paper to a test-tube. Using a teat pipette, add about 2 cm^3 of dilute hydrochloric acid to the residue. Test the gas given off. Add an equal volume of distilled water to the solution in the test-tube. Shake the contents and divide into two portions. **(e)** **(i)** Add several drops of aqueous sodium hydroxide to the first portion of the solution. Now add excess aqueous sodium hydroxide. **(ii)** Add several drops of aqueous ammonia to the second portion. Now add excess aqueous ammonia.	.... [2] .... [3] .... [2]

(f) Explain your observations in test **(b)**.

.....

..... [2]

(g) What conclusions can you draw about solid **F**?

.....

..... [2]

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

.....

..... [2]

[Total: 19]

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NOTES FOR USE IN QUALITATIVE ANALYSIS

Test for anions

anion	*test*	*test result*
carbonate (CO_3^{2-})	add dilute acid	effervescence, carbon dioxide produced
chloride (Cl^-) [in solution]	acidify with dilute nitric acid, then add aqueous silver nitrate	white ppt.
iodide (I^-) [in solution]	acidify with dilute nitric acid, then add aqueous silver nitrate	yellow ppt.
nitrate (NO_3^-) [in solution]	add aqueous sodium hydroxide then aluminium foil; warm carefully	ammonia produced
sulfate (SO_4^{2-}) [in solution]	acidify with dilute nitric acid, then aqueous barium nitrate	white ppt.

Test for aqueous cations

cation	*effect of aqueous sodium hydroxide*	*effect of aqueous ammonia*
aluminium (Al^{3+})	white ppt., soluble in excess giving a colourless solution	white ppt., insoluble in excess
ammonium (NH_4^+)	ammonia produced on warming	–
calcium (Ca^{2+})	white ppt., insoluble in excess	no ppt., or very slight white ppt.
copper (Cu^{2+})	light blue ppt., insoluble in excess	light blue ppt., soluble in excess giving a dark blue solution
iron(II) (Fe^{2+})	green ppt., insoluble in excess	green ppt., insoluble in excess
iron(III) (Fe^{3+})	red-brown ppt., insoluble in excess	red-brown ppt., insoluble in excess
zinc (Zn^{2+})	white ppt., soluble in excess giving a colourless solution	white ppt., soluble in excess giving a colourless solution

Test for gases

gas	*test and test results*
ammonia (NH_3)	turns damp red litmus paper blue
carbon dioxide (CO_2)	turns limewater milky
chlorine (Cl_2)	bleaches damp litmus paper
hydrogen (H_2)	‘pops’ with a lighted splint
oxygen (O_2)	relights a glowing splint