Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

4976035785

CHEMISTRY **0620/63**

Paper 6 Alternative to Practical **October/November 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.

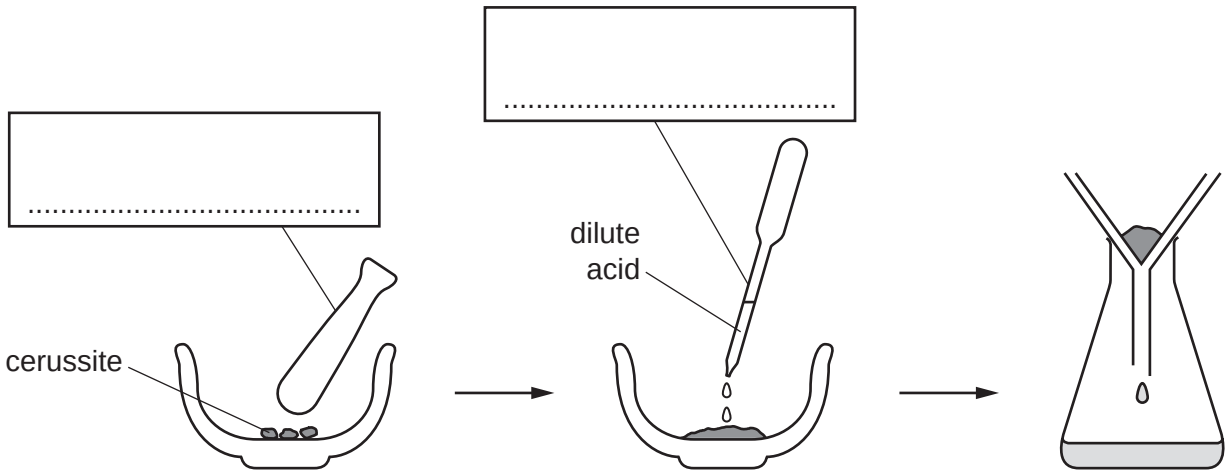
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

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

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

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1 Cerussite is a lead ore which contains lead(II) carbonate. A student obtained a solution of lead(II) nitrate from cerussite using the apparatus shown.



step 1 **step 2** **step 3**

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

(b) Why was the cerussite crushed in **step 1**?

..... [1]

(c) Name the dilute acid used in **step 2**.

..... [1]

(d) What is the general name given to an insoluble solid left on a filter paper after filtration?

..... [1]

(e) Suggest how a sample of lead could be obtained from the solution of lead(II) nitrate.

.....

.....

.....

..... [2]

[Total: 7]

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Question 2 starts on the next page.

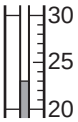
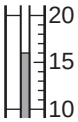
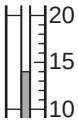
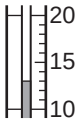
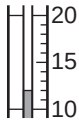
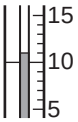
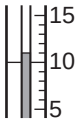
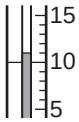
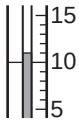
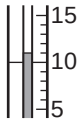
2 A student investigated what happened to the temperature when two different solids, **W** and **X**, dissolved in water.

Two experiments were carried out.

Experiment 1

- Using a measuring cylinder, 30 cm^3 of distilled water were poured into a polystyrene cup. The initial temperature of the water was measured at time = 0 seconds.
- Solid **W** was added to the water, a timer was started and the solution was stirred with a thermometer.
- The temperature of the solution was measured every 10 seconds for 90 seconds.

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

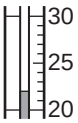
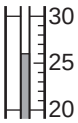
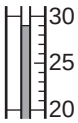
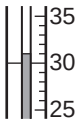
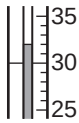
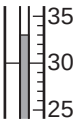
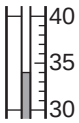
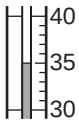
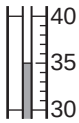
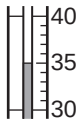
time / s	0	10	20	30	40	50	60	70	80	90
thermometer diagram										
temperature of the solution / °C										

[2]

Experiment 2

- The polystyrene cup was emptied and rinsed with water.
- Experiment 1 was repeated using solid **X**.
- The temperature of the solution was measured every 10 seconds for 90 seconds.

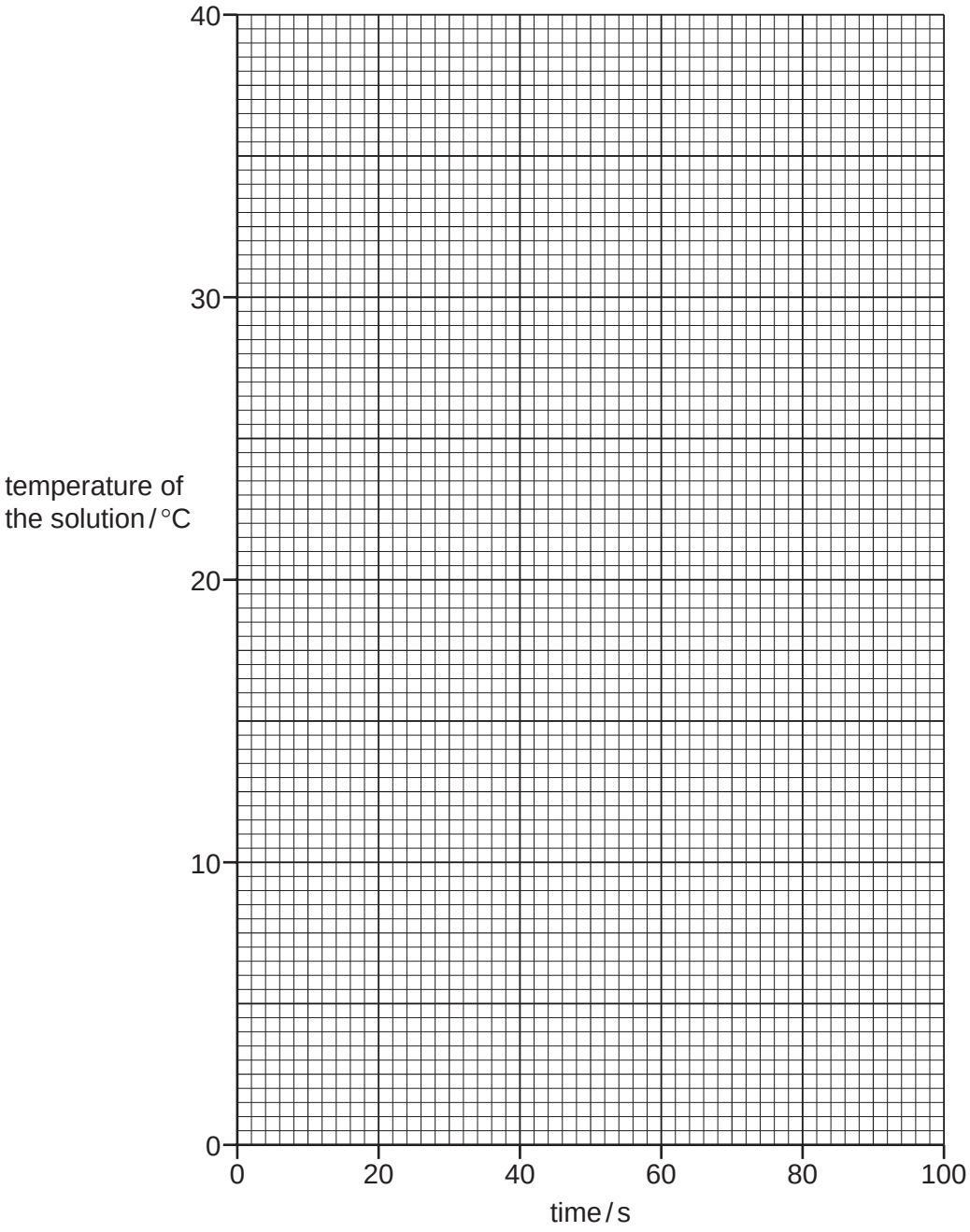
(b) Use the thermometer diagrams to record the temperatures in the table.

time / s	0	10	20	30	40	50	60	70	80	90
thermometer diagram										
temperature of the solution / °C										

[2]

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(c) Plot the results for Experiments 1 and 2 on the grid. Draw **two** smooth line graphs. Clearly label your lines.



[4]

(d) (i) **From your graph**, deduce the temperature of the solution in Experiment 1 after 15 seconds. Show clearly **on the grid** how you worked out your answer.

..... °C [2]

(ii) **From your graph**, deduce the time taken for the temperature of the solution in Experiment 2 to change by 6 °C from the initial temperature.
Show clearly **on the grid** how you worked out your answer.

..... s [2]

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[Turn over

(e) Use the results to identify the type of energy change that occurs when solid **X** dissolves in water.

..... [1]

(f) Predict the temperature of the solution in Experiment 2 after 1 hour. Explain your answer.

.....

..... [1]

(g) State **two** sources of error in these experiments. Give **one** improvement to reduce each of these sources of error.

source of error 1 .....

improvement 1 .....

source of error 2 .....

improvement 2 .....

[4]

(h) When carrying out the experiments, what would be a disadvantage of taking the temperature readings only every 30 seconds?

.....

..... [1]

[Total: 19]

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3 Two solutions, **Y** and **Z**, were analysed.
Solution **Y** was aqueous chromium(III) nitrate.
Tests were carried out on both solutions.

tests on solution Y

Complete the expected observations.

The solution was divided into two equal portions in two test-tubes.

(a) (i) A few drops of aqueous sodium hydroxide were added to the first portion of solution **Y** and the test-tube shaken to mix the solutions.

observations ..... [2]

(ii) An excess of aqueous sodium hydroxide was then added to the mixture.

observations ..... [1]

(iii) The mixture from **(a)(ii)** was poured into a boiling tube and a small piece of aluminium foil was added.
The mixture was heated and the gas produced was tested.

observations .....

..... [3]

(b) Identify the gas produced in **(a)(iii)**.

..... [1]

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[Turn over

tests on solution Z

Tests were carried out and the following observations made.

tests on solution **Z**	observations
Solution **Z** was divided into three equal portions in three test-tubes. **test 1** The pH of the first portion of solution **Z** was tested.	pH 10
test 2 A few drops of aqueous copper(II) sulfate were added to the second portion of solution **Z**. An excess of aqueous copper(II) sulfate was then added to the mixture.	dark blue solution formed light blue precipitate formed
test 3 The second portion of solution **Y** was added to the third portion of solution **Z**.	grey-green precipitate formed

(c) Identify solution **Z**.

..... [1]

[Total: 8]

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4 Washing soda crystals are crystals of hydrated sodium carbonate, $Na_2CO_3.10H_2O$. When exposed to the air, some of the water is lost from the crystals and a new substance is formed. This process occurs faster in hotter climates.

Plan an experiment to determine the percentage of water by mass present in the new substance.

You are provided with common laboratory apparatus.

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.....

..... [6]

[Total: 6]

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