Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

9261581316

CHEMISTRY **0620/61**

Paper 6 Alternative to Practical **October/November 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.

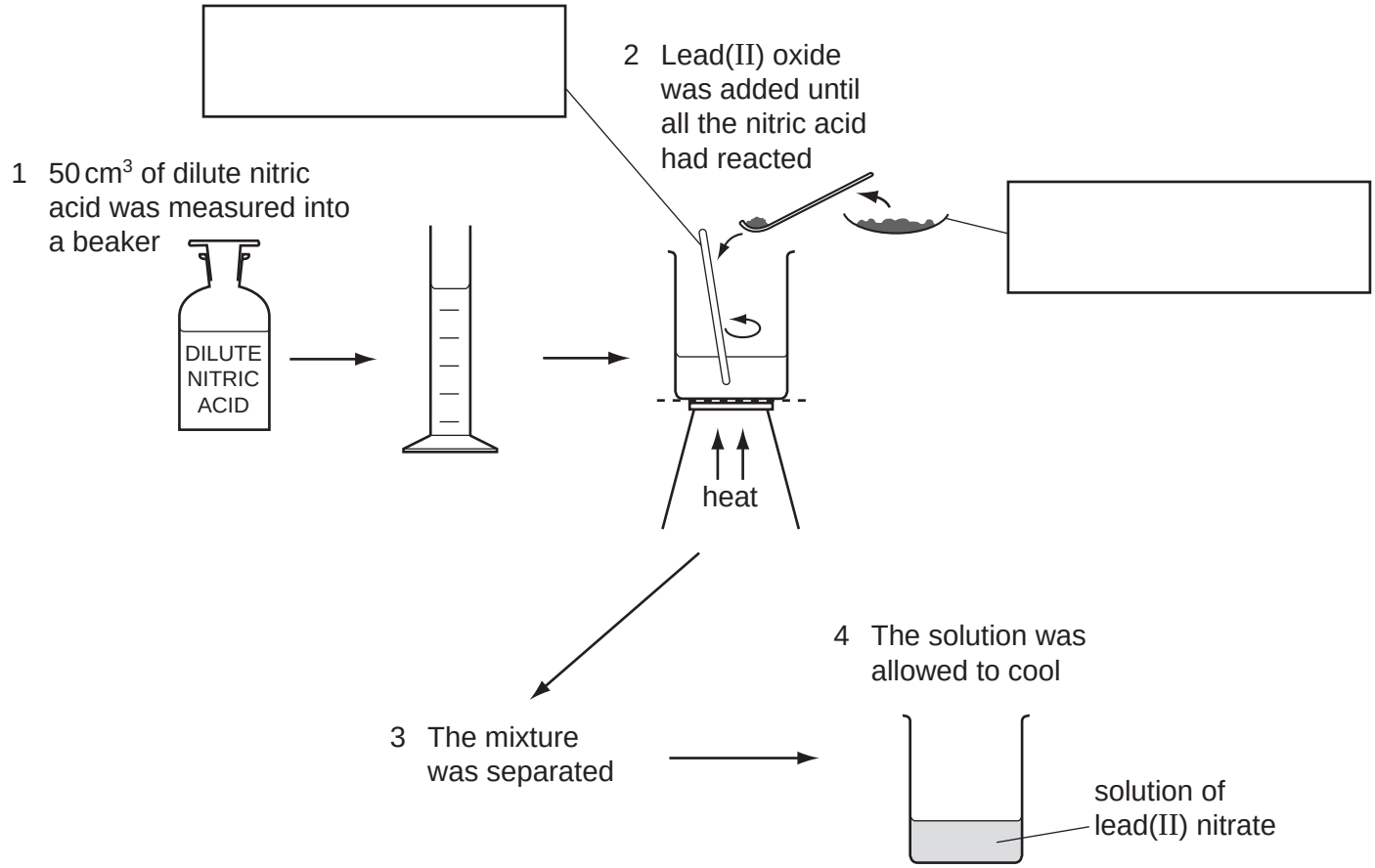
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

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.

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1 A student reacted dilute nitric acid with lead(II) oxide to prepare lead(II) nitrate. The diagram shows the stages in the method used.

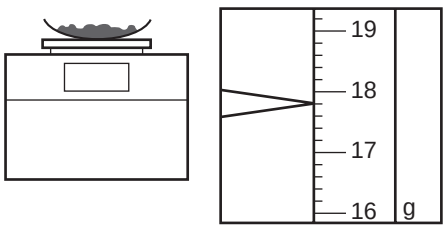


(a) Complete the boxes to identify the pieces of apparatus. [2]

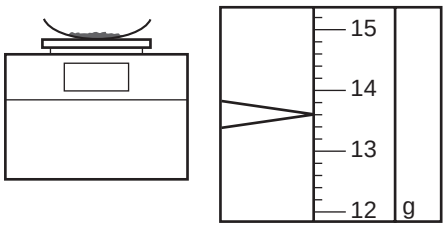
(b) Why is the dilute nitric acid heated?

..... [1]

(c) The lead(II) oxide was weighed before and after the additions.



before



after

Use the balance diagrams to work out the mass of lead(II) oxide added to the dilute nitric acid.

..... [2]

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(d) (i) How would the student know when all of the dilute nitric acid had reacted in stage 2?

..... [1]

(ii) What method is used to separate the mixture in stage 3?

..... [1]

(iii) What term is used to describe the unreacted lead(II) oxide?

..... [1]

(e) Describe the effect of heating the solution of lead(II) nitrate until it boils and then heating for a further ten minutes.

.....

.....

..... [2]

[Total: 10]

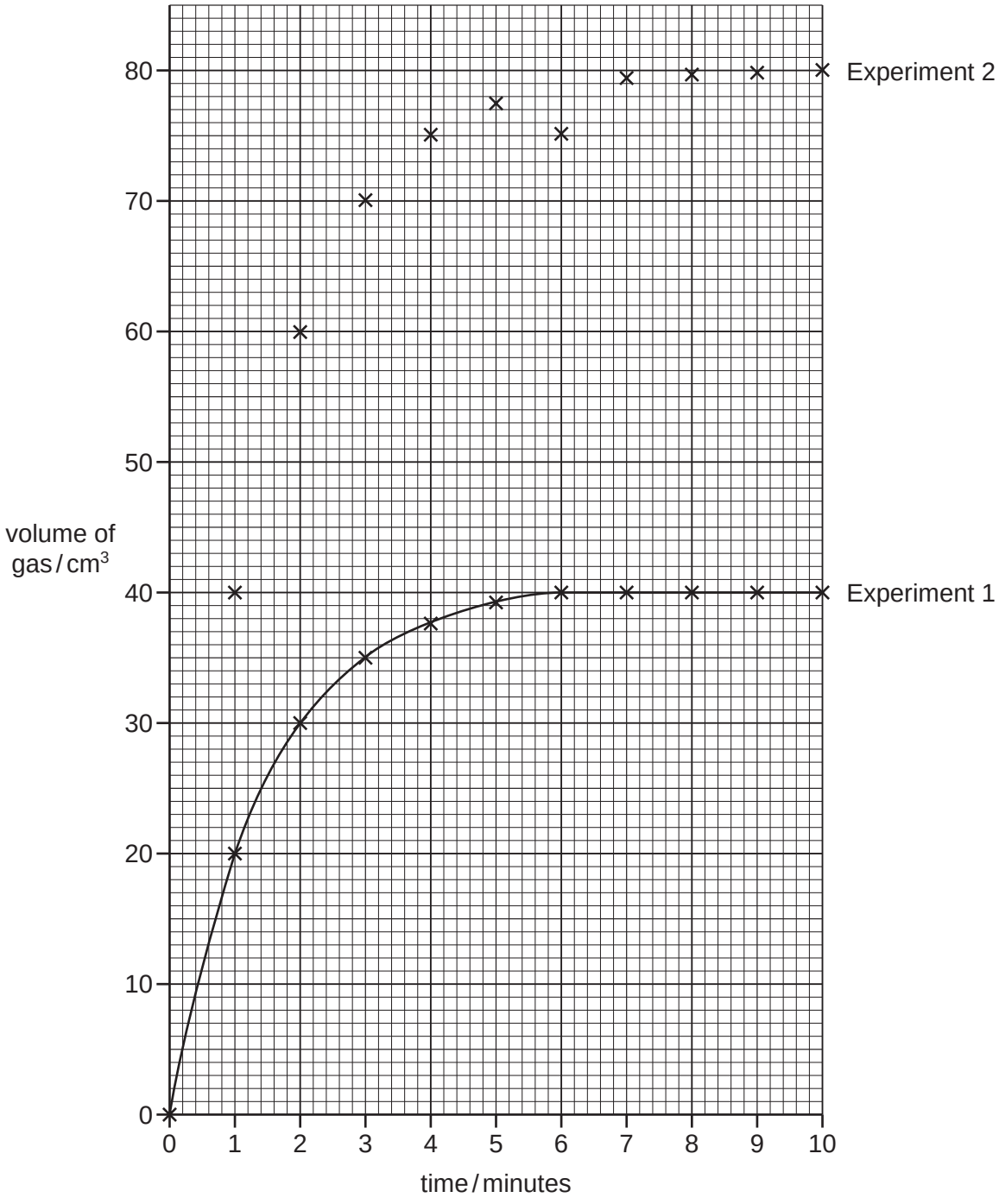
2 Two experiments were carried out to show what factors affect the rate of decomposition of hydrogen peroxide, H_2O_2.
In each experiment the volume of gas produced was measured every minute for ten minutes.

Experiment 1

The student used a mixture of 50 cm^3 of hydrogen peroxide, 50 cm^3 of water and 1 g of manganese(IV) oxide at a room temperature of 20 °C.
The results were plotted to obtain the graph shown.

Experiment 2

The student repeated Experiment 1 but did not record how much of each substance was used. The points were plotted on the grid.



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(a) Complete the graph for Experiment 2. [1]

(b) Suggest the composition of the mixture used in Experiment 2. Explain your suggestion.

composition .....

.....

explanation .....

..... [4]

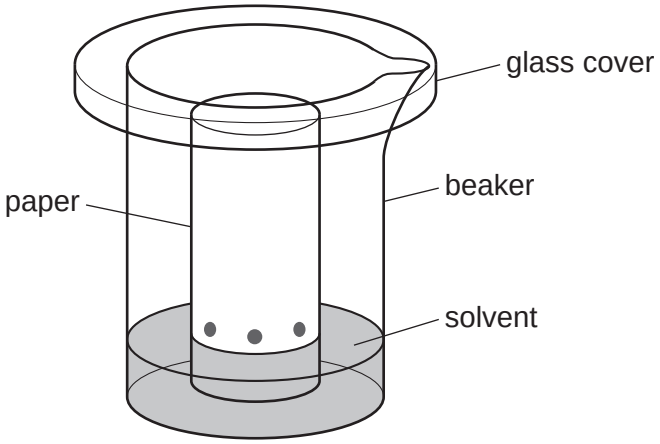
(c) What is the function of the manganese(IV) oxide?

..... [1]

(d) Sketch on the grid the curve that you would expect if Experiment 1 was repeated at 10 °C. [2]

[Total: 8]

3 A student investigated the colours present in a fruit drink. The fruit drink was tested to check that no artificial colours had been added. The apparatus below was used.



(a) (i) Name the method used.

..... [1]

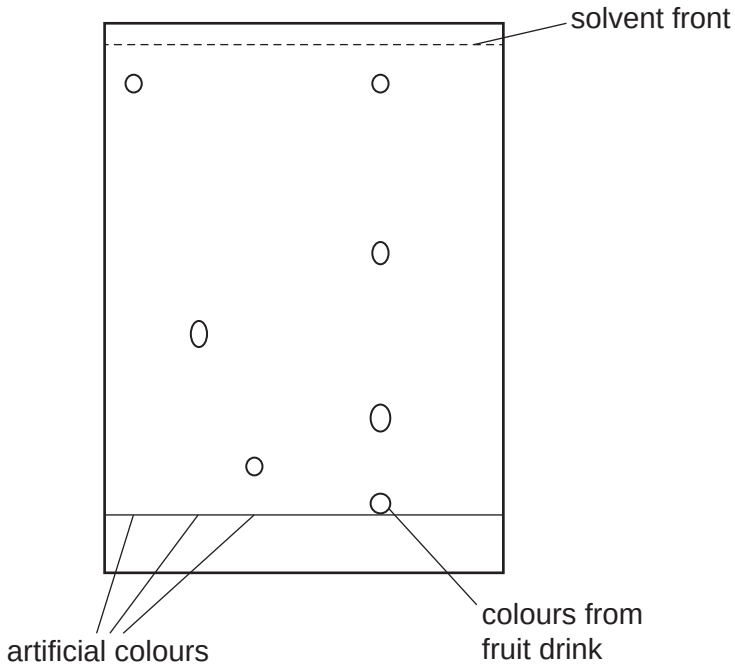
(ii) Why is there a glass cover on the beaker?

..... [1]

(b) When should the paper be removed from the beaker?

..... [1]

(c) The diagram shows the results of the experiment.



(i) How many different coloured compounds were present in the fruit drink?

..... [1]

(ii) Are there any of the artificial colours present in the fruit drink? Explain your answer.

.....

.....

..... [2]

[Total: 6]

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4 A student investigated the reaction between two different solutions of dilute hydrochloric acid, **A** and **B**, and solution **C** which is alkaline.

Two experiments were carried out.

(a) *Experiment 1*

A burette was filled with solution **A** of dilute hydrochloric acid to the 0.0 cm^3 mark. Using a measuring cylinder, 20 cm^3 of solution **C** was poured into a conical flask. A few drops of methyl orange were added to the flask.

Solution **A** was added to the flask, with shaking, until the mixture just changed colour.
Use the burette diagram to record the burette reading in the table and complete the table.



initial reading

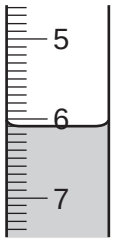
final burette reading / cm^3	
initial burette reading / cm^3	
difference / cm^3	

[2]

(b) *Experiment 2*

The burette was emptied and rinsed, first with distilled water, and then with a little of solution **B**. The burette was filled with solution **B** of dilute hydrochloric acid to the 0.0 cm^3 mark.

Experiment 1 was repeated using solution **B**.
Use the burette diagram to record the burette reading in the table and complete the table.



final reading

final burette reading / cm^3	
initial burette reading / cm^3	
difference / cm^3	

[2]

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[Turn over

(c) **(i)** What type of chemical reaction takes place when hydrochloric acid reacts with alkaline solutions?

..... [1]

(ii) Why is methyl orange added to the flask?

..... [1]

(d) Why was the burette rinsed, first with distilled water and then with solution **B**, before starting Experiment 2?

.....

.....

..... [2]

(e) **(i)** In which experiment was the greater volume of dilute hydrochloric acid used?

..... [1]

(ii) Compare the volumes of dilute hydrochloric acid used in Experiments 1 and 2.

..... [1]

(iii) Suggest, in terms of the concentration of solutions **A** and **B**, an explanation for the difference in volumes used.

.....

.....

..... [2]

(f) If Experiment 2 was repeated using 10 cm^3 of solution **C**, what volume of dilute hydrochloric acid would be used? Explain your answer.

.....

..... [2]

(g) Give **one** advantage and **one** disadvantage of using a measuring cylinder for solution **C**.

advantage .....

disadvantage ..... [2]

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(h) Describe a method other than titration, using a **different** reactant, that could be used to compare the concentrations of the two solutions of dilute hydrochloric acid, **A** and **B**.

.....

.....

.....

.....

.....

..... [4]

[Total: 20]

5 A solid **D**, which is a soluble metal sulfate, was analysed.
The tests on **D**, and some of the observations, are in the following table.
Complete the observations in the table.

tests	observations
<u>tests on solid **D**</u> **(a) (i)** Appearance of solid **D**.	pale green crystals
(ii) Solid **D** was heated in a test-tube gently and then strongly.	condensation formed at the top of the test-tube
<u>tests on the aqueous solution</u> Solid **D** was added to distilled water and shaken to dissolve. The solution was divided into four equal portions in separate test-tubes.	
(b) (i) Several drops of aqueous sodium hydroxide were added to the first portion of the solution.	green precipitate
Excess aqueous sodium hydroxide was added to the mixture.	green precipitate remained
(ii) Excess aqueous ammonia was added to the second portion of the solution.	green precipitate
(c) Aqueous silver nitrate and dilute nitric acid were added to the third portion of the solution.	..... [1]
(d) Aqueous barium nitrate and dilute nitric acid were added to the fourth portion of the solution.	..... [2]

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(e) What does test **(a)** tell you about solid **D**?

..... [2]

(f) What conclusions can you draw about the identity of solid **D**?

.....

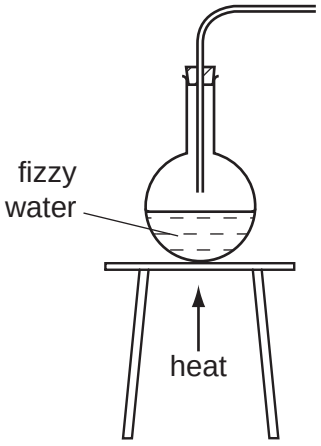
..... [3]

[Total: 8]

6 **Fizzy water**

Fizzy water contains carbon dioxide dissolved under pressure. When the water is heated, the gas is given off.

(a) **(i)** Complete the labelled diagram to show how you could collect and measure the volume of gas given off when fizzy water is heated.



[2]

(ii) State a test for carbon dioxide.

.....

..... [2]

(b) A label on a bottle of fizzy water stated that 'when evaporated completely the mass of solid residue remaining is 200 mg / dm^3 of water'.
Plan an experiment to check the mass of solid formed when the fizzy water is completely evaporated. You are provided with a 500 cm^3 bottle of fizzy water. You can use the space below to draw a diagram of the apparatus used if you wish.

.....

.....

.....

.....

..... [4]

[Total: 8]

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