UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

7279389372

CHEMISTRY **0620/06**

Paper 6 Alternative to Practical **October/November 2007**

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 a pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

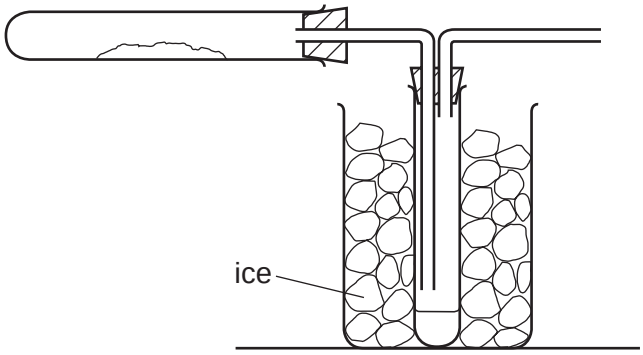
At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
Total	

This document consists of **13** printed pages and **3** blank pages.

1 Hydrated copper sulphate crystals, $CuSO_4.5H_2O$ were heated in the apparatus shown below.



(a) Indicate on the diagram using arrows

(i) where the copper sulphate crystals are placed,

(ii) where heat is applied. [2]

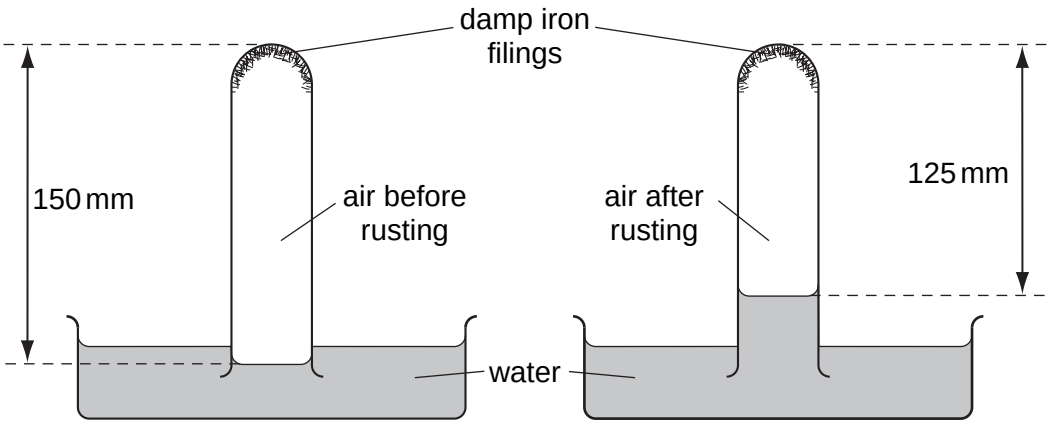
(b) What is the purpose of the ice?

..... [1]

(c) The crystals changed colour from ..... to ..... [2]

[Total: 5]

2 An experiment was set up to investigate the rusting of iron.



(a) Describe the appearance of the iron after rusting.

.....

[1]

(b) **(i)** Why does the water rise up the tube?

.....

[1]

(ii) Calculate the percentage change in the volume of air in the tube.

.....

[1]

(c) What difference would be observed if

(i) an iron nail was suspended in the tube instead of using iron filings,

.....

[1]

(ii) the water contained salt?

.....

[1]

[Total: 5]

3 The information in the box is about the preparation of zinc nitrate crystals.

Step 1: Add a small amount of zinc oxide to some hot dilute nitric acid, and stir.
Step 2: Keep adding zinc oxide until it is in *excess*.
Step 3: Remove the excess zinc oxide to leave colourless zinc nitrate solution.
Step 4: Evaporate the zinc nitrate solution until it is *saturated*.
Step 5: Leave the *saturated solution* to cool. White crystals form on cooling.
Step 6: Remove the crystals from the remaining solution.
Step 7: Dry the crystals on a piece of filter paper.

(a) Suggest a reason for using *excess* zinc oxide in Step 2.

.....

..... [1]

(b) Suggest how the *excess* zinc oxide can be removed from the solution in Step 3.

..... [1]

(c) **(i)** What is meant by the term *saturated solution*?

.....

..... [2]

(ii) What practical method could show the solution to be saturated?

.....

..... [1]

(d) Why are the crystals dried in Step 7 using filter paper instead of by heating?

.....

..... [1]

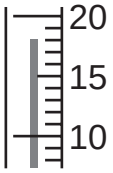
[Total: 6]

4 A student investigated the reaction of dilute hydrochloric acid with two different solids, calcium carbonate (marble) and calcium oxide.
Four experiments were carried out.

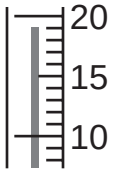
Experiment 1

By using a measuring cylinder, 50 cm^3 of dilute hydrochloric acid was poured into a polystyrene cup and the initial temperature of the acid was measured.
2.5 g of small marble chips were added to the cup and the mixture stirred with the thermometer.
The temperature of the mixture was measured after 2 minutes.

Use the thermometer diagrams to record the temperatures in the table of results on **page 6**.



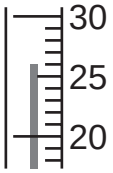
initial temperature / °C



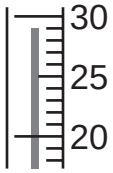
final temperature / °C

Experiment 2

Experiment 1 was repeated using 2.5 g of powdered calcium carbonate. Use the thermometer diagrams to record the results in the table.



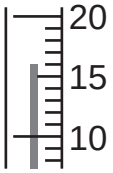
initial temperature / °C



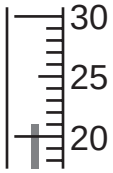
final temperature / °C

Experiment 3

Experiment 1 was repeated using 1.5 g of lumps of calcium oxide. Use the thermometer diagrams to record the temperatures in the table.



initial temperature / °C

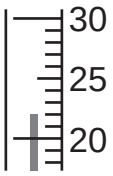


final temperature / °C

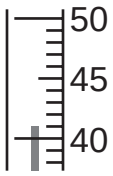
[Turn over

Experiment 4

Experiment 1 was repeated using 1.5 g of powdered calcium oxide.
Use the thermometer diagrams to record the results in the table.



initial temperature / °C



final temperature / °C

Table of results

Experiment	temperature / °C		
	initial	**final**	**difference**
1			
2			
3			
4			

[4]

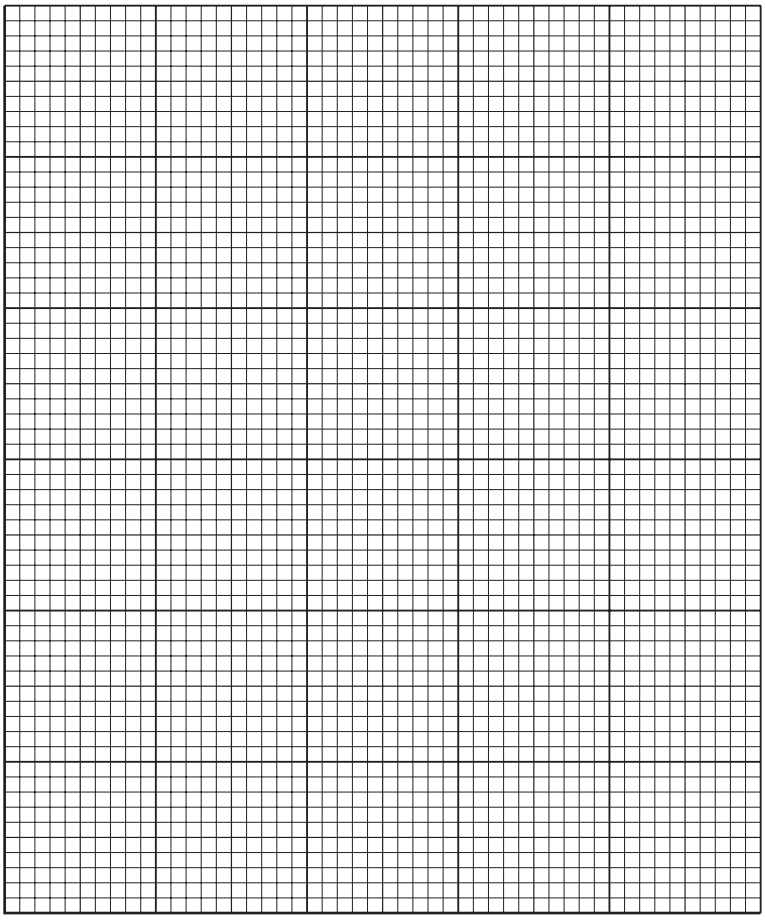
(a) What would be observed in Experiment 2?

.....

[1]

(b) Draw a bar chart of the results of the experiments on the grid below.

temperature difference / °C



experiment number

[3]

(c) Which experiment produced

(i) the smallest temperature change,

..... [1]

(ii) the largest temperature change?

..... [1]

(d) Give two reasons why the temperature changes are different in **(c)**.

1. .....

.....

2. .....

..... [2]

(e) In Experiment 1, how would you know which reactant is in *excess*? Explain your answer.

.....

.....

..... [2]

(f) Explain how the temperature changes would differ in the experiments if 100 cm^3 of hydrochloric acid were used.

.....

.....

..... [2]

[Total: 16]

5 Three different liquids **P**, **Q** and **R** were analysed. **Q** was an aqueous solution of sodium hydroxide.
The tests on the liquids and some of the observations are in the following table.
Complete the observations in the table.

tests	observations
(a) Test the pH of the liquids using indicator paper. Note the colour of the paper.	**P** colour red pH 1 **Q** colour ..... pH .....[2] **R** colour orange pH 5
(b) (i) Add a 5 cm piece of magnesium to about 3 cm^3 of liquid **P** in a test–tube. Test the gas given off.	bubbles of gas lighted splint pops
(ii) Repeat **(b)(i)** using liquids **Q**, and **R**. Do not test for any gases.	**Q** ..... **R** .....[2]

tests	observations
(c) To about 2 cm^3 of liquid **P** add 1 spatula measure of sodium carbonate. Test the gas given off.	.... [3]
(d) By using a teat pipette add aqueous silver nitrate to about 1 cm^3 of liquid **P**.	white precipitate
(e) By using a teat pipette add liquid **Q** to about 1 cm^3 of aqueous iron(II) sulphate.	..... [2]

(**f**) Name the gas given off in test **(b)(i)**.

..... [1]

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

..... [1]

(h) Identify liquid **P**.

..... [1]

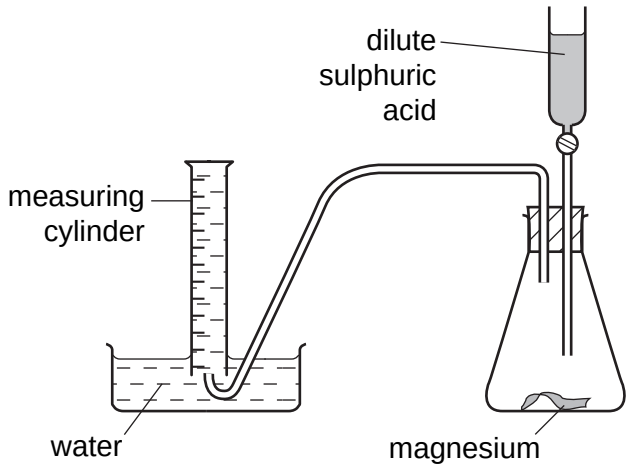
(i) What conclusions can you draw about liquid **R**?

.....

..... [2]

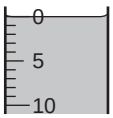
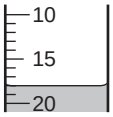
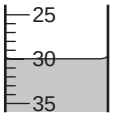
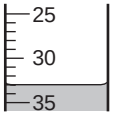
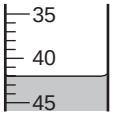
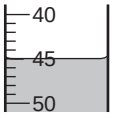
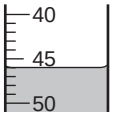
[Total: 14]

6 Magnesium reacts with dilute sulphuric acid to form hydrogen gas. The speed of the reaction was investigated using the apparatus below.



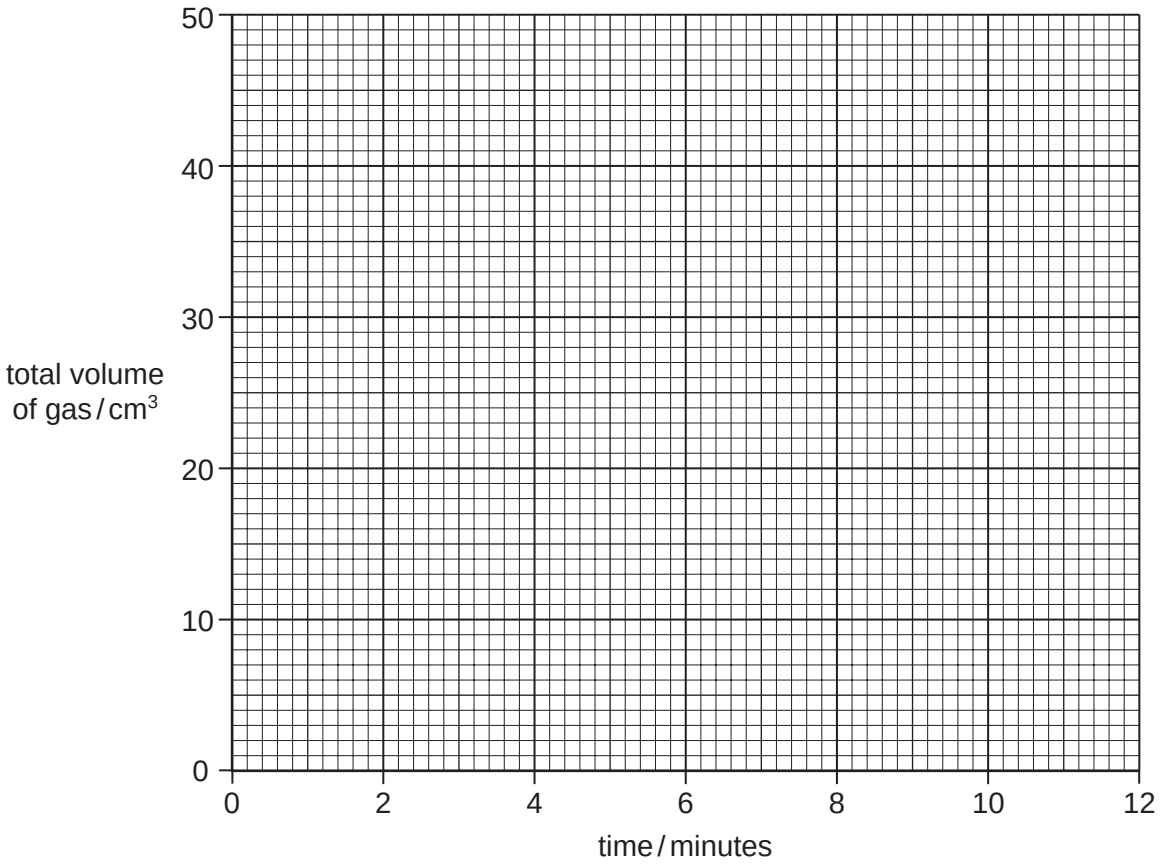
In an experiment 50 cm^3 of dilute sulphuric acid was added to a large piece of magnesium. A student measured the total volume of gas produced at 2 minute intervals.

Use the measuring cylinder diagrams to complete the table.

time / minutes	measuring cylinder diagram	total volume of collected / cm^3
0		
2		
4		
6		
8		
10		
12		

[3]

(a) Plot the student's results on the grid. Use the points to draw a smooth line graph.



[3]

(b) (i) At which time does the result appear to be inaccurate?

..... [1]

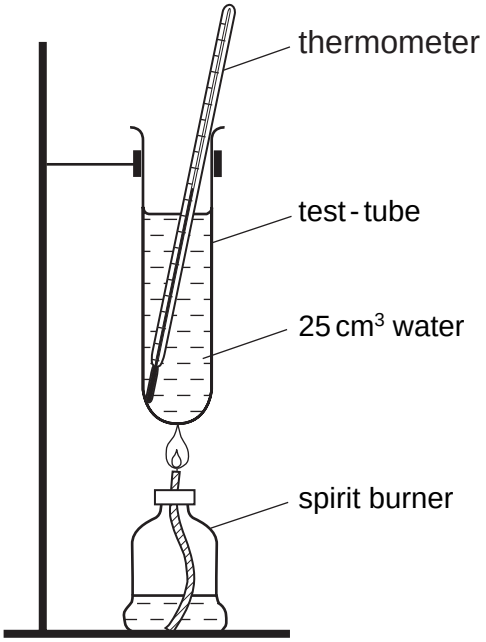
(ii) Use the graph to deduce what the correct volume should be at this time.

..... [1]

[Total:8]

7 Diesel is a liquid fuel obtained from crude oil. Biodiesel is a fuel made from oil obtained from the seeds of plants such as sunflowers.

Using the apparatus below plan an experiment to investigate which of these two fuels produces more energy.



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.....

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..... [6]

[Total: 6]

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