



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

CANDIDATE  
NAME

CENTRE  
NUMBER

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CANDIDATE  
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**CHEMISTRY**

**0620/63**

Paper 6 Alternative to Practical

**May/June 2010**

**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.

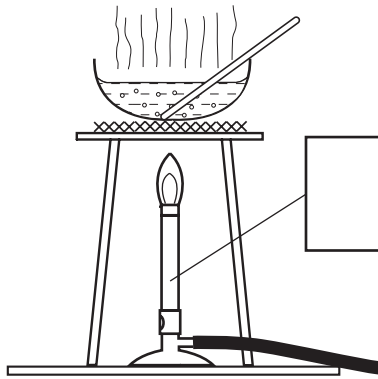
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
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7	
<b>Total</b>	

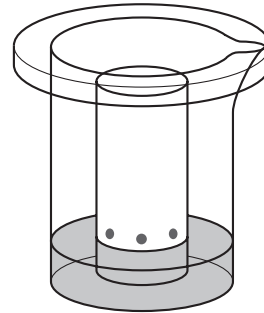
This document consists of **14** printed pages and **2** blank pages.



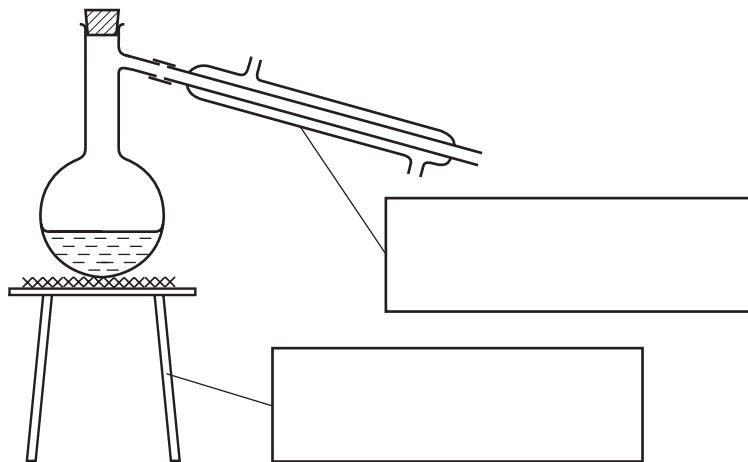
- 1 The diagrams show three sets of apparatus, **F**, **G** and **H**, used to separate three different mixtures.



F



G



H

(a) Complete the boxes to name the apparatus used. [3]

(b) (i) Which apparatus is used to obtain crystals of a salt from a solution of the salt?

..... [1]

(ii) Which apparatus is used to separate a mixture of coloured dyes?

..... [1]

[Total: 5]

2 A student investigated the green colour in grass.  
The student followed these instructions.

- 1 Cut the grass into small pieces and crush the grass by grinding with sand and ethanol.
- 2 Decant the liquid.
- 3 Investigate which colours are present in the green solution.

(a) Name the apparatus used to crush the grass in instruction 1.

..... [1]

(b) Explain the term *decant*.

..... [1]

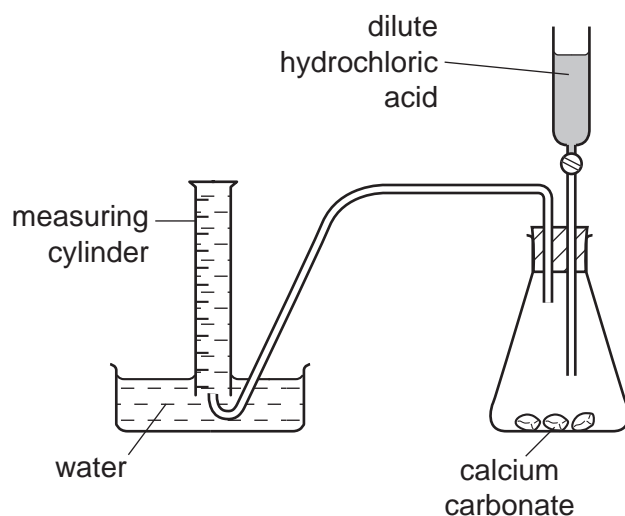
(c) Outline how the student could carry out instruction 3. You may draw a diagram to help you answer this question.

.....  
.....  
.....  
.....  
.....  
.....  
..... [4]

[Total: 6]

- 3 Two students investigated the speed of reaction between excess calcium carbonate and dilute hydrochloric acid using the apparatus below.

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Large lumps of calcium carbonate were used.

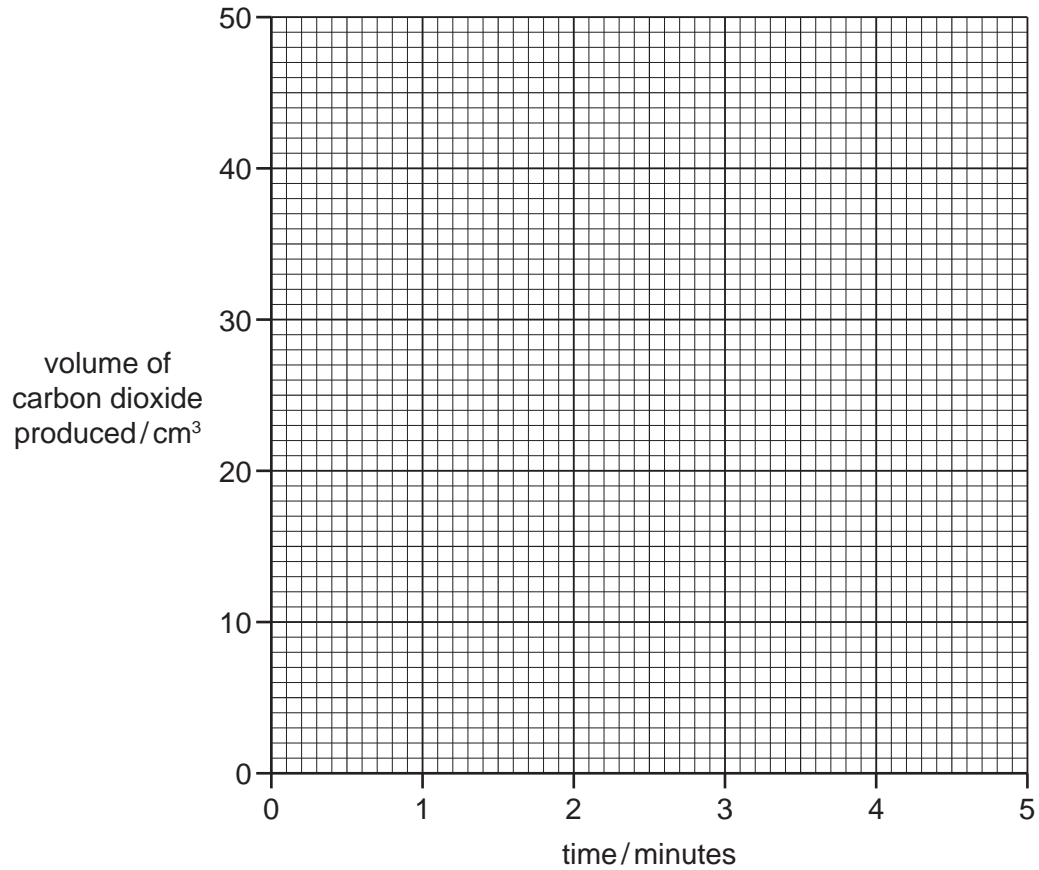
The volume of carbon dioxide produced was measured every minute for five minutes.

- (a) Use the measuring cylinder diagrams to complete the table of results.

time / minutes	measuring cylinder diagram	total volume of carbon dioxide produced / cm <sup>3</sup>
0		
1		
2		
3		
4		
5		

[3]

(b) Plot the results on the grid below and draw a smooth line graph.



[4]

(c) Which point appears to be inaccurate? Explain why.

.....  
 ..... [2]

(d) Sketch on the grid, the graph you would expect if the experiment was repeated using small lumps of calcium carbonate. [2]

[Total: 11]

- 4 A student investigated the reaction of aqueous potassium hydroxide with two different acids, acid **C** and acid **D**.

Two experiments were carried out.

*Experiment 1*

By using a measuring cylinder, 40 cm<sup>3</sup> of aqueous potassium hydroxide was poured into a conical flask and the initial temperature of the solution was measured.

A burette was filled with acid **C** up to the 0.0 cm<sup>3</sup> mark.

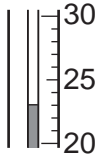
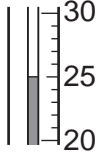
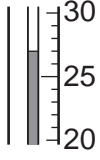
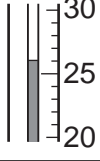
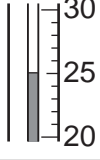
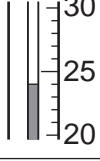
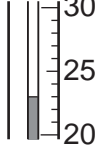
10 cm<sup>3</sup> of acid **C** was added to the potassium hydroxide in the flask. The temperature of the mixture was measured.

Further 10 cm<sup>3</sup> portions of acid **C** were added to the mixture in the flask, stirring with the thermometer until a total volume of 60 cm<sup>3</sup> of acid **C** had been added. The temperatures after each 10 cm<sup>3</sup> portion had been added were measured.

- (a)** Use the thermometer diagrams to record the temperatures in the table of results.

Table of results

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Use

volume of acid C added / cm <sup>3</sup>	thermometer diagrams	temperature / °C
0		
10		
20		
30		
40		
50		
60		

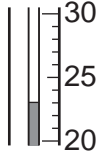
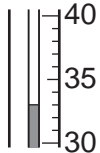
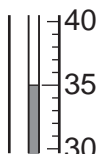
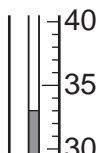
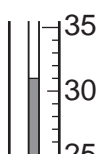
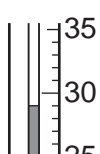

[2]

## Experiment 2

The burette was emptied and rinsed with water. Experiment 1 was repeated using acid **D**.

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

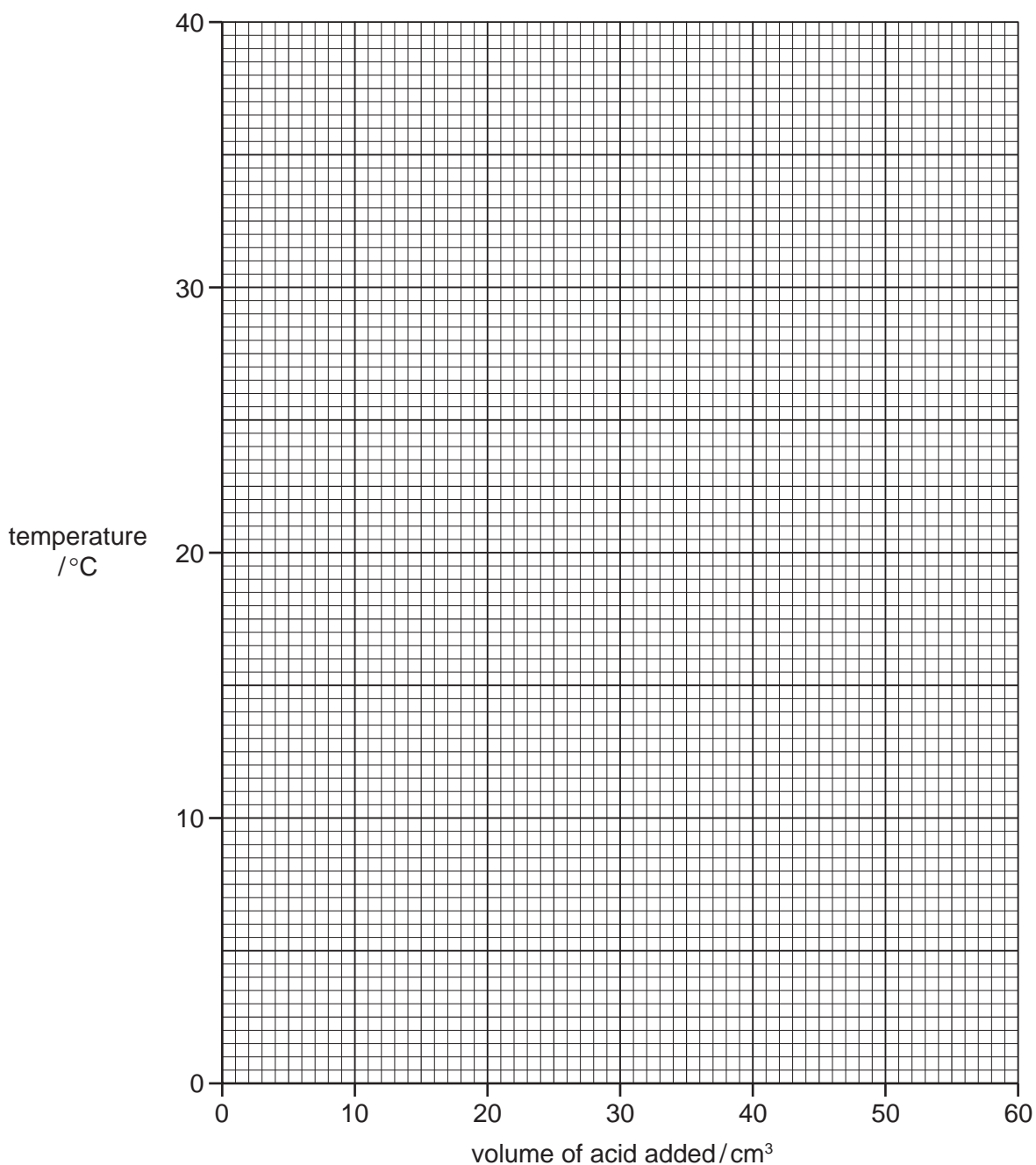
**Table of results**

volume of acid <b>D</b> added/cm <sup>3</sup>	thermometer diagrams	temperature/°C
0		
10		
20		
30		
40		
50		
60		

[2]



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



[6]

- (d) From your graph, deduce the temperature of the mixture when 6 cm<sup>3</sup> of acid **C** reacted with potassium hydroxide in Experiment 1.

Show clearly **on the graph** how you worked out your answer.

..... °C

[2]

**(e) (i)** Which experiment produced the larger temperature change?

..... [1]

**(ii)** Suggest why the temperature change is greater in this experiment.

.....  
.....  
..... [2]

**(f)** Why was the burette rinsed with water in Experiment 2?

.....  
..... [1]

**(g)** Predict the temperature of the reaction mixture in Experiment 2 after 1 hour. Explain your answer.

.....  
.....  
..... [2]

[Total: 18]

- 5 Solid **E** was analysed. **E** was a calcium salt.  
The tests on the solid and some of the observations are in the following table.  
Complete the observations in the table.

tests	observations
<u>tests on solid E</u>	
(a) Appearance of solid <b>E</b> .	white crystalline solid
(b) A little of solid <b>E</b> was heated in a test-tube.	colourless drops of liquid formed at the top of the tube
(c) A little of solid <b>E</b> was dissolved in distilled water.  The solution was divided into four test-tubes and the following tests were carried out.  (i) To the first test-tube of solution, drops of aqueous sodium hydroxide were added. Excess sodium hydroxide was then added to the test-tube.  (ii) Test (i) was repeated using aqueous ammonia solution instead of aqueous sodium hydroxide.  (iii) To the third test-tube of solution, dilute hydrochloric acid was added followed by barium chloride solution.  (iv) To the fourth test-tube of solution, aqueous sodium hydroxide and aluminium powder were added. The mixture was heated.	<p>.....</p> <p>.....</p> <p>..... [3]</p> <p>.....</p> <p>..... [1]</p> <p>no reaction</p> <p>effervescence pungent gas given off turned damp litmus paper blue</p>

**(d)** What does test **(b)** tell you about solid **E**.

.....  
..... [1]

**(e)** What does test **(c)(iii)** tell you about solid **E**?

..... [1]

**(f)** Identify the gas given off in test **(c)(iv)**.

..... [1]

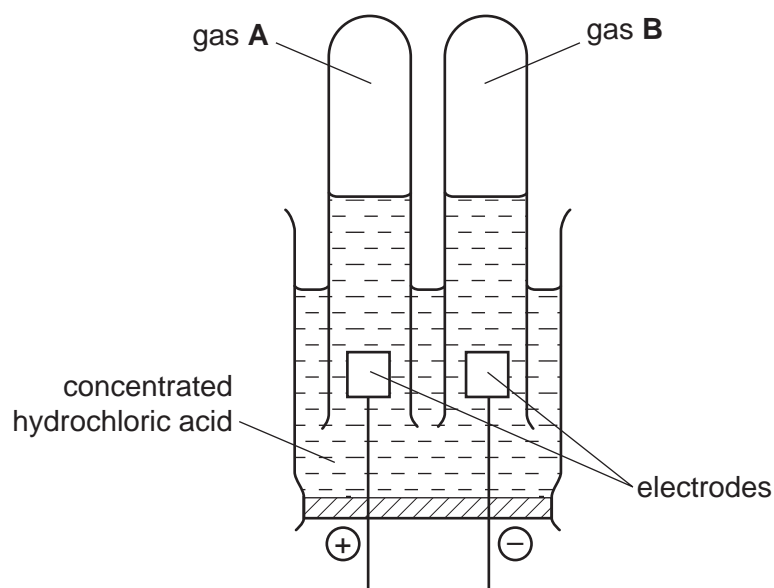
**(g)** What conclusions can you draw about solid **E**?

.....  
..... [2]

[Total: 9]

- 6 Concentrated hydrochloric acid was broken down by the passage of electricity using this apparatus.

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- (a) What is the name of this process?

..... [1]

- (b) Suggest a suitable material from which to make the electrodes.

..... [1]

- (c) Gas **A** is chlorine. Give a test for chlorine.

test .....

result ..... [2]

- (d) Gas **B** pops when tested with a lighted splint. What is gas **B**?

..... [1]

[Total: 5]





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