UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

8990937183

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.

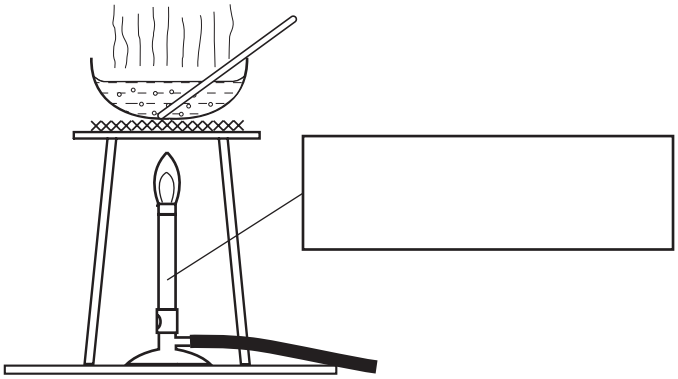
Answer **all** questions.

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.

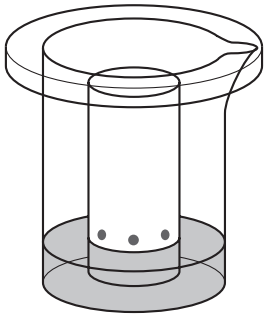
For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
Total	

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

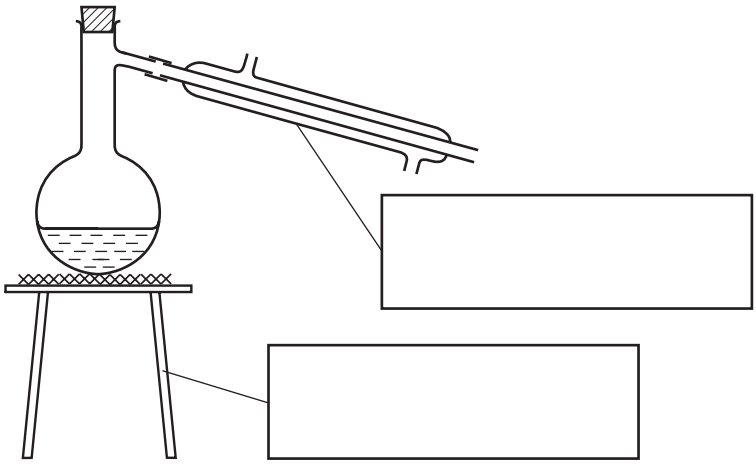
1 The diagrams show three sets of apparatus, **F**, **G** and **H**, used to separate three different mixtures.



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]

For Examiner's Use

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.

.....

.....

.....

.....

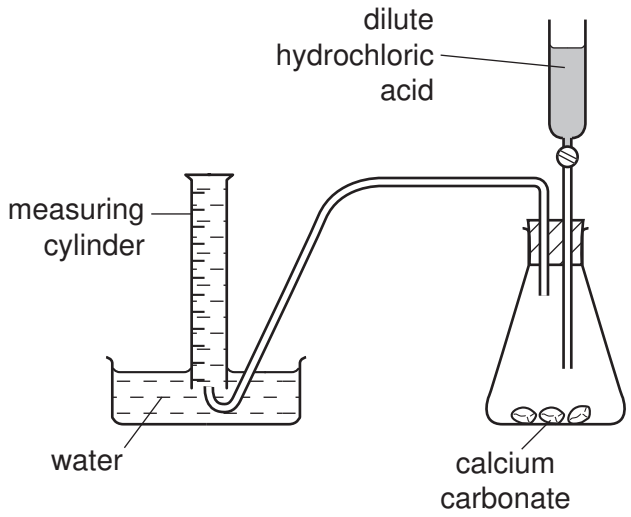
.....

..... [4]

[Total: 6]

For Examiner's Use

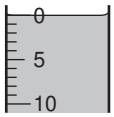
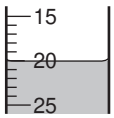
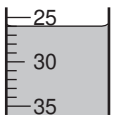
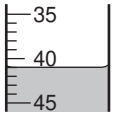
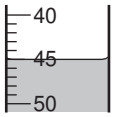
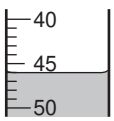
3 Two students investigated the speed of reaction between excess calcium carbonate and dilute hydrochloric acid using the apparatus below.



Large lumps of calcium carbonate were used.

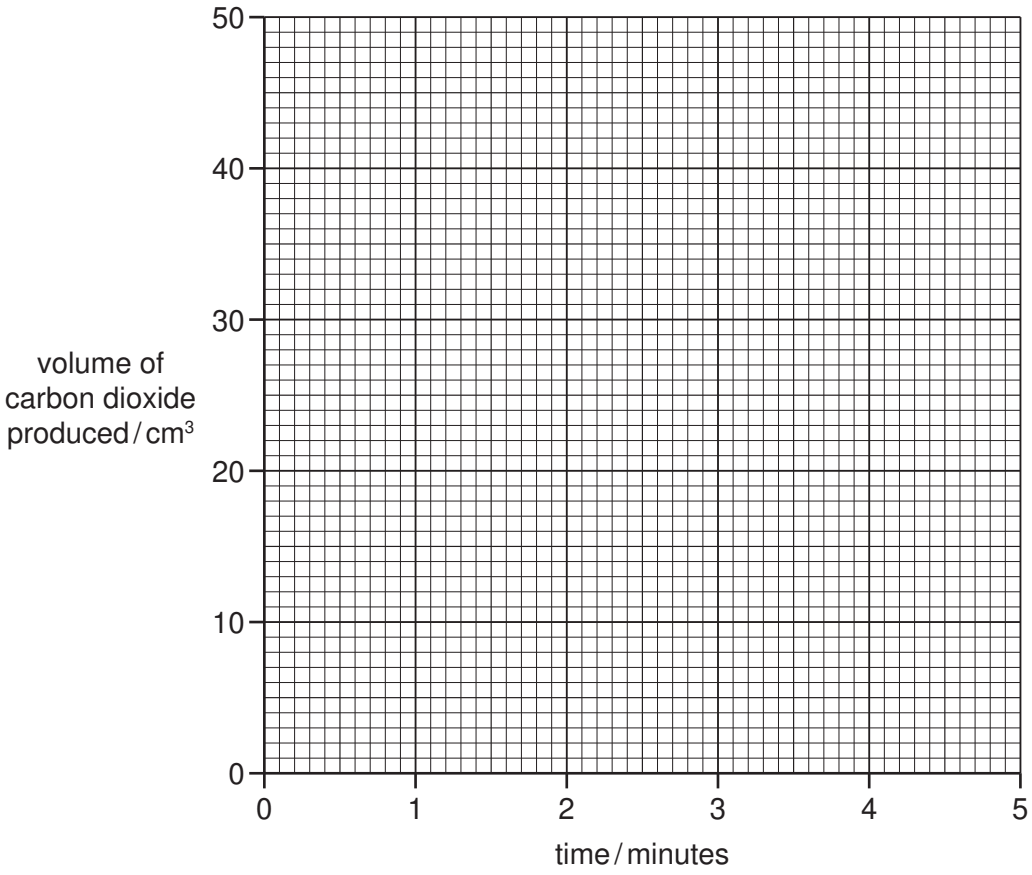
The volume of carbon dioxide produced was measured every minute for five minutes.

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

time / minutes	measuring cylinder diagram	total volume of carbon dioxide produced / cm^3
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^3 of aqueous potassium hydroxide was poured into a conical flask and the initial temperature of the solution was measured.

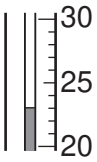
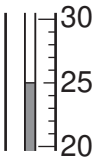
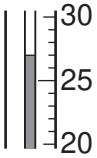
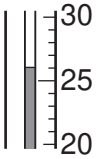
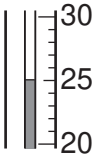
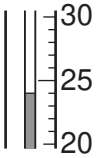
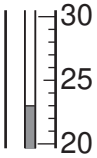
A burette was filled with acid **C** up to the 0.0 cm^3 mark.

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

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

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

Table of results

volume of acid **C** added / cm^3	thermometer diagrams	temperature / °C
0		
10		
20		
30		
40		
50		
60		

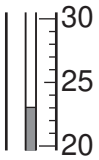
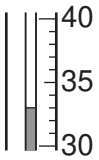
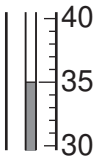
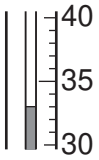
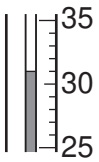
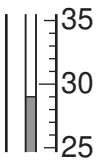
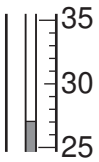
[2]

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.

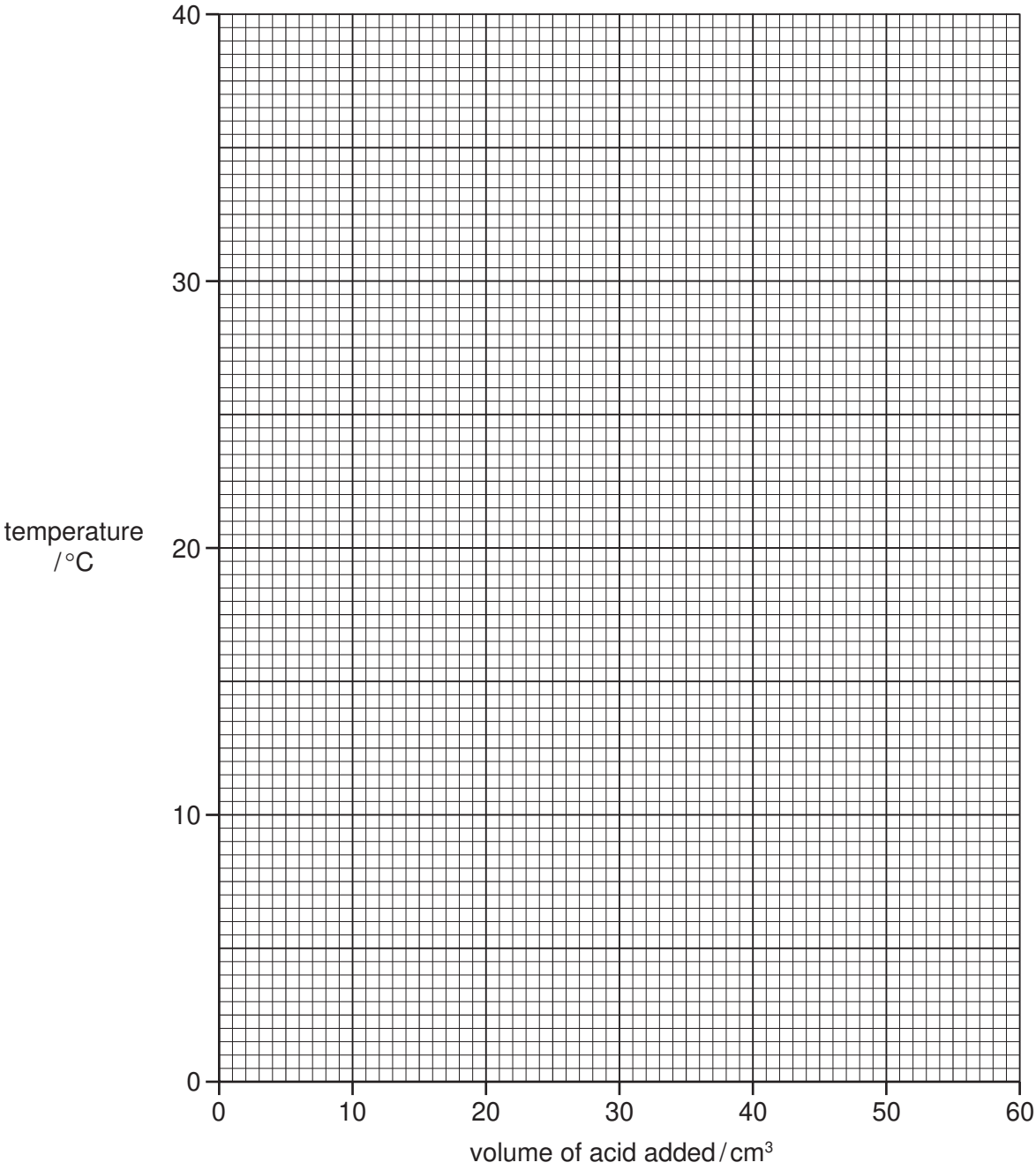
Table of results

volume of acid **D** added / cm^3	thermometer diagrams	temperature / °C
0		
10		
20		
30		
40		
50		
60		

[2]

For Examiner's Use

(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^3 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
tests on solid **E**	
(a) Appearance of solid **E**.	white crystalline solid
(b) A little of solid **E** was heated in a test-tube.	colourless drops of liquid formed at the top of the tube
(c) A little of solid **E** 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.	.... [3]
(ii) Test **(i)** was repeated using aqueous ammonia solution instead of aqueous sodium hydroxide.	.... [1]
(iii) To the third test-tube of solution, dilute hydrochloric acid was added followed by barium chloride solution.	no reaction
(iv) To the fourth test-tube of solution, aqueous sodium hydroxide and aluminium powder were added. The mixture was heated.	effervescence pungent gas given off turned damp litmus paper blue

(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]

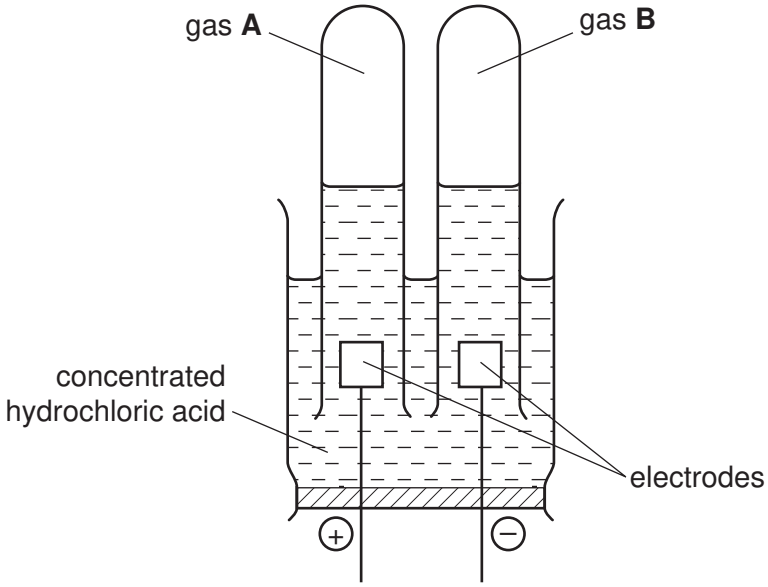
(g) What conclusions can you draw about solid **E**?

.....

..... [2]

[Total: 9]

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



(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]

For Examiner's Use

7 Metal cooking containers, such as saucepans, can be made from copper or steel.

Outline experiments that could be carried out to show which of these metals would be most suitable for a saucepan.
You are provided with pieces of copper and steel foil.
Common laboratory chemicals and apparatus are available.

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..... [6]

[Total: 6]

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