Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY **0620/06**

Paper 6 Alternative to Practical

May/June 2006

1 hour

Candidates answer on the Question Paper.
No additional materials are required.

READ THESE INSTRUCTIONS FIRST

Write your name, Centre number and candidate number at the top of this page.
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.

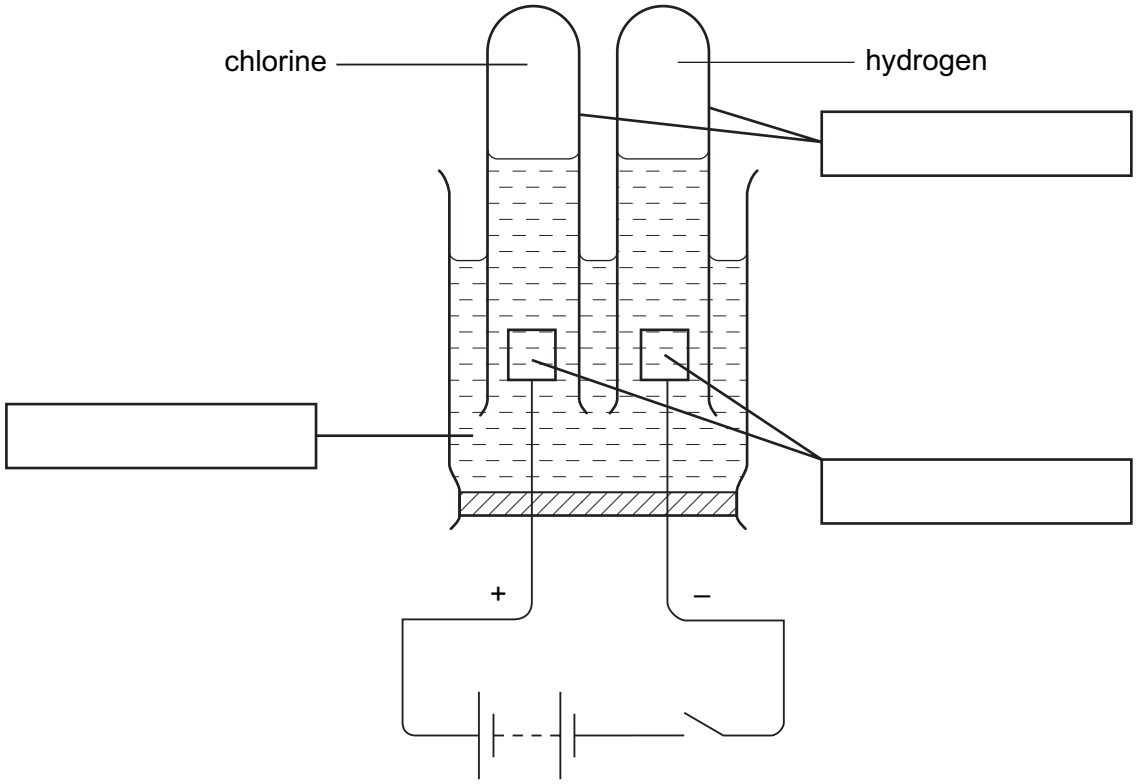
Answer **all** questions.

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	
Total	

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

1 The diagram shows the effect of passing electricity through concentrated hydrochloric acid.



(a) Label the diagram by completing the boxes. [3]

(b) Name this process.

..... [1]

(c) Give a test for chlorine.

test .....

result ..... [2]

2 A sample of orange fruit jam was investigated to check the three colourings present.

Step 1 The jam was boiled with water.

Step 2 The mixture was filtered.

Step 3 The filtrate was concentrated.

Step 4 The concentrate was analysed by chromatography.

(a) What was the purpose of Step 1?

.....

[1]

(b) Why was the mixture filtered?

.....

[1]

(c) How was Step 3 carried out?

.....

[1]

(d) Draw a diagram to show the possible paper chromatogram obtained in Step 4.

[2]

3 A student carried out an experiment to measure the temperature changes during the reaction of two solutions **X** and **Y**.

The instructions were as follows.

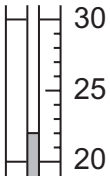
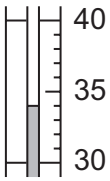
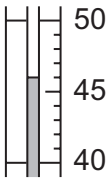
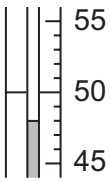
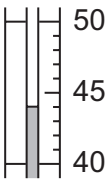
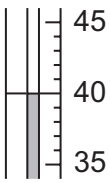
Leave the solutions to stand in the laboratory for one hour.

Pour 25 cm^3 of solution **X** into a polystyrene cup and record its temperature.

Add 10 cm^3 of solution **Y** and record the maximum temperature reached.

Repeat the experiment using 25 cm^3 of solution **X** with different volumes of solution **Y**.

The results are shown in the table. Use the thermometer diagrams to record the maximum temperatures reached.

volume of solution **Y** added to 25 cm^3 solution **X** / cm^3	thermometer diagram	maximum temperature / °C
0		
10		
20		
30		
40		
50		

[2]

(a) Why were the solutions left standing in the laboratory for about one hour before the experiment?

.....

..... [1]

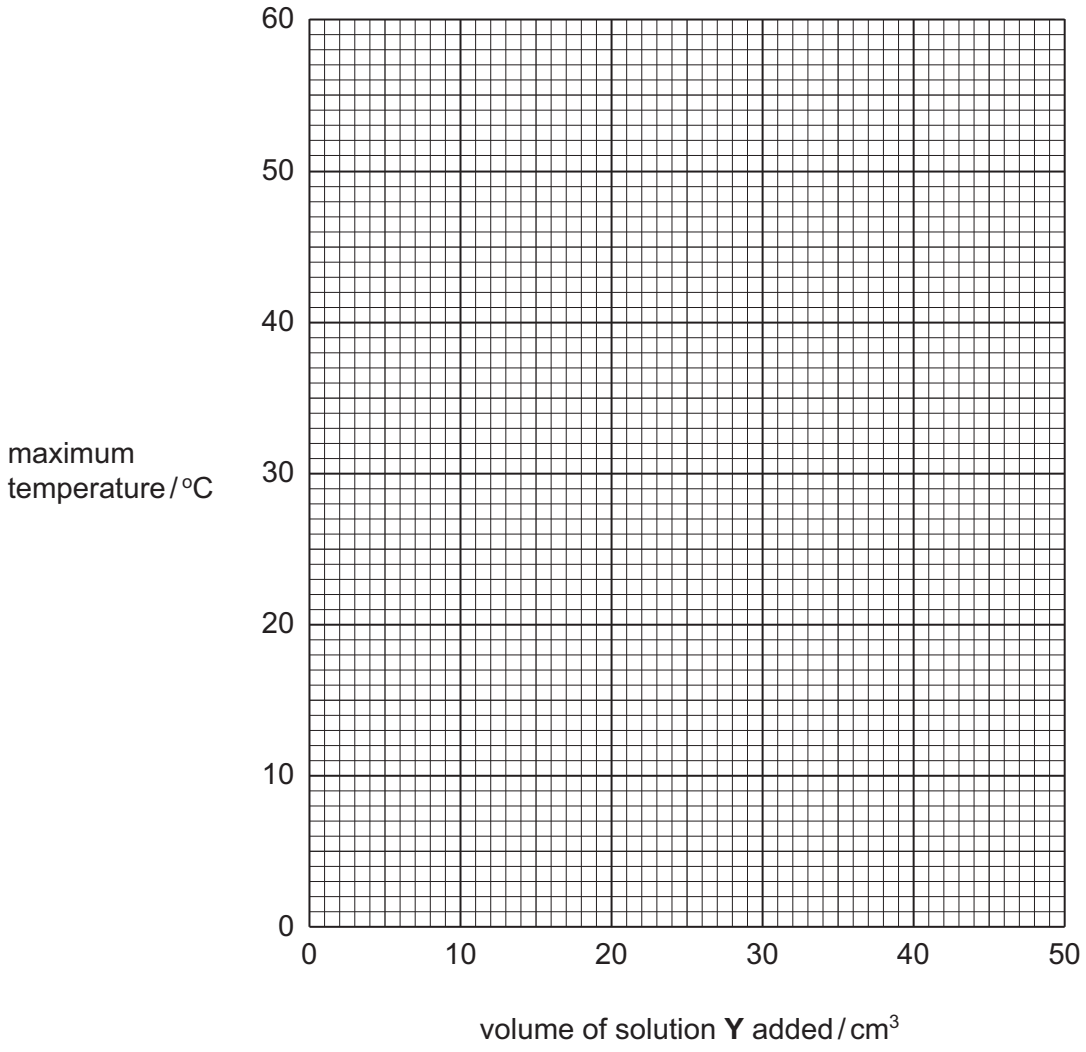
(b) What was the temperature in the laboratory?

..... [1]

(c) Why were the reactions carried out in a polystyrene cup rather than a glass container?

..... [1]

(d) Plot the results on the grid. Draw two **straight** lines through the points, one for the increasing temperatures and one for the decreasing temperatures.



[3]

(e) (i) Read from your graph the maximum temperature that could be reached in the reaction.

..... [1]

(ii) Indicate on the graph where the two solutions completely react with each other. [1]

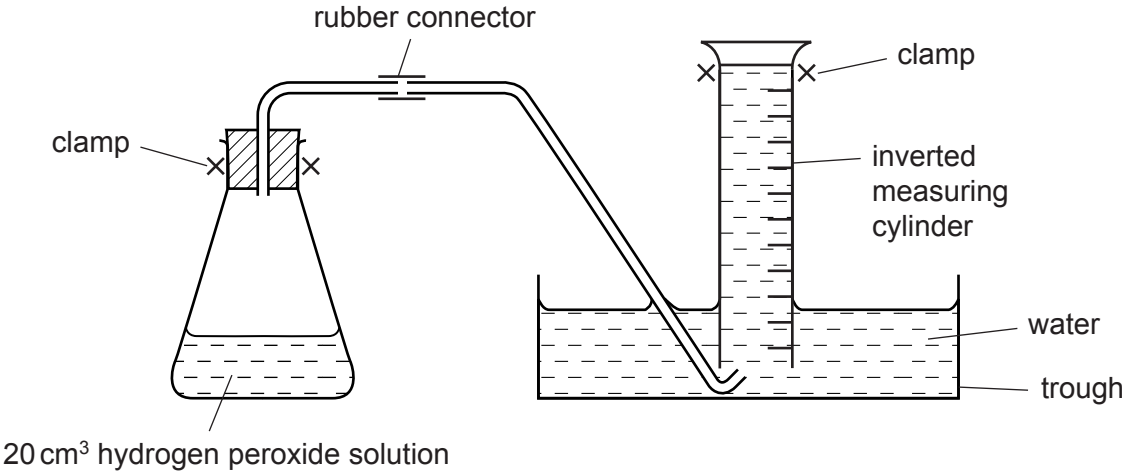
(iii) What volume of solution **Y** exactly reacts with the 25 cm^3 of solution **X**?

..... [1]

(f) Circle which word correctly describes this chemical reaction.

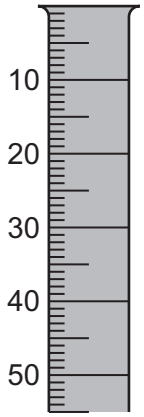
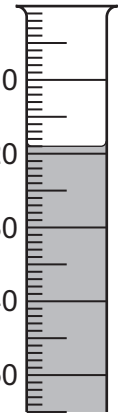
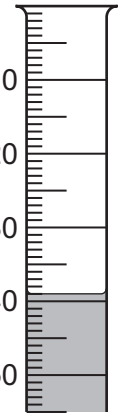
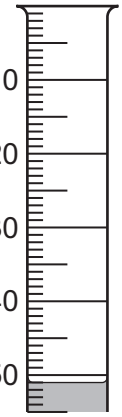
endothermic **reversible** **exothermic** [1]

4 A student investigates the speed of reaction when aqueous hydrogen peroxide breaks down using a catalyst, manganese(IV) oxide. The catalyst remains unchanged at the end of the reaction.
The apparatus was set up as shown in the diagram.



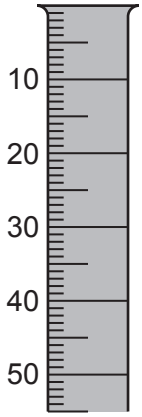
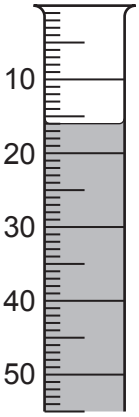
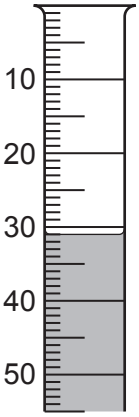
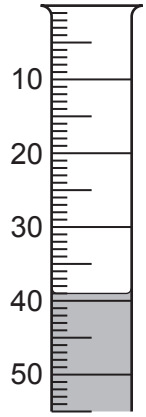
Experiment 1

By using a measuring cylinder, 20 cm^3 of hydrogen peroxide solution was poured into a conical flask. One spatula measure of manganese(IV) oxide was added to the flask, the bung was quickly put in the flask and the timer started.
The volume of gas collected in the measuring cylinder at 10 seconds, 20 seconds and 30 seconds was measured.
The results are shown in the table below.

time / s	0	10	20	30
measuring cylinder diagram				
volume of gas in measuring cylinder / cm^3	0	19	39	51

Experiment 2

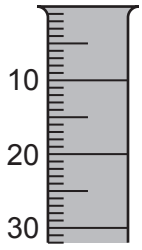
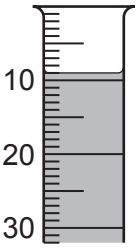
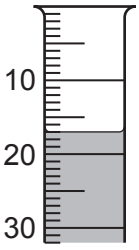
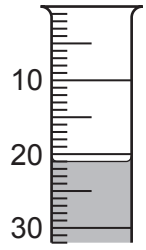
By using a measuring cylinder 15 cm^3 of hydrogen peroxide was poured into the conical flask. The instructions were repeated exactly as given for Experiment 1, but 5 cm^3 of distilled water was also added to the flask.
Use the diagrams to record your results in the table below.

time / s	0	10	20	30
measuring cylinder diagram				
volume of gas in measuring cylinder / cm^3				

[2]

Experiment 3

Experiment 1 was repeated using 10 cm^3 of hydrogen peroxide and 10 cm^3 of distilled water. Record your results in the table.

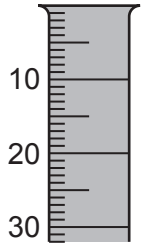
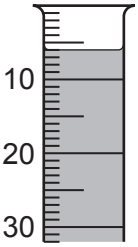
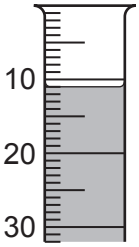
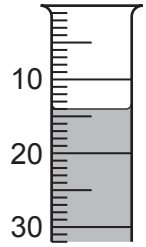
time / s	0	10	20	30
measuring cylinder diagram				
volume of gas in measuring cylinder / cm^3				

[2]

Experiment 4

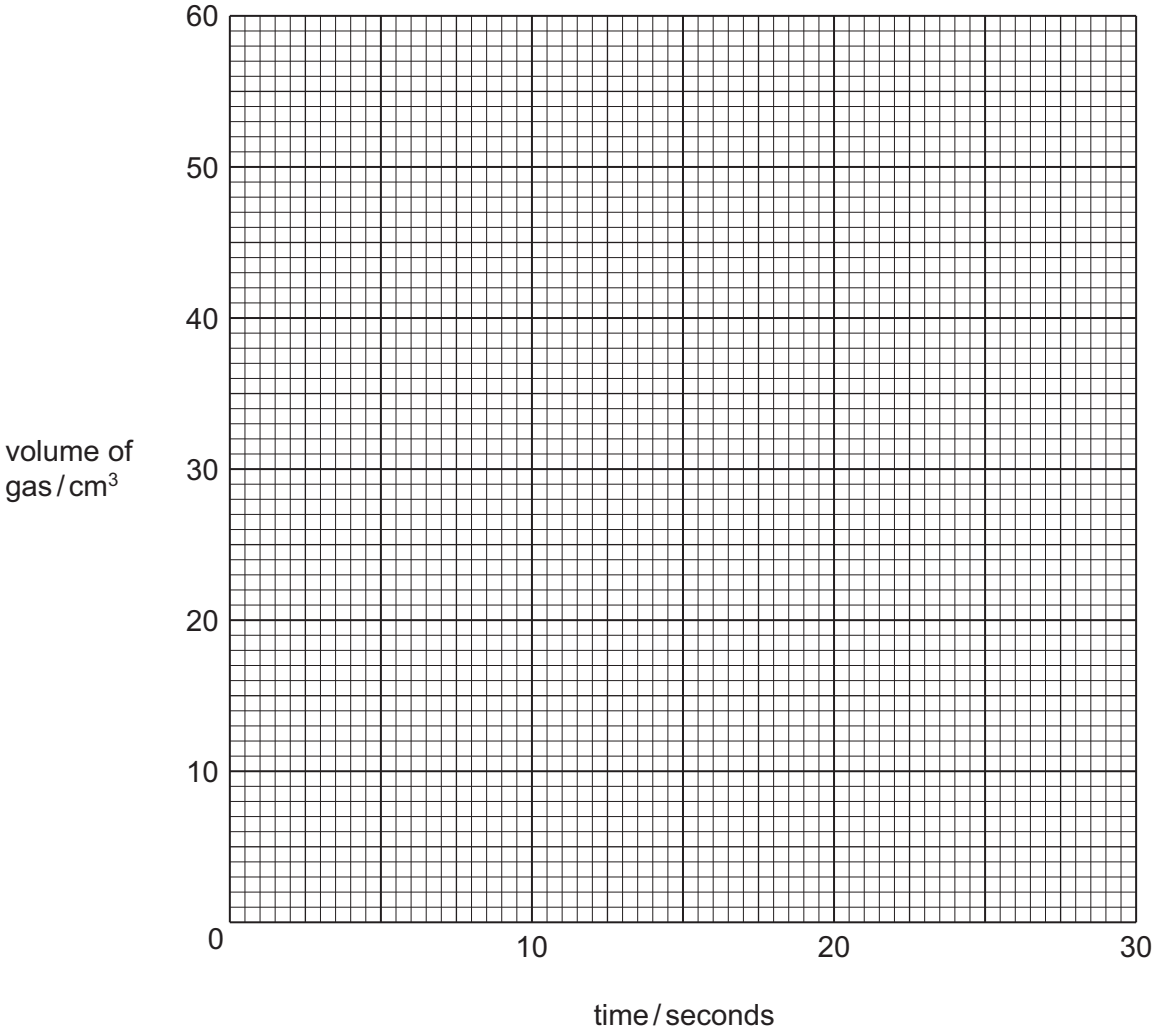
Experiment 1 was repeated using 5 cm^3 of hydrogen peroxide and 15 cm^3 of distilled water.

Record your results in the table.

time / s	0	10	20	30
measuring cylinder diagram				
volume of gas in measuring cylinder / cm^3				

[2]

(a) Plot your results on the grid for each Experiment. Draw 4 graphs and label each clearly with the number of the Experiment.



[5]

(b) (i) Which Experiment has the fastest rate of reaction?

.....

[1]

(ii) Explain, in terms of particles, why this Experiment has the fastest rate.

.....

.....

.....

[2]

(c) (i) State two sources of error in the Experiments.

1 .....

.....

2 .....

..... [2]

(ii) Suggest two improvements to reduce the sources of error in the Experiments.

1 .....

.....

2 .....

..... [2]

(d) State a practical method you could use to prove that manganese(IV) oxide was a catalyst in Experiment 1.

.....

.....

..... [2]

5 A mixture of two compounds, **B** and **C**, was tested.
Compound **B** was a water-soluble zinc salt and compound **C** was insoluble.
The tests and some of the observations are in the following table.
Complete the observations in the table.

tests	observations
(a) One measure of the mixture was heated gently then strongly.	condensation at the top of the tube
The gas released was tested with cobalt chloride paper.	paper turned pink
The rest of the mixture was added to about 25 cm^3 of distilled water in a boiling tube. The contents of the tube were shaken and filtered. The following tests were carried out.	
Tests on the filtrate The solution was divided into 2 cm^3 portions in four test-tubes.	
(b) (i) Drops of aqueous sodium hydroxide were added to the first portion of the solution. Excess aqueous sodium hydroxide was added.	....[3]
(ii) Using the second portion test **(b)(i)** was repeated using aqueous ammonia instead of aqueous sodium hydroxide.	....[3]
(iii) To the third portion of solution was added hydrochloric acid and barium nitrate solution.	white precipitate

tests	observations
(iv) To the fourth portion of solution was added nitric acid and silver nitrate solution.	no visible reaction
Tests on the residue	
(c) Some of the residue was placed into a test-tube. Dilute hydrochloric acid was added and the gas given off was tested with limewater.	rapid effervescence limewater turned milky

(d) What does test **(a)** indicate?

.....

[1]

(e) What conclusions can you draw about compound **B**?

.....

.....

[2]

(f) What does test **(c)** indicate?

.....

.....

[2]

6 The diagram shows two bottles of liquid oven cleaner.

The oven cleaners contain sodium hydroxide solution. Plan an investigation to show which oven cleaner contains the highest concentration of sodium hydroxide.

.....

.....

.....

.....

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.....

.....

..... [6]

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