UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER			

CHEMISTRY **0620/06**

Paper 6 Alternative to Practical **October/November 2009**

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 **12** printed pages.

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

1   The apparatus below was used to make oxygen. The tube of manganese oxide was ~~a~~ to the hydrogen peroxide solution by releasing the cotton.

cotton

20   40   60   80   100 cm³

hydrogen peroxide

tube containing manganese oxide
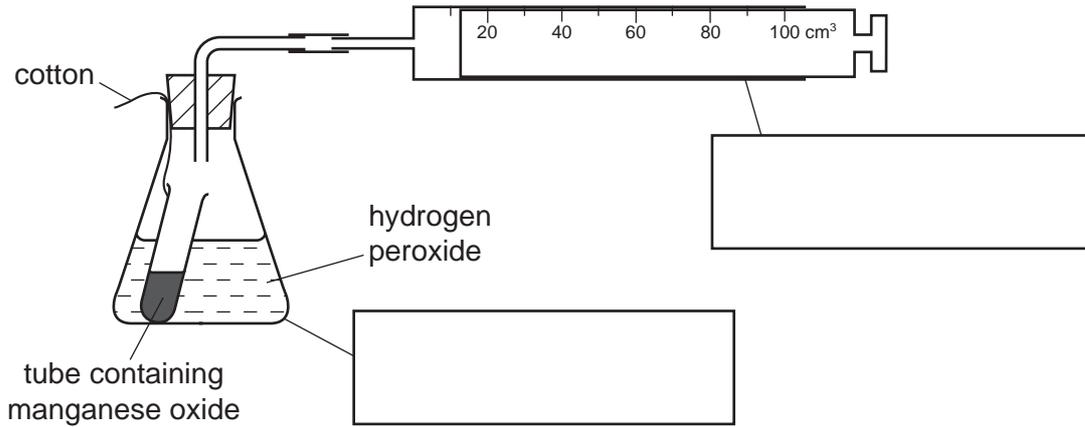
(a) Complete the boxes to identify the pieces of apparatus.   [2]

(b) Why was the tube of manganese oxide suspended in the flask?

.... [1]

(c) Give a test for oxygen.

test   ....

result .... [2]

[Total: 5]

2   A steel spoon can be coated in silver using electrolysis. The spoon must be very cle~~an~~ and free of grease.

spoon

metal electrode

electrolyte
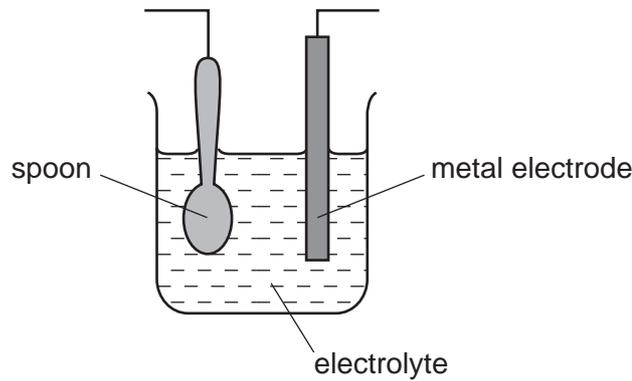
   (a) Suggest

      (i) **one** advantage of putting a thin layer of silver on the spoon,

      .... [1]

      (ii) **one** disadvantage if the spoon is used frequently,

      .... [1]

      (iii) why the spoon must be very clean and free of grease?

      .... [1]

   (b) Which electrode should be the spoon?

      .... [1]

   (c) Identify the metal from which the other electrode is made.

      .... [1]

                                                                                    [Total: 5]

4 A student investigated the temperature change produced when equal leng[th]
   magnesium ribbon reacted with excess dilute sulfuric acid of different concentra[tions]
   (labelled solutions **A**, **B**, **C**, **D** and **E**).

   Five experiments were carried out.

   Experiment 1

   Using a measuring cylinder, 20 cm^3 of sulfuric acid solution **A** was poured into a beaker.
   The initial temperature of the solution was measured. A length of magnesium ribbon was
   added to the solution and stirred. The highest temperature reached was measured.

   Experiment 2

   Experiment 1 was repeated using solution **B** instead of solution **A**. The initial and highest
   temperatures were measured as before.

   Experiment 3

   Experiment 1 was repeated using solution **C**. The initial and highest temperatures were
   measured.

   Experiment 4

   Experiment 1 was repeated using solution **D**. The initial and highest temperatures were
   measured.

   Experiment 5

   Experiment 1 was repeated using solution **E**. The initial and highest temperatures were
   measured.

   Use the thermometer diagrams in the table on page 6, to record the initial and highest
   temperatures in each experiment.

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iner's

solution of sulfuric acid	thermometer diagram	initial temperature /°C	thermometer diagram	highest temperature /°C	change in temperature /°C
A					
B					
C					
D					
E					

[4]

(a) Work out the temperature change for each experiment and record the values in the table. [1]

(b) Draw a labelled bar chart of the results for Experiments 1, 2, 3, 4 and 5 on the gr[...] below.

change in
temperature
/°C
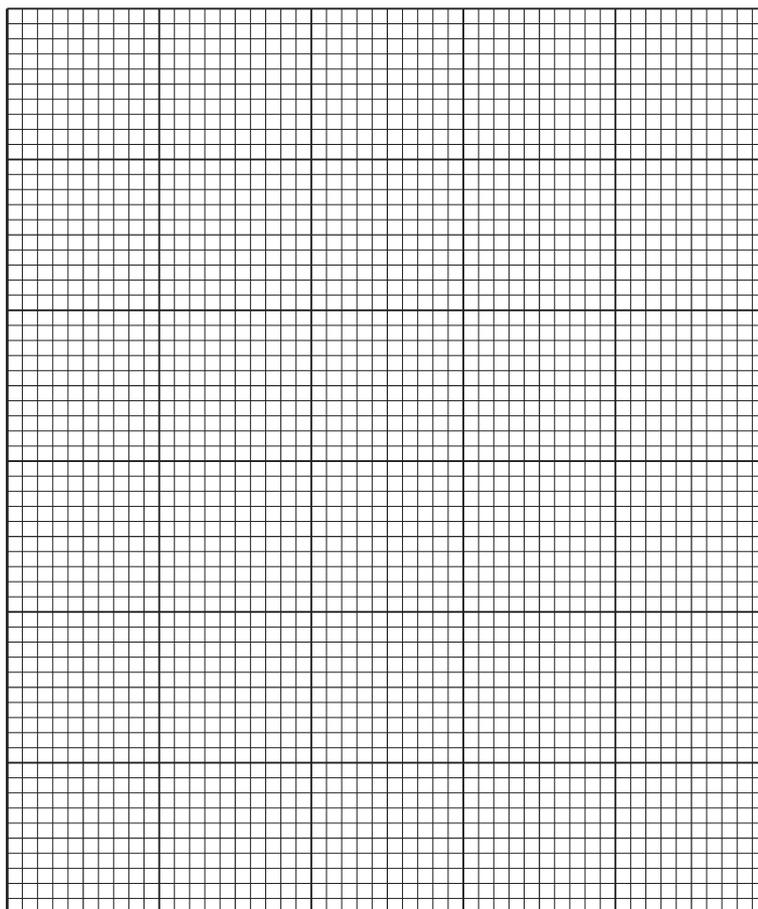
Use the results and observations to answer the following questions.

(c) What type of chemical reaction occurs when magnesium reacts with dilute sulfuric acid?

.... [1]

(d) (i) Which Experiment produced the largest temperature change?

.... [1]

(ii) Suggest why this Experiment produced the largest temperature change.

....

.... [1]

(e) Predict the effect on the temperature changes that would happen if

   (i) equal masses of magnesium powder were used in the Experiments.

   .... [1]

  (ii) 40 cm^3 of dilute sulfuric acid was used in Experiment 1.

   .... [1]

 (iii) Explain your answer to **(e)(ii)**.

   ....

   .... [1]

(f) Give **one** possible source of experimental error in this investigation.

   ....

   .... [1]

[Total: 16]

5   Three aqueous solutions **K**, **L** and **M**, were analysed. **L** was a solution of sodium hyd...
    The tests on the solutions and some of the observations are in the table.
    Complete the observations in the table. Do not write any conclusions in the table.

tests	observations
(a) Appearance of the solutions. solution **K** solution **L** solution **M**	 colourless liquid colourless liquid colourless liquid
(b) Universal Indicator paper was used to test the pH of each solution. solution **K** solution **L** solution **M**	 pH 10 pH .... [1] pH 2
(c) <u>tests on solution **K**</u> **(i)** Drops of solution **K** were added to copper sulfate solution in a test-tube. Excess of solution **K** was then added to the test-tube. **(ii)** Experiment **(c)(i)** was repeated using aqueous aluminium sulfate instead of aqueous copper sulfate. **(iii)** A few drops of nitric acid and silver nitrate solution were added to solution **K**.	 pale blue precipitate formed deep blue solution formed white precipitate formed insoluble in excess no visible reaction
(d) <u>tests on solution **L**</u> **(i)** Experiment **(c)(i)** was repeated using solution **L**. **(ii)** Experiment **(c)(ii)** was repeated using solution **L**.	 .... [1] .... [3]
(e) <u>test on solution **M**</u> Experiment **(c)(iii)** was repeated using solution **M**.	 white precipitate formed

(f) What conclusions can you make about solution **K**?

....

.... [2]

(g) What conclusions can you make about solution **M**?

....

.... [2]

[Total: 9]

6 Dilute hydrochloric acid was added to excess calcium carbonate in a beaker as shown.
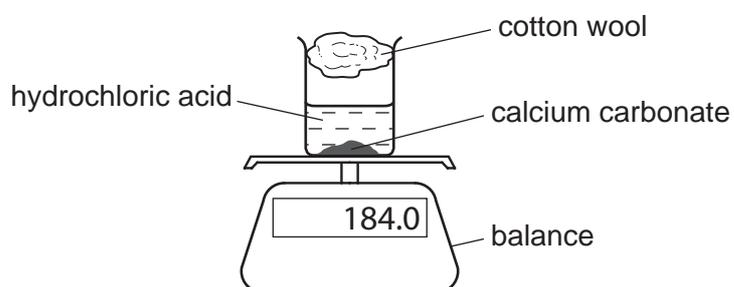
The beaker was placed on a balance and the mass of the beaker and contents recorded every minute.
The results are shown in the table.

mass of beaker and contents / g	184.0	178.0	175.6	174.6	174.0	174.0
time / min	0	1	2	3	4	5

(a) Plot the results on the grid and draw a smooth line graph.
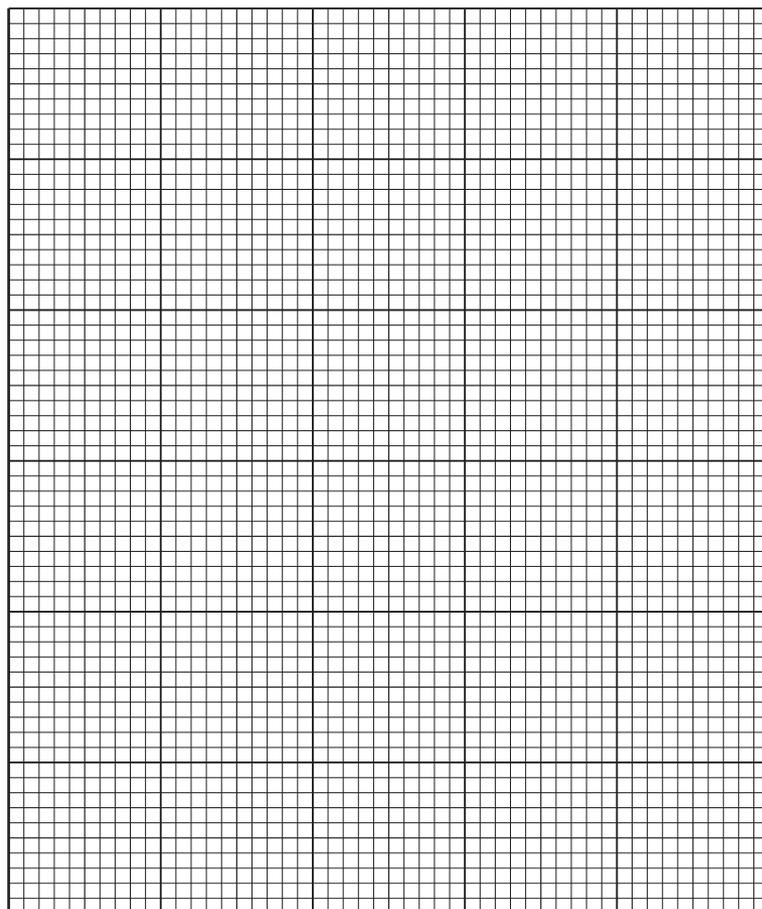
[5]

(b) Use your graph to determine the mass of the beaker and contents after 30 seconds.
Show clearly on your graph how you worked out your answer.

.... [2]

(c) Why does the mass of the beaker and contents decrease?

.... [1]

(d) Suggest the purpose of the cotton wool.

.... [1]

(e) After how long did the reaction finish?

.... [1]

(f) A second experiment was carried out using hydrochloric acid at a lower temperature.
On the grid sketch a curve to show the expected results for this experiment.
Label this curve **C**.   [2]

[Total: 12]
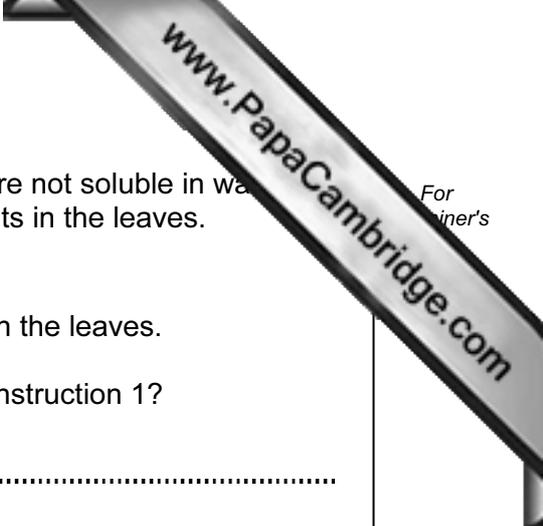
7 Leaves from trees contain a mixture of coloured pigments which are not soluble in wa~~ter~~. A student was given these two instructions to investigate the pigments in the leaves.

1. Crush some leaves to extract the coloured pigments.
2. Use the liquid extract to find the number of coloured pigments in the leaves.

(a) What would the student need in order to effectively carry out instruction 1?

....

....

....

.... [3]

(b) Describe an experiment to carry out instruction 2.
A space has been left below if you want to draw a diagram to help answer the question.

....

....

....

....

.... [4]

[Total: 7]