



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE
NAME

CENTRE
NUMBER

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CANDIDATE
NUMBER

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CHEMISTRY

0620/06

Paper 6 Alternative to Practical

May/June 2007

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.

DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

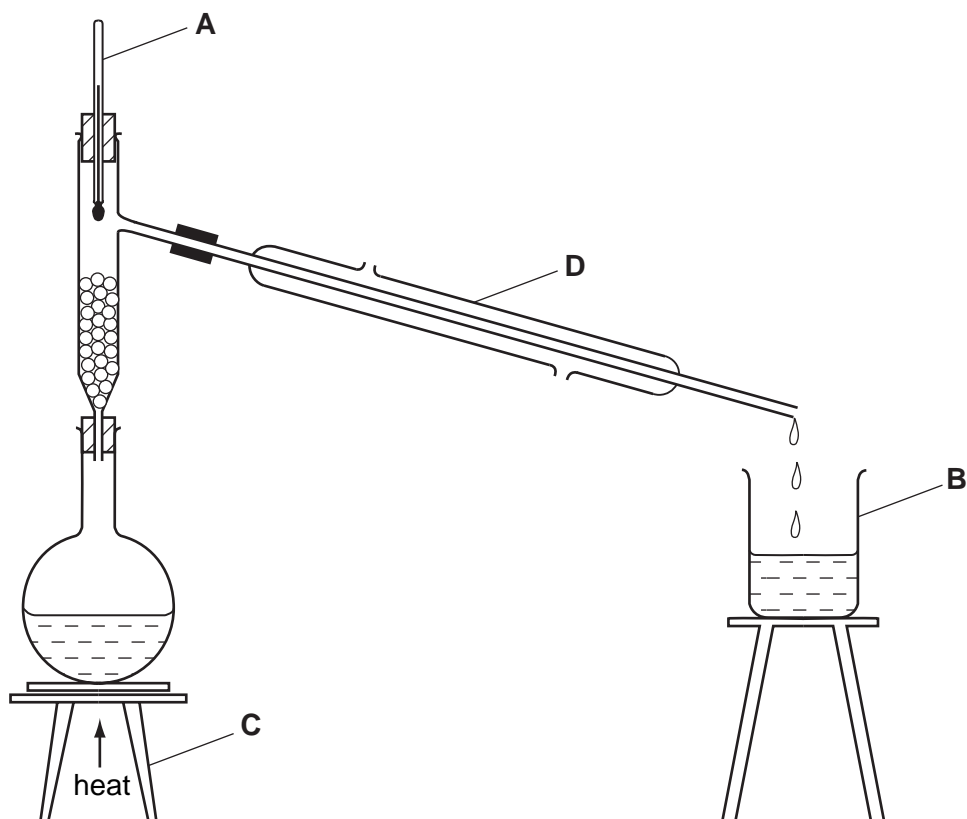
The number of marks is given in brackets [] at the end of each question or part question.

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

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



- 1 A mixture of ethanol and water can be separated by fractional distillation. The apparatus below can be used to carry out such a separation in the laboratory.



- (a) Name each piece of apparatus.

A

B

C [3]

- (b) What is the purpose of **D**?

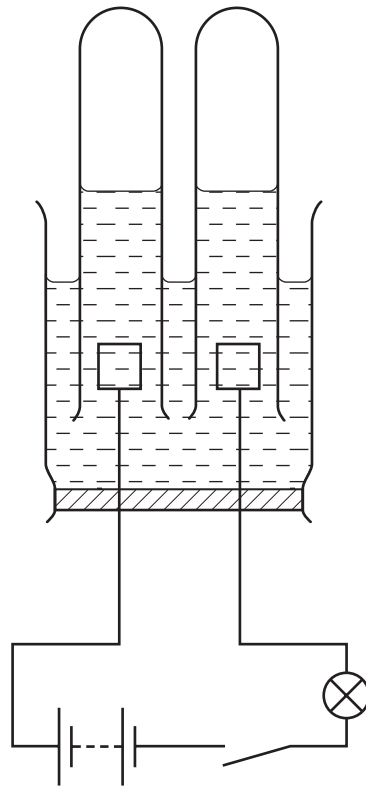
..... [1]

- (c) How could the purity of the ethanol collected be checked?

..... [1]

[Total: 5]

2 Concentrated hydrochloric acid can be electrolysed using the apparatus shown.



(a) Label the position of the electrodes on the diagram. [1]

(b) Give two observations when the circuit is switched on.

1

2 [2]

(c) (i) Name the product at the positive electrode.

..... [1]

(ii) State a test for this product and the result of the test.

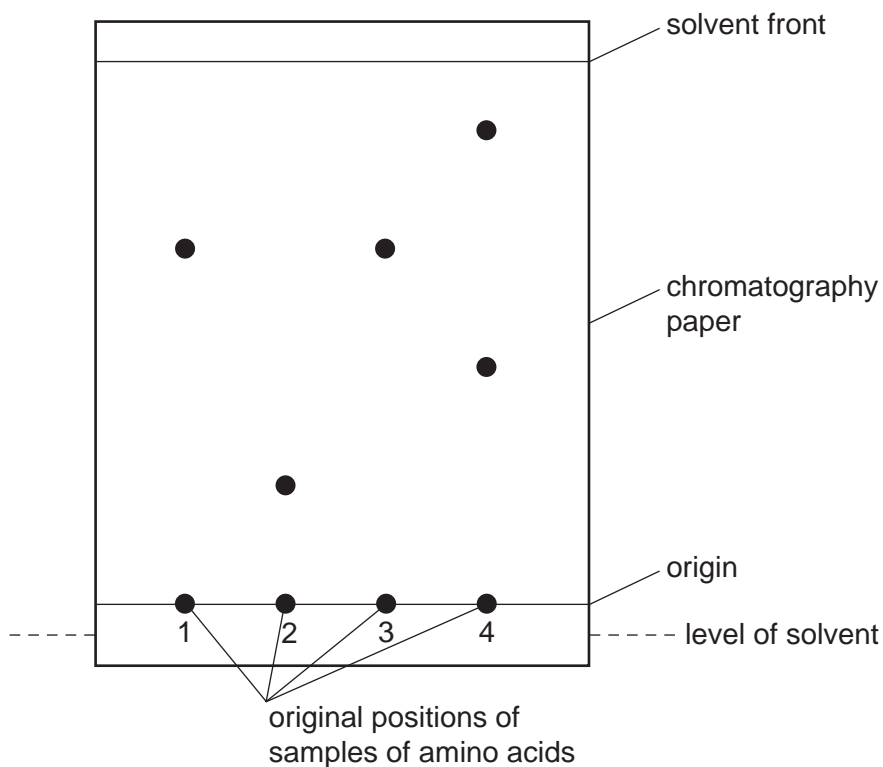
test

result [2]

[Total: 6]

- 3 Chromatography can be used to identify amino acids from a sample of protein.

The diagram shows the chromatogram obtained when four samples of amino acids were analysed. The paper was sprayed with ninhydrin.



- (a) Why is the origin line drawn in pencil?

..... [1]

- (b) Which amino acids could possibly be the same?

..... [1]

- (c) Which amino acid sample contains more than one amino acid? Explain your answer.

sample

explanation

..... [2]

- (d) Suggest why it is necessary to spray the chromatogram with ninhydrin.

..... [1]

[Total: 5]

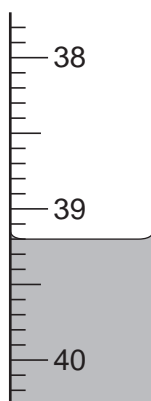
- 4 A student investigated the reaction between sodium thiosulphate and potassium iodate.

Two experiments were carried out.

Experiment 1

A burette was filled up to the 0.0 cm³ mark with sodium thiosulphate solution. By using a measuring cylinder, 20 cm³ of solution **A** of potassium iodate was placed into a conical flask. Dilute sulphuric acid and potassium iodide were also added to the flask. The flask was shaken to mix the contents and produce a red solution of iodine.

The sodium thiosulphate solution was added to the flask. When the contents of the flask were yellow, 1 cm³ of starch solution was added to the flask. Addition of sodium thiosulphate to the flask was continued until the solution turned colourless. Use the burette diagram to record the final volume in the table and complete the column in the table of results on page 6.

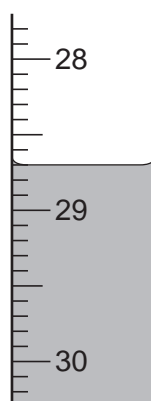


Experiment 2

Experiment 1 was repeated using a different solution of potassium iodate, solution **B**. Use the burette diagrams to record the volumes and complete the table on page 6.



initial



final

Table of results

Burette readings / cm ³		
	Experiment 1	Experiment 2
final reading		
initial reading	0.0	8.1
difference		

[4]

(a) Suggest why the starch was used.

..... [1]

(b) (i) In which experiment was the greatest volume of sodium thiosulphate solution used?

..... [1]

(ii) Compare the volumes of sodium thiosulphate solution used in Experiments 1 and 2.

..... [1]

(iii) Suggest an explanation for the difference in the volumes.

.....
 [2]

(c) Predict the volume of sodium thiosulphate solution which would be needed to react completely with 10 cm³ of solution **B**.

.....
 [2]

(d) Explain one change that could be made to the experimental **method** to obtain more accurate results, without changing the apparatus.

change

explanation [2]

[Total: 13]

- 5 A sample of solid **C** was analysed. **C** is a mixture of two salts, **D** and **E**. Solid **D** is insoluble in dilute nitric acid, is a lead salt, is a lead carbonate and solid **E** is water-soluble. The tests on **C**, and some of the observations are in the following table. Complete the observations in the table.

tests	observations
(a) Describe the appearance of C .	pale green solid
(b) Using a spatula, place a little of C in a hard glass test-tube. Inside the top of the tube suspend a piece of damp indicator paper. Heat C gently until gas comes out of the tube.	paper turns blue pH 8 to 11
(c) Using a spatula, place a little of C in a test-tube. Add about 2 cm ³ of dilute nitric acid and test the gas. [3]

Solid **C** was added to a boiling tube containing distilled water. The tube was shaken to mix the contents. The contents of the boiling tube were filtered.

tests on the residue in the filter paper	observations
(d) Place the funnel in a test-tube. Pour dilute nitric acid onto the residue contained in the funnel. Add 2 cm ³ of potassium iodide to the solution collected in the tube. [2]

tests on the filtrate	observations
<p>(e) Divide the filtrate into three test-tubes.</p> <p>(i) To the first portion add dilute hydrochloric acid and about 1 cm³ of aqueous barium nitrate.</p> <p>(ii) To the second portion of solution add excess aqueous ammonia.</p> <p>(iii) To the third portion of solution, add an equal volume of aqueous sodium hydroxide.</p> <p>Warm the mixture gently. Test the gas with indicator paper.</p>	<p>white precipitate</p> <p>green precipitate</p> <p>green precipitate</p> <p>paper turned blue</p> <p>pH 8 to 11</p>

(f) Name the gas given off in **(c)**.

..... [1]

(g) Name the gas given off in **(e)(iii)**.

..... [1]

(h) What conclusions can you draw about salt **E**?

.....

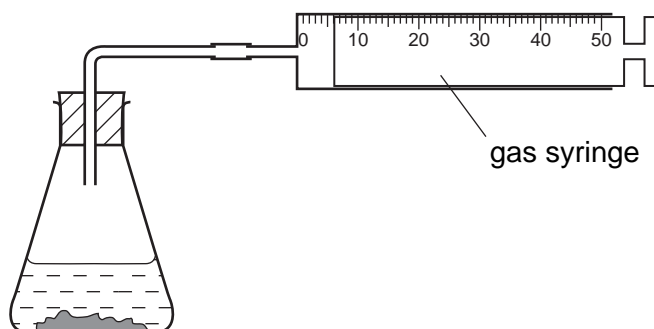
.....

..... [4]

[Total: 11]

6 Hydrogen peroxide breaks down to form oxygen.

The volume of oxygen given off can be measured using the apparatus below.



Solids **W** and **X** both catalyse the breakdown of hydrogen peroxide. The syringe diagrams show the volume of oxygen formed every 20 seconds using these catalysts at 25 °C.

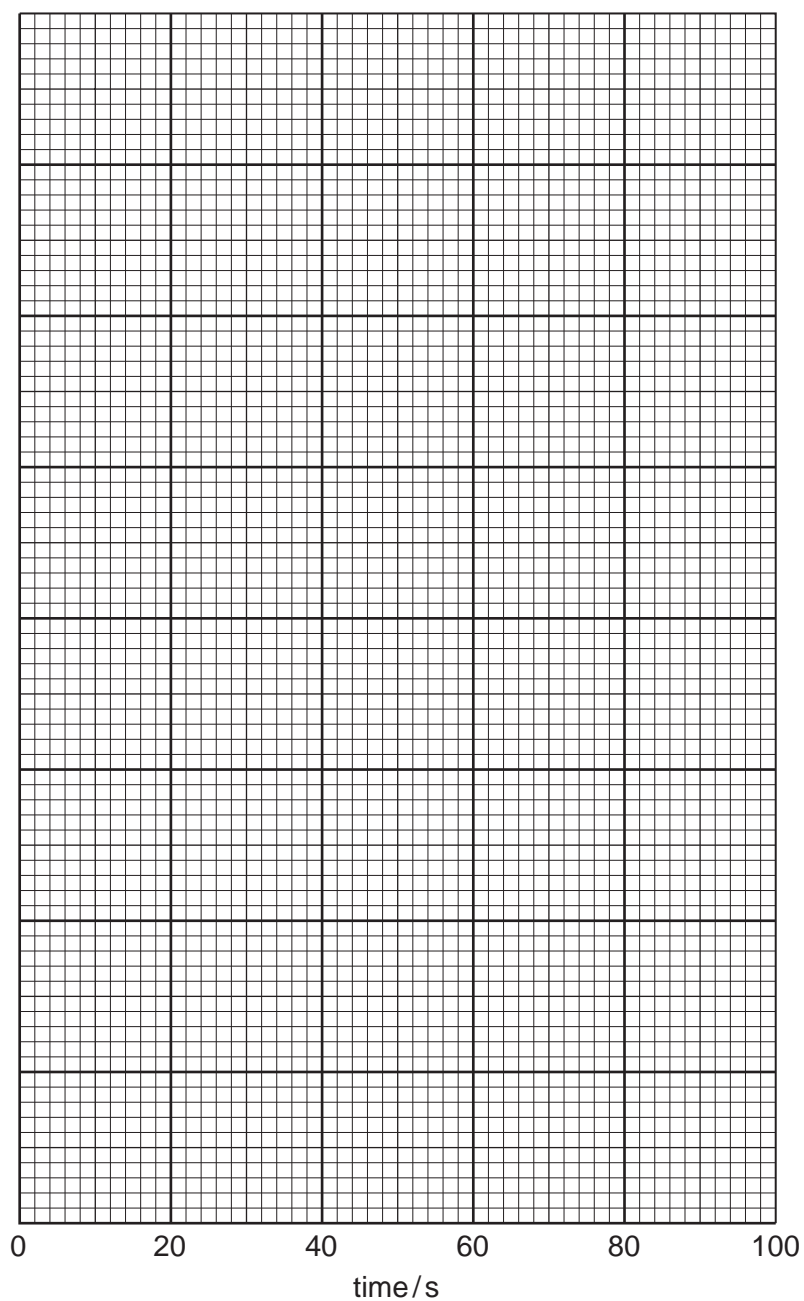
time/s	using catalyst W	using catalyst X
0		
20		
40		
60		
80		
100		

(a) Use the gas syringe diagrams to complete the table.

time / s	volume of oxygen / cm ³	
	catalyst W	catalyst X
0		
20		
40		
60		
80		
100		

[3]

(b) Plot a graph to show each set of results. Clearly label the curves.



[6]

(c) Which solid is the better catalyst in this reaction? Give a reason for your choice.

solid

reason

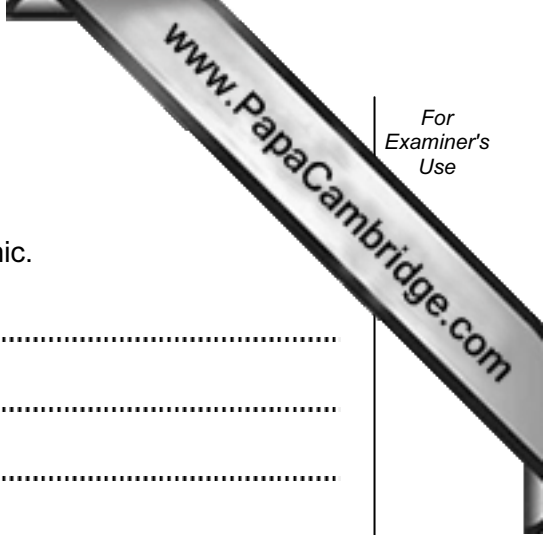
..... [2]

(d) Why is the final volume of oxygen the same in each experiment?

.....

(e) Sketch a line on the grid to show the shape of the graph you would expect if the reaction with catalyst **X** was repeated at 40 °C. [2]

[Total: 14]



7 When cement powder is added to water a reaction takes place.

(a) Describe an experiment to show that this reaction is exothermic.

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

(b) How could you show that the solution contains calcium ions?

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

[Total: 6]

