UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

9723414007

CHEMISTRY **0620/06**

Paper 6 Alternative to Practical **October/November 2008**

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.

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1	
2	
3	
4	
5	
6	
7	
Total	

This document consists of **11** printed pages and **1** blank page.

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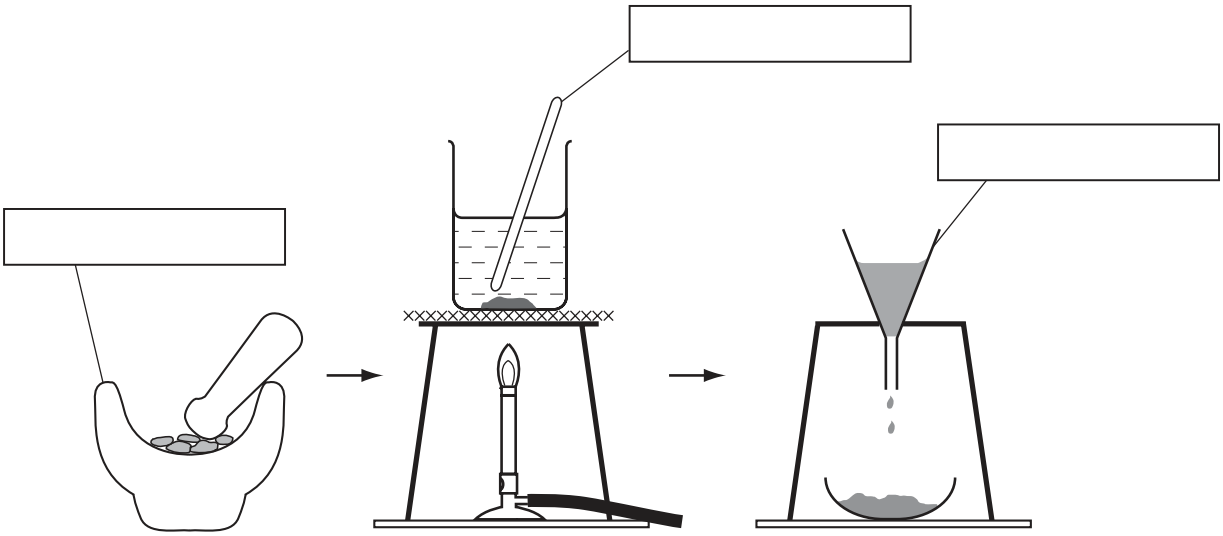
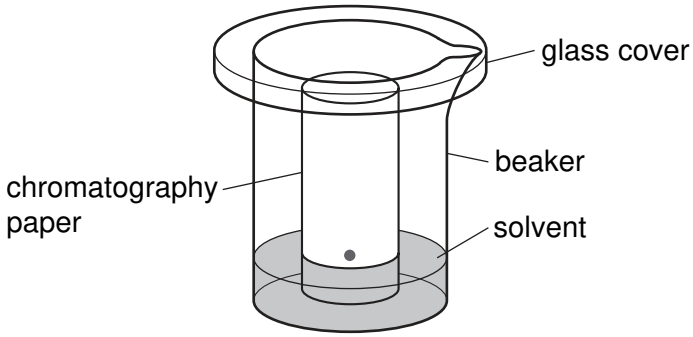
1 The colours present in some blackcurrant sweets can be separated by chromatography. The colours are water-soluble dyes.
The diagrams show how the colours can be extracted from the sweets.



(a) Complete the empty boxes to name the pieces of apparatus. [3]

The apparatus below was used to carry out the chromatography.



(b) (i) Name the solvent used.

..... [1]

(ii) Label, with an arrow, the origin on the diagram. [1]

(c) Sketch, in the box, the chromatogram you would expect if two different colours were present in the sweets.

[1]
[Total: 6]

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2 Electricity was passed through a concentrated solution of sodium chloride containing Universal Indicator.

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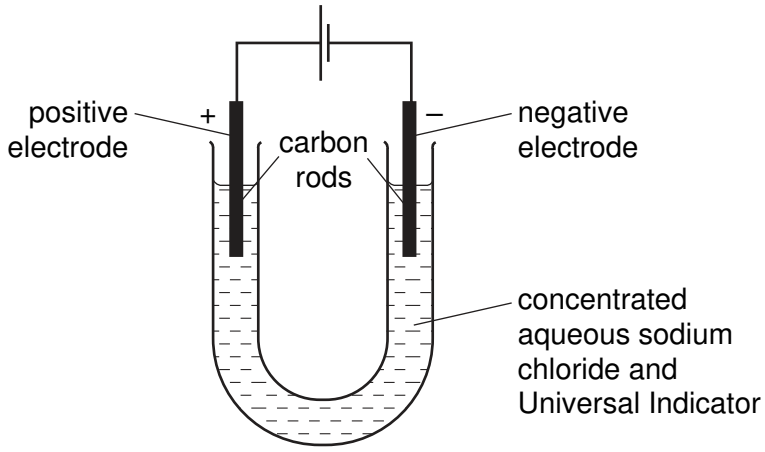

(a) Suggest a suitable material for the electrodes.

.....[1]

Three observations were noted:

1 Bubbles of gas seen immediately at the negative electrode.
2 Bubbles of gas formed after some time at the positive electrode.
3 The solution turned blue around the negative electrode and colourless near the positive electrode.

(b) Give a test to show that the gas observed in 1 is hydrogen.

test .....

result ..... [2]

(c) Suggest why bubbles of gas were not seen immediately in 2.

.....

.....[1]

(d) What causes the colour change in 3 at

the negative electrode, ...

the positive electrode? ..... [2]

[Total: 6]

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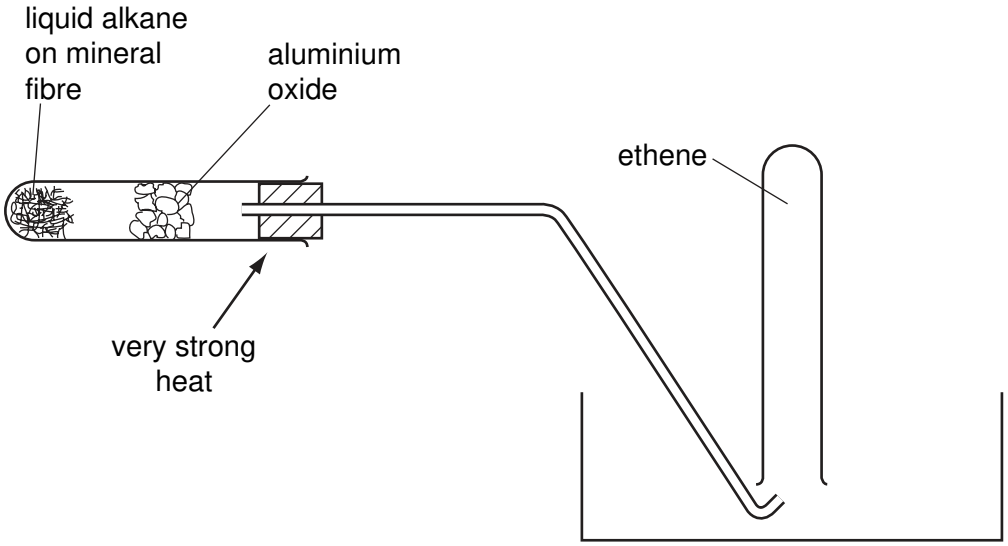
3 Ethene gas was formed by the cracking of a liquid alkane. The diagram shows the apparatus used.



(a) Identify two mistakes in the diagram.

1 .....

..... [1]

2 .....

..... [1]

(b) Describe a test to show the presence of ethene.

test .....

result ..... [2]

[Total: 4]

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4 A student investigated the addition of four different solids, **A**, **B**, **C** and **D**, to water.

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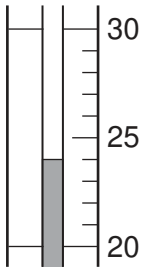
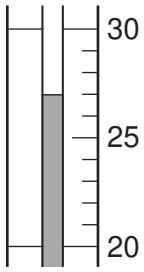
Five experiments were carried out.

Experiment 1

By using a measuring cylinder, 30 cm^3 of distilled water was poured into a polystyrene cup and the initial temperature of the water was measured. 4 g of solid **A** was added to the cup and the mixture stirred with a thermometer. The temperature of the solution was measured after 2 minutes.



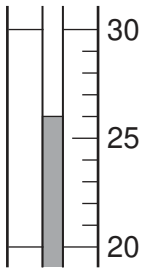
initial temperature



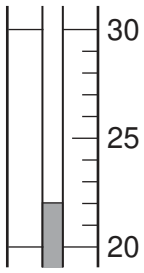
final temperature

Experiment 2

Experiment 1 was repeated using 4 g of solid **B**.



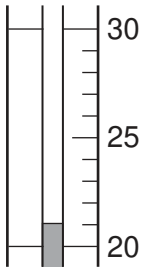
initial temperature



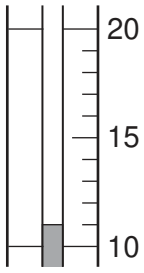
final temperature

Experiment 3

Experiment 1 was repeated using 4 g of solid **C**.



initial temperature



final temperature

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Experiment 4

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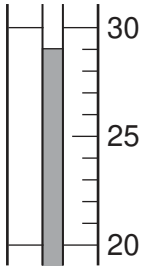
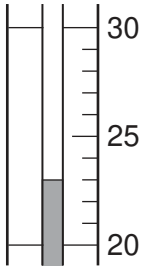
Experiment 1 was repeated using 4 g of solid **D**.



initial temperature



final temperature

Experiment 5

A little of the solution from Experiment 4 was added to a little of the solution from Experiment 2 in a test-tube. The observations were recorded.

observations *A fast reaction. Vigorous effervescence and bubbles produced.*

(a) Use the thermometer diagrams for Experiments 1-4 to record the initial and final temperatures in Table 4.1.
Calculate and record the temperature difference in Table 4.1.

Table 4.1

experiment	initial temperature / °C	final temperature / °C	difference / °C
1			
2			
3			
4			

[4]

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(b) Draw a labelled bar chart of the results to Experiments 1, 2, 3 and 4 on the grid below.

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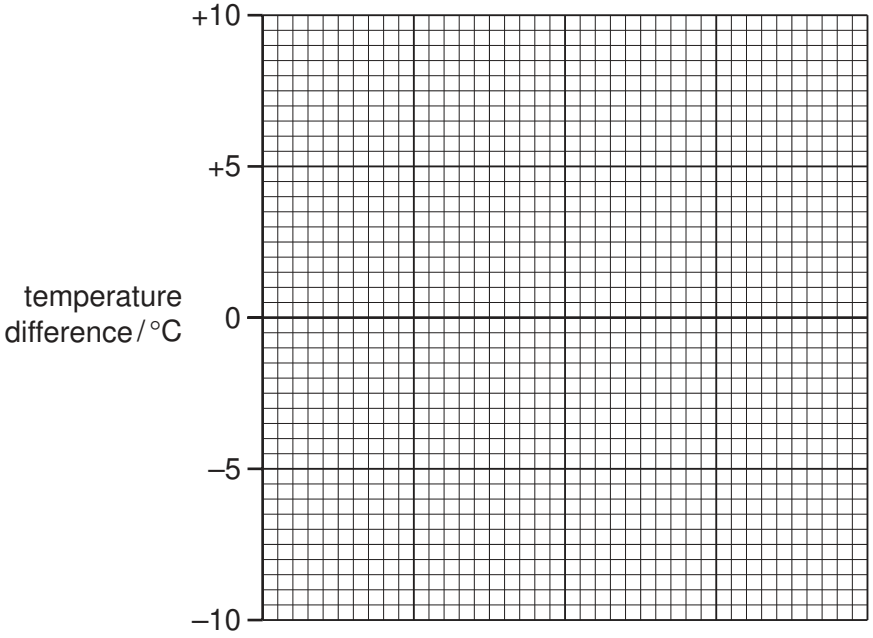

[4]

Use the results and observations from Experiments 1-5 to answer the following questions.

(c) **(i)** Which solid dissolves in water to produce an exothermic reaction?

..... [1]

(ii) Give a reason why you chose this solid.

..... [1]

(d) Which Experiment produced the largest temperature change?

..... [1]

(e) Predict the temperature change that would happen if

(i) 8 g of solid **B** were used in Experiment 2,

..... [1]

(ii) 60 cm^3 of water was used in Experiment 4.

..... [1]

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

.....

..... [2]

(f) Suggest an explanation for the observations in Experiment 5.

.....

..... [2]

[Total: 17]

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5 Two salt solutions **K** and **L** were analysed. Each contained the same chloride anion but different metal cations. **K** was a copper(II) salt.
The tests on the solutions and some of the observations are in the following table. Complete the observations in the table.

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tests	observations
(a) Appearance of the solutions. solution **K**	.....[1]
solution **L**	yellow
(b) The pH of each solution was tested. solution **K**	pH 3
solution **L**	pH 2
<u>tests on solution **K**</u> **(c)** **(i)** Drops of aqueous sodium hydroxide were added to solution **K**. Excess aqueous sodium hydroxide was then added to the test-tube.	....[2]
(ii) Experiment **(c)(i)** was repeated using aqueous ammonia instead of aqueous sodium hydroxide.	drops .....[1] excess ....[2]
(iii) A few drops of hydrochloric acid and about 1 cm^3 of barium chloride solution were added to a little of solution **K.**	.....[1]

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tests	observations
(iv) A few drops of nitric acid and about 1 cm^3 of silver nitrate solution were added to a little of solution **K**.	.....[1]
<u>tests on solution **L**</u> **(d) (i)** Experiment **(c)(i)** was repeated using solution **L**.	red - brown precipitate
(ii) Experiment **(c)(ii)** was repeated using solution **L**.	red – brown precipitate
(iii) Experiment **(c)(iii)** was repeated using solution **L**.	.....[1]
(iv) Experiment **(c)(iv)** was repeated using solution **L**.	.....[1]

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(e) What does test **(b)** indicate?

..... [1]

(f) Identify the metal cation present in solution **L**.

..... [2]

[Total: 13]

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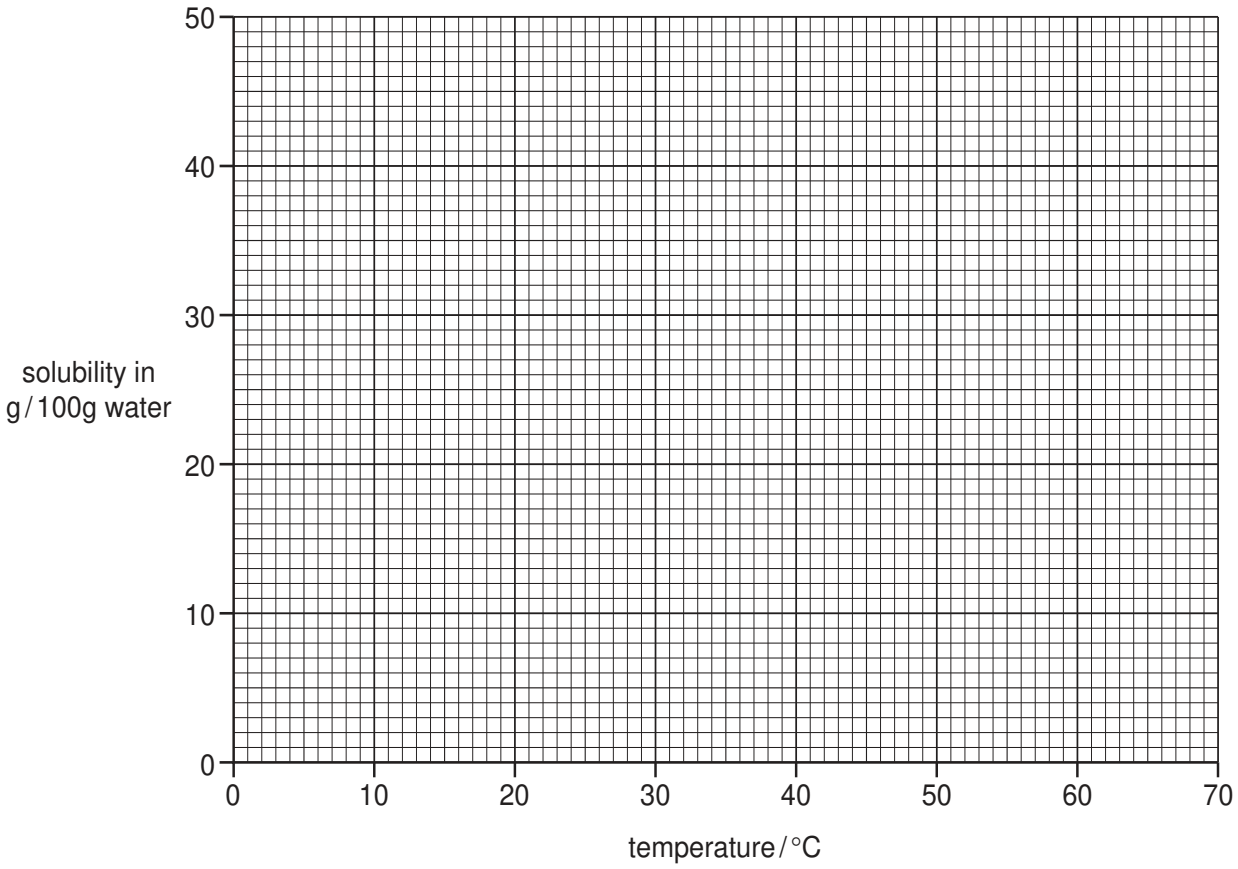
6 An experiment was carried out to determine the solubility of potassium chlorate at different temperatures. The solubility is the mass of potassium chlorate that dissolves in 100 g of water.
The results obtained are shown in the table below.

temperature / °C	0	10	20	30	40	50	60
solubility in g / 100 g water	14	17	20	24	29	34	40

(a) On the grid, draw a smooth line graph to show the solubility of potassium chlorate at different temperatures.



[4]

(b) Use your graph to determine the solubility of potassium chlorate at 70 °C. Show clearly on the graph how you obtained your answer.

.....

[2]

(c) What would be the effect of cooling a saturated solution of potassium chlorate from 60 °C to 20 °C?

.....

.....

.....

[2]

[Total: 8]

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7 A solution of magnesium sulphate can be made by reacting magnesium oxide with warm sulphuric acid.

(a) Describe how you could make a solution of magnesium sulphate starting with magnesium oxide powder and dilute sulphuric acid.

.....

.....

.....

.....

.....

..... [3]

(b) Describe how you would obtain pure dry crystals of hydrated magnesium sulphate, $MgSO_4.7H_2O$, from the solution of magnesium sulphate in **(a)**.

.....

.....

.....

.....

.....

..... [3]

[Total: 6]

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