UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

8566192908

CHEMISTRY **0620/62**

Paper 6 Alternative to Practical **May/June 2012**

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.

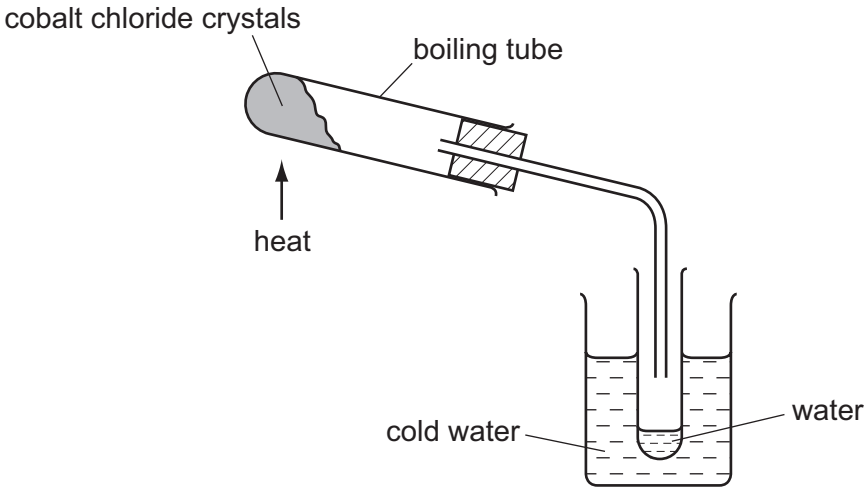
Answer **all** questions.

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.

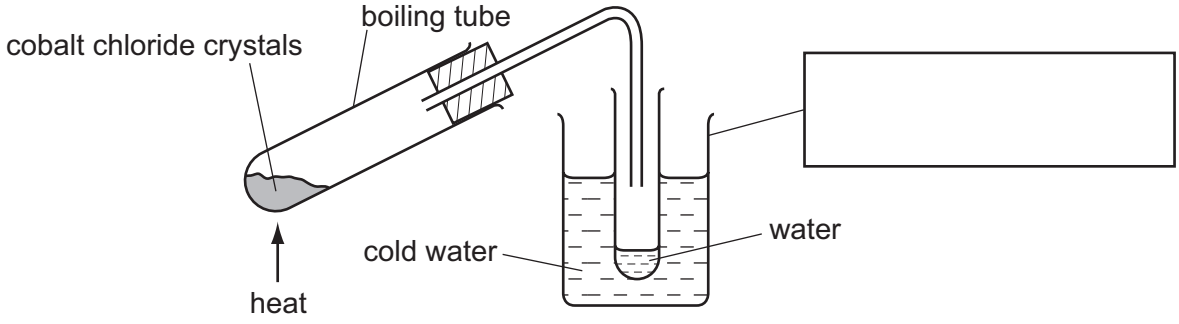
For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
Total	

This document consists of **12** printed pages.

1 A student heated red crystals of hydrated cobalt(II) chloride, $CoCl_2.6H_2O$, to obtain a sample of water. He used two different sets of apparatus, **A** and **B**.



A



B

(a) Complete the box to identify the piece of apparatus labelled. [1]

(b) The steam could have been condensed more efficiently using a condenser.
Draw a labelled diagram of a condenser.

[2]

(c) The colour of the solid remaining in the boiling tube after heating was blue. Predict the effect of adding water to this solid. Explain your answer.

effect .....

explanation ..... [2]

(d) Suggest why the boiling tube cracked using set of apparatus **B** but not set **A**.

.....

..... [2]

[Total: 7]

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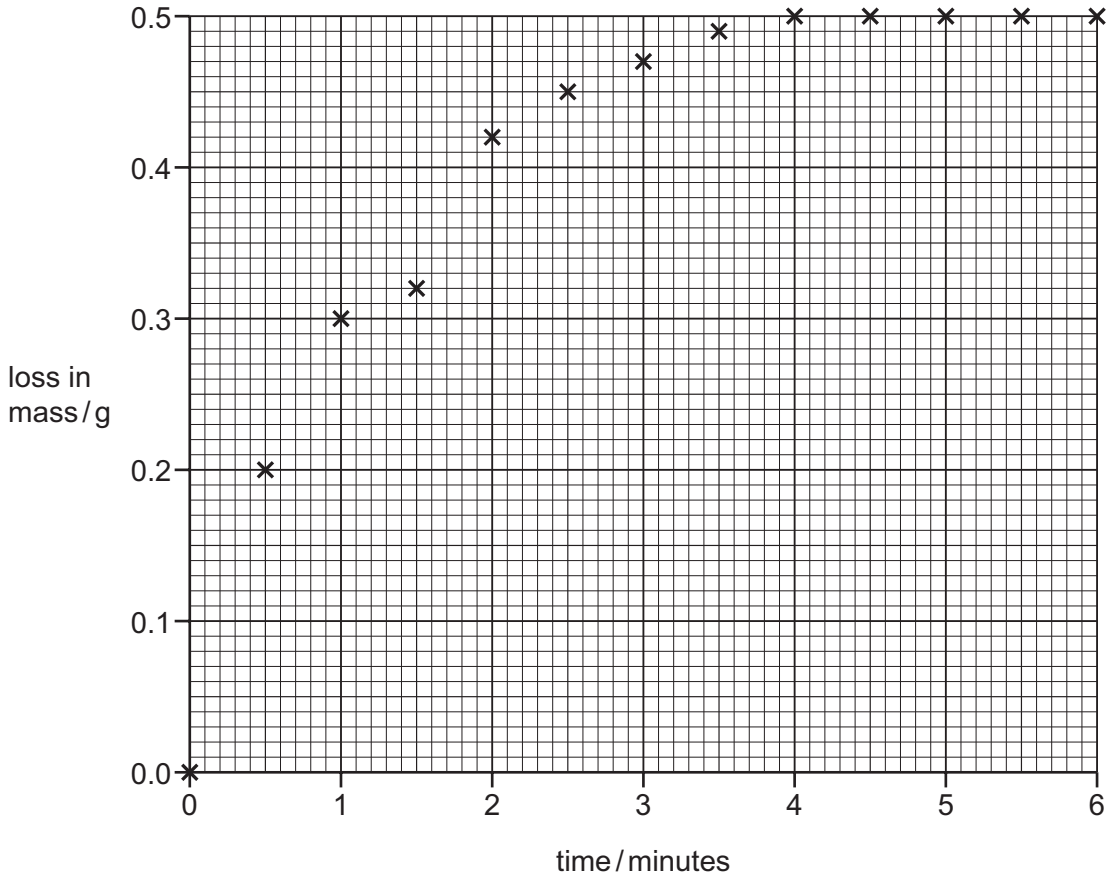
2 An experiment was carried out to measure the speed (rate) of reaction between magnesium carbonate and excess dilute nitric acid.
50 cm^3 of dilute nitric acid was poured into a conical flask and placed on a balance. 1.0 g of powdered magnesium carbonate was added to the flask. The mass of the flask and contents decreased as a gas was given off. The loss in mass was recorded every half minute for six minutes.

The results of the experiment are shown plotted on the grid below.



(a) Draw a smooth line graph through the points. [1]

(b) Which point appears to be inaccurate?

..... [1]

(c) Why does the curve level out? Explain your answer.

.....

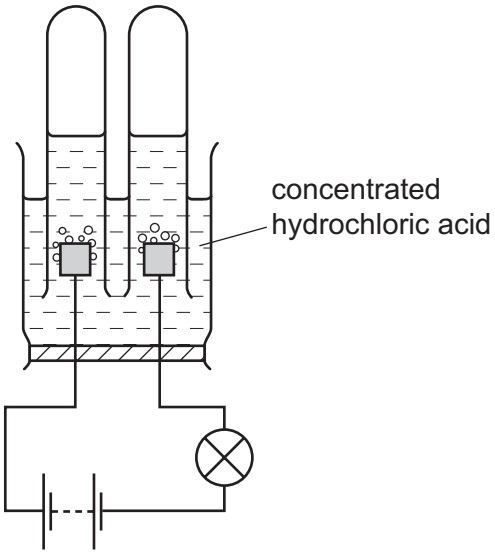
..... [2]

(d) On the grid, sketch the graph you would expect if the reaction was repeated using 0.5 g of lumps of magnesium carbonate. [2]

[Total: 6]

For Examiner's Use

3 Electricity was passed through a solution of concentrated hydrochloric acid as shown below.



Bubbles were observed at both electrodes.

(a) Give **one** other expected observation.

..... [1]

(b) Label the electrodes. [1]

(c) **(i)** Name the gas given off at the cathode (negative electrode).

..... [1]

(ii) Give a test for this gas.

test .....

result ..... [2]

(d) Suggest why, at the beginning of the electrolysis, no gas was collected at the anode (positive electrode).

.....

..... [2]

[Total: 7]

4 A student investigated a reaction between a solid and a liquid. The reaction produced a gas. She wanted to know if any of the substances **W**, **X** and **Y** were catalysts for the reaction.
Firstly she carried out the reaction without any **W**, **X** or **Y**.
Then she repeated the reaction three times adding a small amount of **W**, **X** or **Y**. In each case she timed how long the reaction took to finish. The results are in the table.

substance added	time of reaction / s
none	277
W	266
X	279
Y	78

(a) How would the student know when the reaction had finished?

..... [1]

(b) **(i)** State the effect of each substance on the speed (rate) of the reaction.

W .....

X .....

Y ..... [3]

(ii) Which substance, **W**, **X** or **Y**, is the best catalyst for this reaction?

..... [1]

(c) How could the student check the reliability of her results?

.....

..... [2]

[Total: 7]

For Examiner's Use

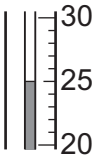
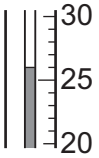
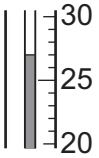
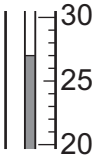
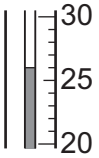
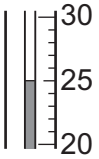
5 A student investigated the temperature changes when two different solids, **C** and **D**, dissolved in water.

Two experiments were carried out.

Experiment 1

Using a measuring cylinder, 25 cm^3 of distilled water was poured into a polystyrene cup. The initial temperature of the water was measured.
Solid **C** was added to the water, the timer started and the mixture stirred with a thermometer. The temperature of the solution was measured every 30 seconds for three minutes.

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

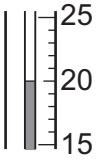
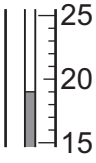
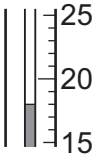
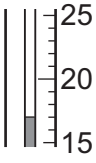
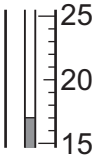
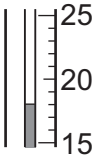
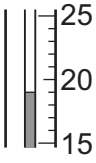
time / s	thermometer diagram	temperature / °C
0		
30		
60		
90		
120		
150		
180		

[2]

Experiment 2

The polystyrene cup was emptied and rinsed with water. Experiment 1 was repeated using solid **D** instead of solid **C**. The temperature of the solution was measured every 30 seconds for three minutes as before.

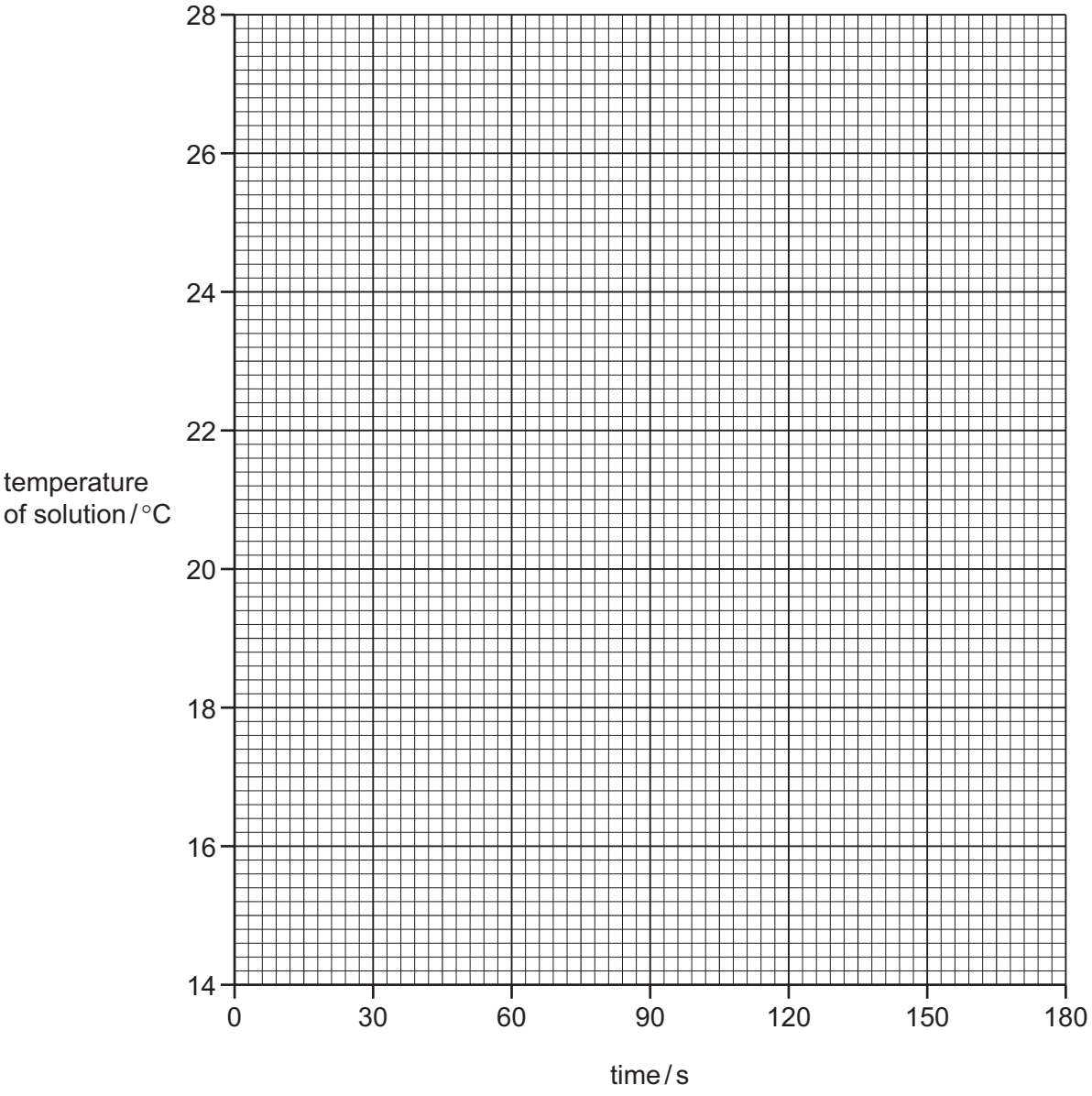
(b) Use the thermometer diagrams in the table to record the temperatures.

time / s	thermometer diagram	temperature / °C
0		
30		
60		
90		
120		
150		
180		

[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) (i) **From your graph**, deduce the temperature of the solution in Experiment 1 after 15 seconds.
Show clearly **on the graph** how you worked out your answer.

.....°C [2]

(ii) **From your graph**, deduce how long it takes for the **initial** temperature of the solution in Experiment 2 to change by 1.5 °C.
Show clearly **on the graph** how you worked out your answer.

.....s [2]

[Turn over

(e) What type of change occurs when substance **D** dissolves in water?

..... [1]

(f) Suggest the effect on the results if Experiment 1 was repeated using 50 cm^3 of distilled water.

.....

..... [1]

(g) Predict the temperature of the solution in Experiment 2 after 1 hour. Explain your answer.

.....

..... [2]

(h) When carrying out the experiments what would be the advantage of taking the temperature readings every 15 seconds?

.....

..... [2]

[Total: 20]

6 Two substances, **E** and **F**, were analysed. **E** was a solid compound and **F** was a solution of ethanoic acid.
The tests on **E** and **F**, 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
tests on solid **E** **(a)** Appearance of solid **E**.	green powder
(b) Solid **E** was heated in a test-tube. The gas given off was tested.	black solid formed limewater turned milky
(c) (i) Solid **E** was added to dilute sulfuric acid. The solution was divided into two equal portions in test-tubes. **(ii)** Excess aqueous sodium hydroxide was added to the first portion of the solution. **(iii)** Drops of aqueous ammonia were added to the second portion of the solution. Excess aqueous ammonia was then added to the mixture.	effervescence and blue solution formed pale blue precipitate formed pale blue precipitate formed precipitate dissolved to form a dark blue solution
tests on liquid **F** **(d)** Appearance and smell of liquid **F**. **(e)** pH indicator paper was used to measure the pH of liquid **F**.	appearance ..... smell ..... [2] pH ..... [1]

(f) Identify the gas given off in test **(c)(i)**.

..... [1]

(g) Identify solid **E**.

..... [2]

[Total: 6]

7

For Examiner's Use

Fizzy drinks

The bubbles in fizzy drinks are bubbles of carbon dioxide. The carbon dioxide is dissolved in the drink under pressure.
When a bottle of fizzy drink is opened the gas escapes and eventually the drink goes flat.
The gas is lost more quickly if the fizzy drink is heated.

(a) How could the acidity of the fizzy drink be checked?

..... [1]

(b) Plan an experiment to find the volume of gas in a bottle of fizzy drink.
You may use common laboratory apparatus.

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 7]