UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

* 1 8 7 4 3 3 0 8 5 *

CHEMISTRY **0620/63**

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.

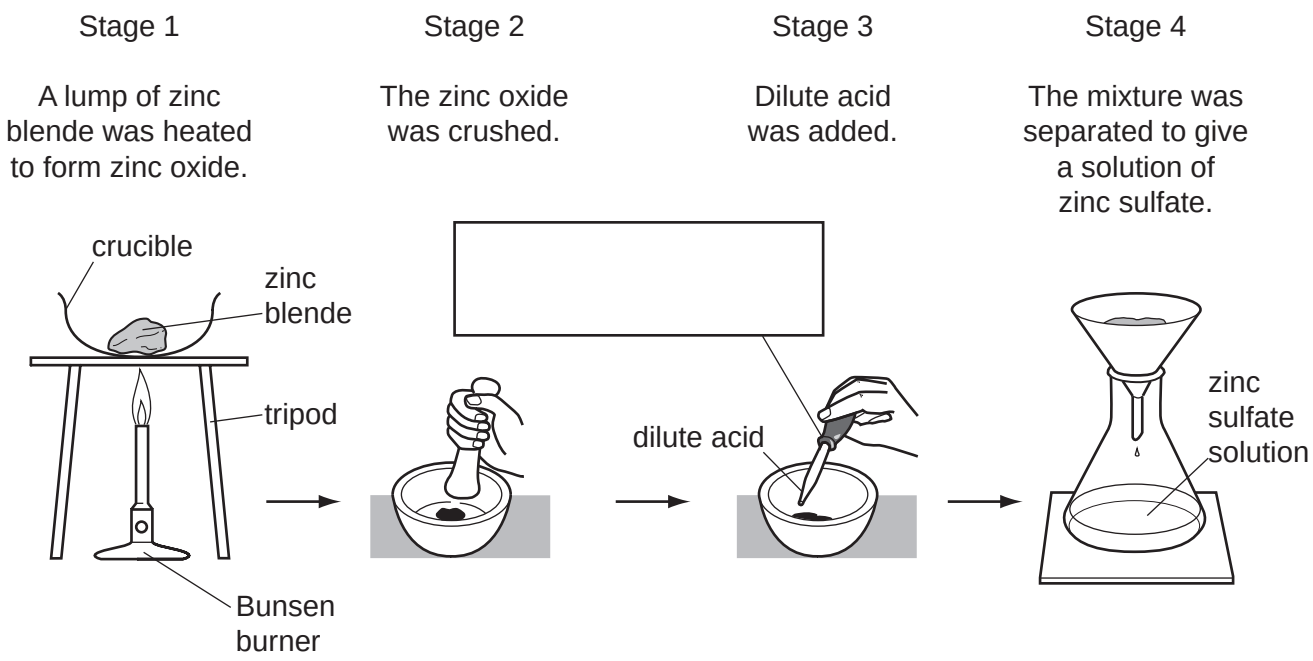
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2	
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7	
Total	

This document consists of **10** printed pages and **2** blank pages.

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1 Zinc blende is an ore of zinc containing zinc sulfide, ZnS.
A student attempted to obtain a sample of zinc metal from this ore. The diagram shows the procedure followed in four stages.



(a) Complete the box to name the apparatus used. [1]

(b) Explain why the student should have carried out stage 2 before stage 1.

.....

..... [2]

(c) Identify the dilute acid used in stage 3.

..... [1]

(d) Name the process used in stage 4.

..... [1]

(e) Suggest how the student could have obtained a sample of zinc from the zinc sulfate solution.

..... [1]

[Total: 6]

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2 Three bottles of liquids have lost their labels.
The liquids are known to be:

pentene;

aqueous sodium iodide;

aqueous ammonia.

Outline chemical tests you would do to identify and distinguish the liquid in each bottle.

liquid	chemical test	result
pentene	....	....
aqueous sodium iodide	....	....
aqueous ammonia	....	....

[6]

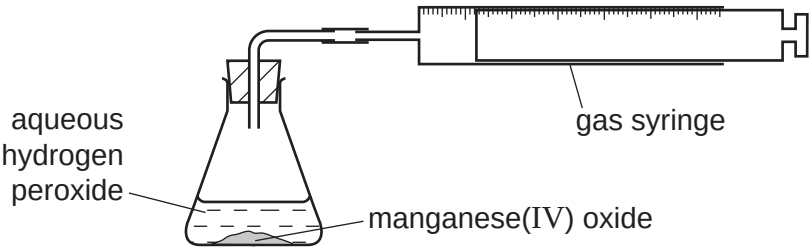
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3 Hydrogen peroxide decomposes to form oxygen. Manganese(IV) oxide is a catalyst for this reaction.

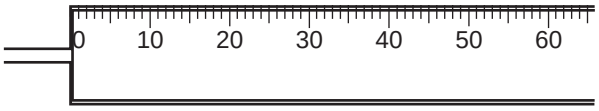
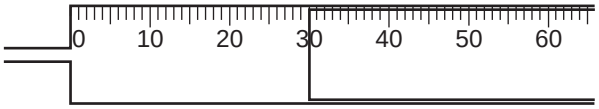
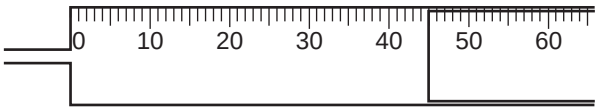
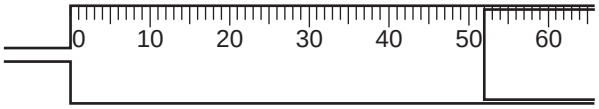
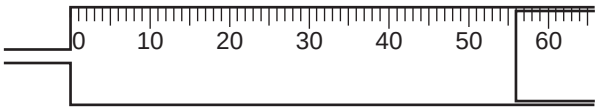
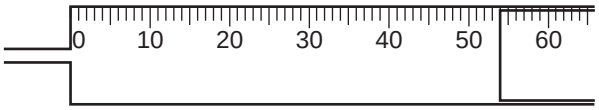
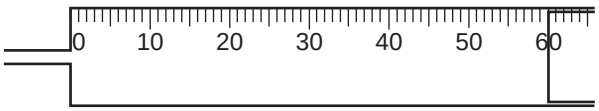
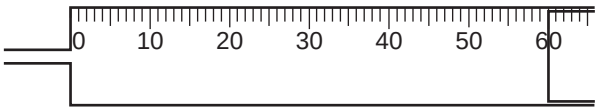
Two students investigated the speed of reaction using the apparatus below.

2 g of manganese(IV) oxide powder was added to 50 cm^3 of aqueous hydrogen peroxide at 20 °C.



The volume of oxygen released was measured every 20 seconds.

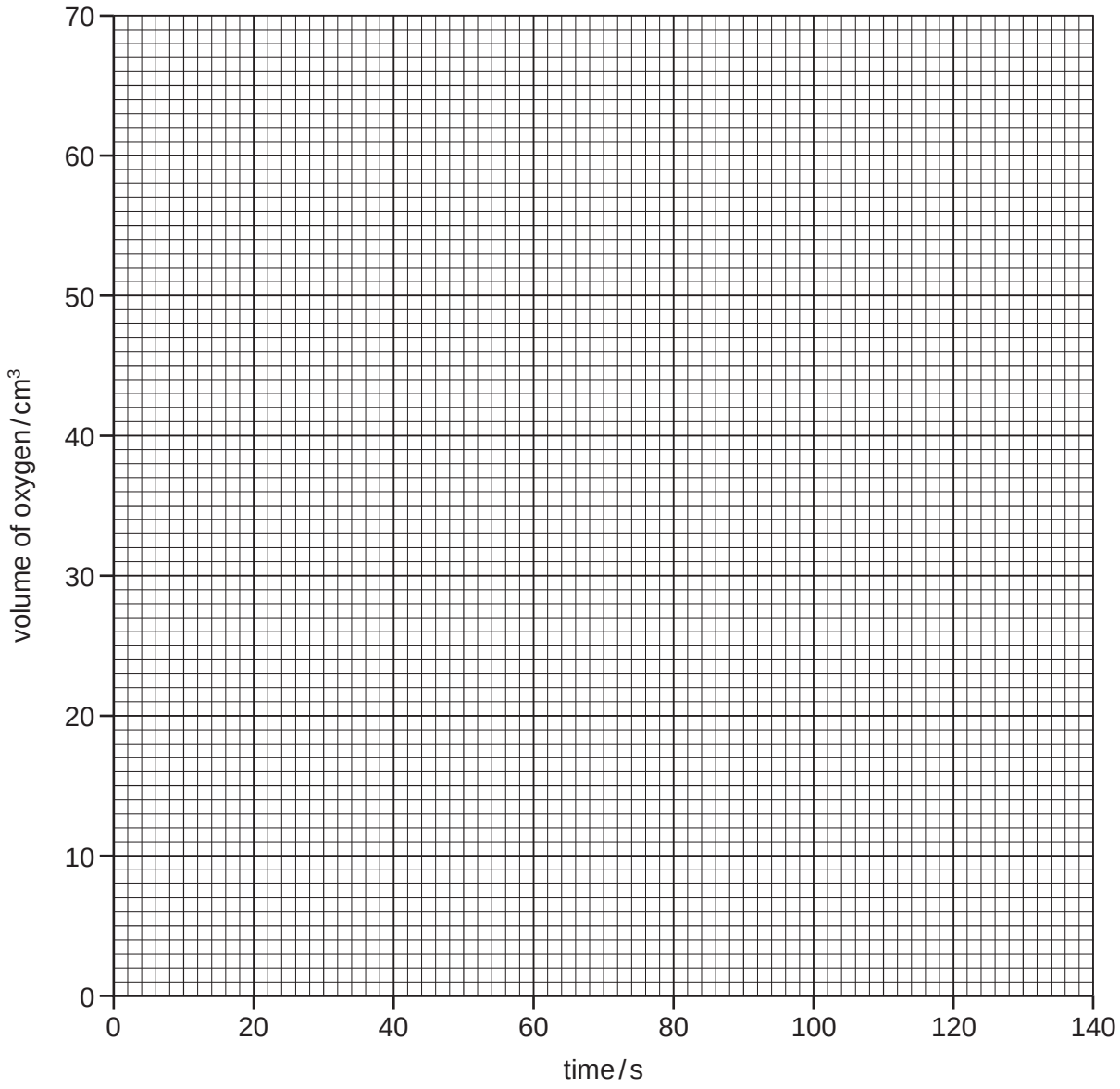
(a) Use the gas syringe diagrams to record the volumes in the table.

time / s	gas syringe diagram	volume of oxygen / cm^3
0		
20		
40		
60		
80		
100		
120		
140		

[3]

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(b) Plot the results on the grid below. Draw a smooth line graph.



[4]

(c) Which point appears to be inaccurate? Explain why.

.....

..... [2]

(d) **Use your graph** to find the volume of oxygen produced after 12 seconds. Show clearly how you used the graph.

..... [2]

(e) Why did the volume of oxygen level out after 120 seconds?

..... [1]

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(f) The experiment was repeated but the hydrogen peroxide was cooled to 10 °C before starting.

(i) How could the hydrogen peroxide be cooled?

..... [1]

(ii) Sketch on the grid, on page 5, the graph you would expect for the results at 10 °C. [2]

[Total: 15]

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4 A student prepared some crystals of sodium nitrate. The following extract was taken from her notes.

	Preparing sodium nitrate crystals
	Into a conical flask was placed 25.0 cm^3 of aqueous sodium hydroxide
	and 5 drops of indicator. Dilute nitric acid was added to the flask until
	the indicator changed colour. The volume of nitric acid used was 29.0 cm^3.
	Crystals of sodium nitrate were obtained from the mixture in the flask.

(a) What piece of apparatus should be used to measure the aqueous sodium hydroxide?

..... [1]

(b) **(i)** Name a suitable indicator that could be used.

..... [1]

(ii) This indicator would change colour from ..... to ..... . [1]

(c) Which solution was less concentrated? Explain your answer.

Solution of .....

Explanation .....

..... [2]

(d) How could the student obtain pure crystals of sodium nitrate using this method?

.....

.....

.....

..... [3]

[Total: 8]

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5 A mixture of two solids, **G** and **H**, was analysed. **G** was water-soluble and **H** was copper carbonate.
The tests on the mixture and some of the observations are in the following table.
Complete the observations in the table.

tests	observations
The mixture was added to water in a boiling tube. The mixture was shaken and filtered. The filtrate and the residue were tested. <u>tests on the filtrate</u> **(a)** To the filtrate, dilute nitric acid was added followed by aqueous silver nitrate.	white precipitate
(b) To the filtrate, dilute sulfuric acid was added.	white precipitate
<u>tests on the residue</u> **(c)** A little of the residue was put into a test-tube and dilute nitric acid added. The gas was tested. The contents of the test-tube were kept for test **(d)**.	..... [1] ..... [2]
(d) The contents of the test-tube were divided into two portions. **(i)** To the first portion, an excess of aqueous sodium hydroxide was added. **(ii)** To the second portion, a few drops of aqueous ammonia were added. Excess aqueous ammonia was then added.	..... [2] ..... [1] .... [2]

(e) What conclusions can you draw about solid **G**?

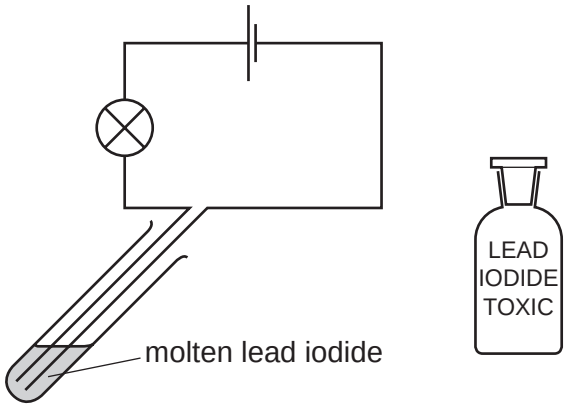
..... [2]

[Total: 10]

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6 Electricity was passed through molten lead iodide as shown below.



A purple gas was observed coming from the positive electrode (anode).

(a) What piece of apparatus is missing from the diagram?

..... [1]

(b) Clearly label the electrodes on the diagram. [1]

(c) Give **one** other expected observation

(i) during the electrolysis, ...

(ii) when the molten lead iodide cools and solidifies.

..... [2]

(d) Suggest why a stopper is not used in the top of the boiling tube.

..... [1]

(e) Explain the observation at the positive electrode.

.....

..... [2]

(f) Give **one** safety precaution necessary when carrying out this experiment.

.....

..... [1]

[Total: 8]

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7

Fertilisers

Growwell and Plantstrong are two different granular fertilisers.
Fertilisers improve the growth of plants.
A farmer decides to buy one of these fertilisers to improve the soil on his land.

Plan an investigation to find out which of these fertilisers would be best for the farmer to buy, and use, to grow beans on his land.

.....

.....

.....

.....

.....

.....

.....

.....

..... [7]

[Total: 7]

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