Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME		
CENTRE NUMBER		
CANDIDATE NUMBER		

7700325994

CHEMISTRY **0620/63**

Paper 6 Alternative to Practical **October/November 2015**

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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

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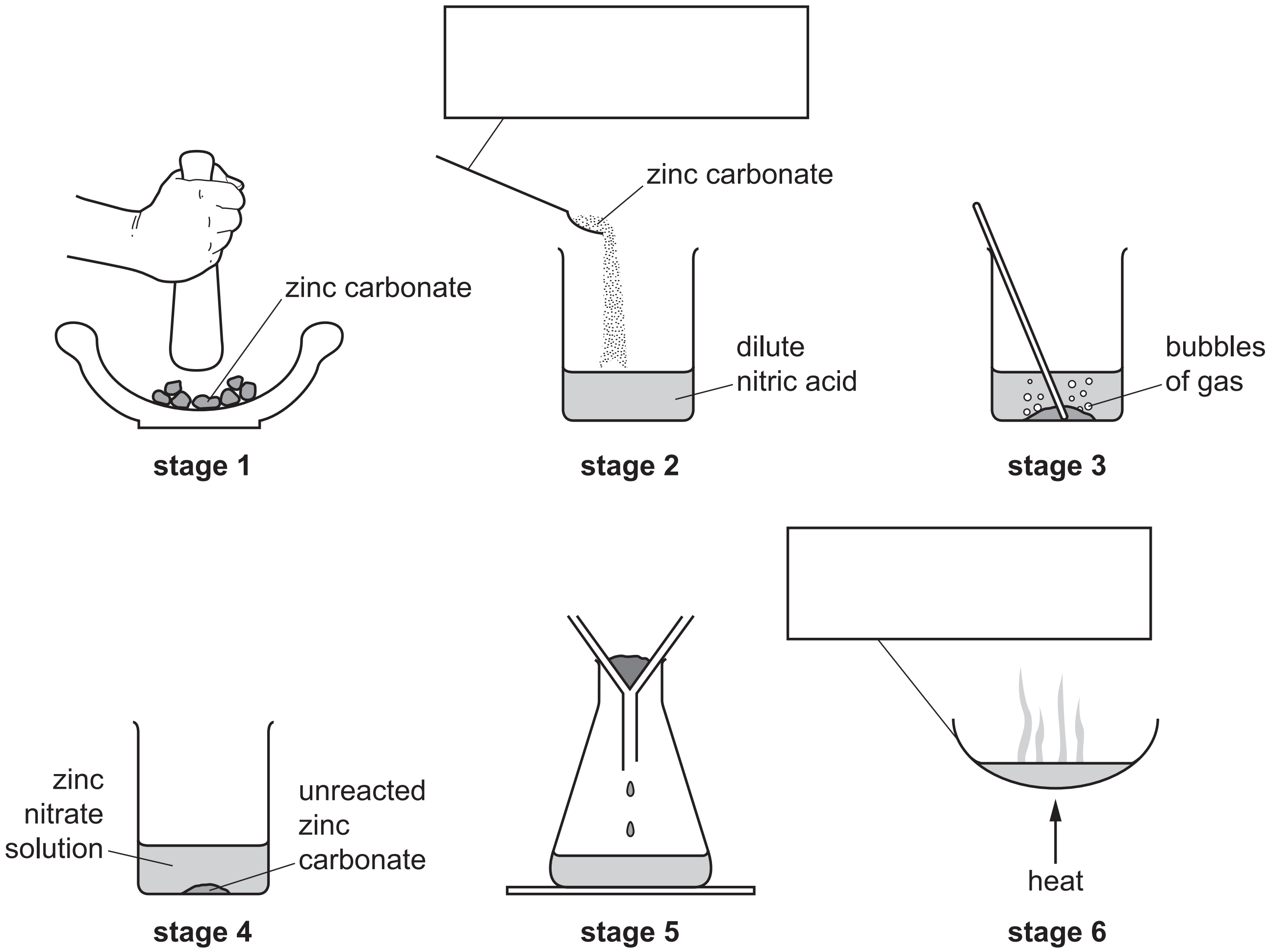
CAMBRIDGE International Examinations

1 The diagrams show the stages in the preparation of zinc nitrate crystals from lumps of zinc carbonate.



(a) Complete the boxes to show the apparatus used. [2]

(b) Use the diagrams to write a list of instructions for the stages of this preparation.

(i) stages 1, 2, 3 and 4

....

....

.... [3]

(ii) stage 5

.... [1]

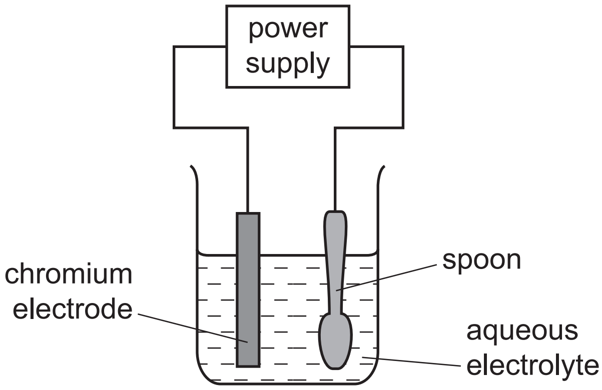
(iii) stage 6

....

.... [2]

[Total: 8]

2 A steel spoon can be coated in chromium using electrolysis. The spoon has to be very clean and free of grease.



(a) Name this process of coating a metal object with another metal.

.... [1]

(b) Suggest **one** advantage of putting a layer of chromium on the spoon.

.... [1]

(c) Which electrode should be the spoon?

.... [1]

(d) Suggest the name of a compound that could dissolve in water to form the electrolyte.

.... [2]

(e) Why must the spoon be very clean and free of grease?

.... [1]

(f) Suggest **one** mistake in the apparatus set up.

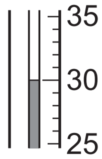
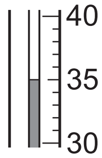
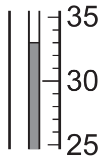
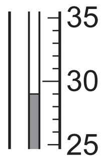
.... [1]

[Total: 7]

3 A student investigated the temperature changes when dilute nitric acid reacted with aqueous potassium hydroxide.
Solution **C** was nitric acid and solution **D** was aqueous potassium hydroxide.
She mixed together different volumes of **C** and **D** in four experiments. The maximum temperature reached was measured in each experiment.

The initial temperature of the solutions was 25 °C.

(a) Use the thermometer diagrams in the table to record the maximum temperatures. Work out the rise in temperature in each experiment.

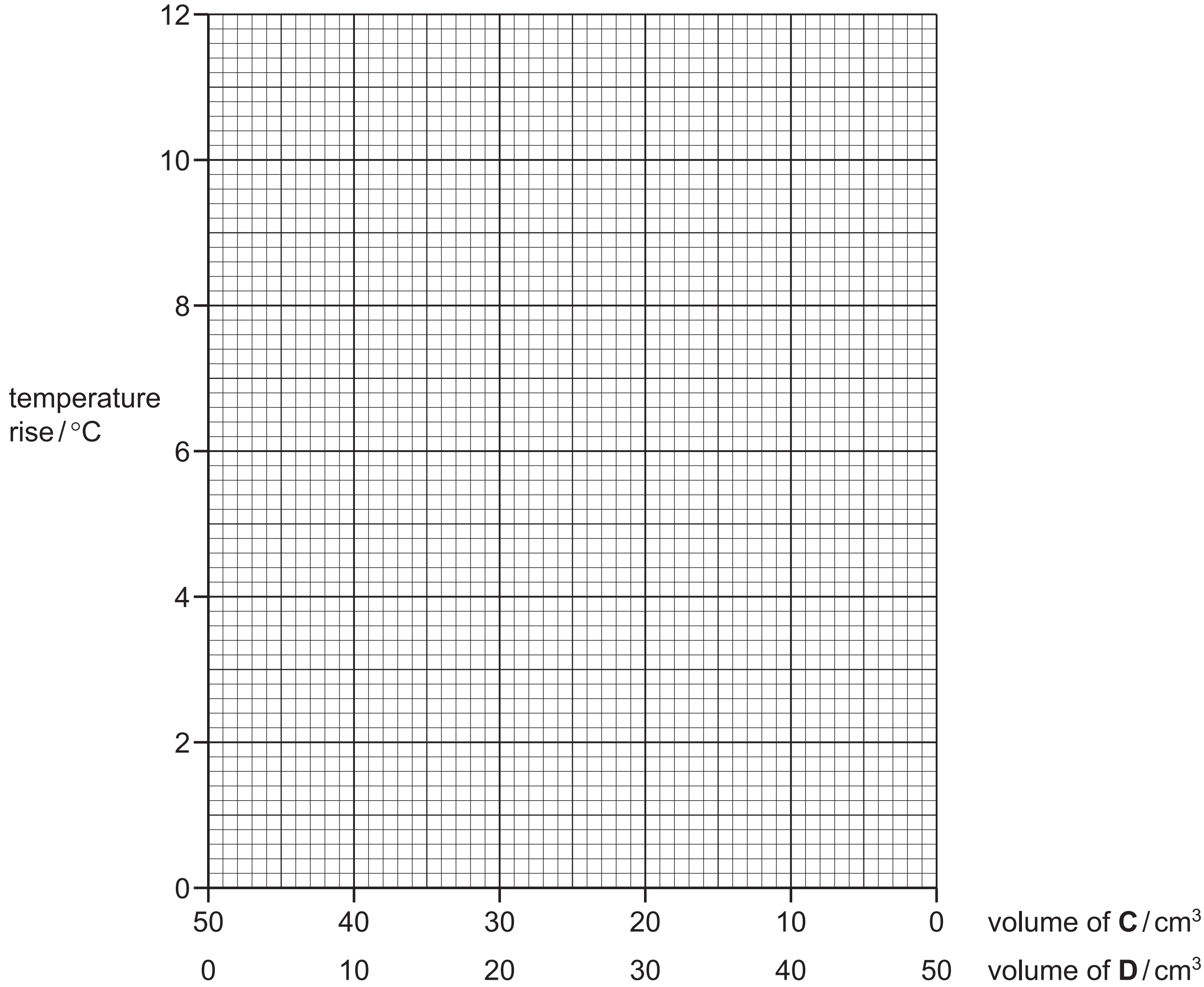
experiment	volume of **C** / cm^3	volume of **D** / cm^3	thermometer diagram	maximum temperature / °C	temperature rise / °C
1	40	10			
2	30	20			
3	20	30			
4	10	40			

[3]

(b) Why was the total volume of solution always 50 cm^3?

.... [1]

(c) Plot the results on the grid and draw two intersecting straight line graphs.



[3]

(d) **(i)** **From your graph**, deduce the greatest temperature rise that could occur.
Show this point clearly **on the grid**, with an arrow.

.... °C [1]

(ii) **From your graph**, deduce the volumes of **C** and **D** that would produce this temperature rise.

C ....

D ....

[2]

(e) The experiment was repeated using solutions of **C** and **D** that were twice as concentrated as used in the original experiment. The initial temperature of the solutions was still 25 °C.

Suggest the greatest temperature rise that could occur.

.... [1]

[Total: 11]

4 A student investigated the reaction between an acidic solution of iron(II) sulfate, solution **L**, and two different solutions of aqueous potassium manganate(VII), solutions **M** and **N**.

Three experiments were carried out.

(a) *Experiment 1*

Excess aqueous sodium hydroxide was added to about 3 cm^3 of solution **L** in a test-tube.

What observations would be expected in Experiment 1?

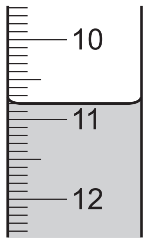
.... [2]

(b) *Experiment 2*

A burette was filled with the solution **M** of potassium manganate(VII) to the 0.0 cm^3 mark. Using a measuring cylinder, 25 cm^3 of solution **L** was poured into a conical flask.

Solution **M** was added to the flask until the mixture just turned permanently pink.

Use the burette diagram to record the readings in the table and complete the table.



final reading

final burette reading / cm^3	
initial burette reading / cm^3	
difference / cm^3	

[2]

(c) *Experiment 3*

The burette was emptied and rinsed thoroughly with distilled water. A small volume of the solution **N** of aqueous potassium manganate(VII) was added to the burette and shaken.
This solution was discarded.
Solution **N** of potassium manganate(VII) was then poured into the burette.

Experiment 1 was repeated using solution **N** instead of solution **M**.

Use the burette diagrams to record readings in the table and complete the table.

initial reading　　　final reading

final burette reading / cm^3	
initial burette reading / cm^3	
difference / cm^3	

[2]

(d) Why was the burette washed before starting Experiment 3

(i) with distilled water,

....

(ii) then with solution **N**?

....
[2]

(e) Explain why an indicator was not needed.

.... [1]

(f) **(i)** In which experiment was the greater volume of potassium manganate(VII) solution used?

.... [1]

(ii) Compare the volumes of potassium manganate(VII) solution used in Experiments 2 and 3.

.... [1]

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

....

....

.... [2]

(g) If Experiment 3 was repeated using 12.5 cm^3 of solution **L**, what volume of potassium manganate(VII) solution would be used? Explain your answer.

....

.... [2]

(h) Give **one** advantage and **one** disadvantage of using a measuring cylinder for solution **L**.

advantage ....

disadvantage ....
[2]

[Total: 17]

5 Two solids, **P** and **Q**, were analysed. **Q** was anhydrous copper(II) sulfate.
Tests on the solids and some of the observations are in the following tables.
Complete the observations in the table.

tests	**observations**
<u>tests on solid **P**</u> **(a)** Appearance of solid **P**.	white crystals
(b) Solid **P** was heated gently in a dry test-tube.	condensation formed at the top of the test-tube
<u>tests on aqueous solution of **P**</u> An aqueous solution of **P** was divided into three equal portions. The following tests were carried out. **(c)** The pH of the first portion of the solution was tested.	pH 5
(d) Copper(II) oxide was added to the second portion of the solution. The mixture was boiled and the mixture left to stand for one minute.	blue solution formed
(e) Magnesium powder was added to the third portion of the solution. The mixture was shaken and the gas evolved tested.	effervescence, lighted splint popped

(f) Identify the gas in test **(e)**.

.... [1]

(g) What conclusions can you draw about solid **P**?

....

.... [2]

tests	observations
<u>tests on solid **Q**</u> **(h)** Appearance of solid **Q**.	.... [1]
(i) Solid **Q** was added to distilled water and stirred with a thermometer. The temperature of the mixture was measured and recorded after one minute.	temperature change .... other observations .... [2]
The solution formed was divided into two equal portions. **(j)** An equal volume of aqueous sodium hydroxide was added to the first portion of the solution.	.... [2]
(k) Drops of aqueous ammonia were added to the second portion of the solution and shaken. Excess ammonia solution was then added.	.... [3]

[Total: 11]

6 Dilute sulfuric acid reacts rapidly with magnesium ribbon. The magnesium ribbon gets smaller and eventually disappears.

Plan an investigation to show how the rate of this reaction changes using different concentrations of sulfuric acid.
You are provided with common laboratory apparatus, sulfuric acid, water and magnesium ribbon.

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....

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....

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....

....

.... [6]

[Total: 6]

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