Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER		CANDIDATE NUMBER	

9232692217

CHEMISTRY **0620/63**

Paper 6 Alternative to Practical **October/November 2014**

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.

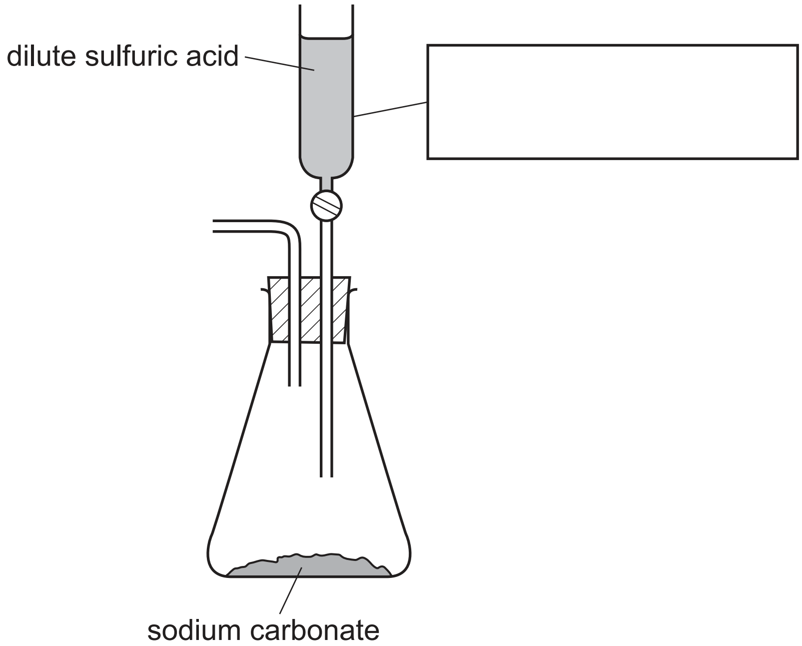
This document consists of **12** printed pages.

IB14 11_0620_63/RP

CAMBRIDGE
International Examinations

[Turn over

1 Sulfuric acid was added to sodium carbonate to prepare and collect a sample of carbon dioxide.



(a) Complete and label the diagram to show how a sample of carbon dioxide should be collected. [2]

(b) Complete the box to identify the piece of apparatus used. [1]

(c) Suggest why it is not necessary to heat the reactants.

.... [1]

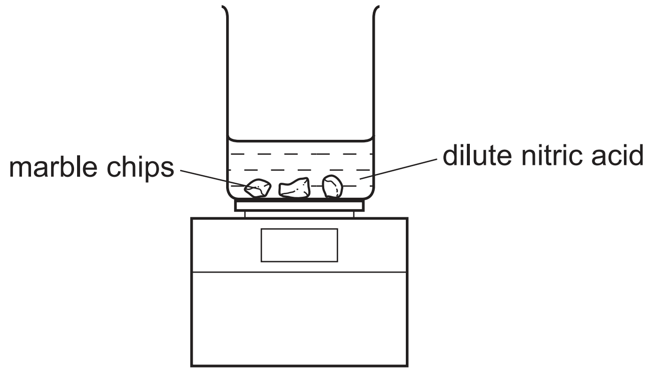
(d) Give a test to identify carbon dioxide.

test ....

result .... [2]

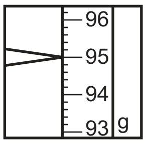
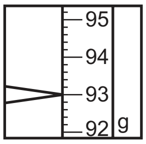
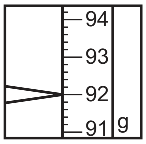
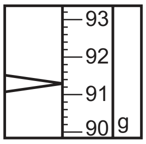
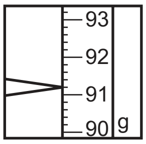
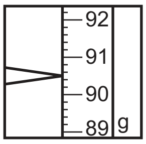
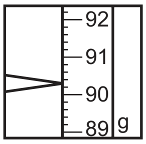
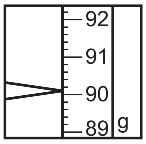
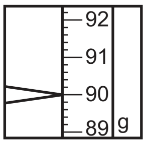
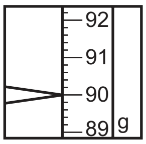
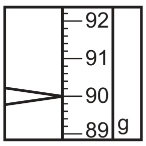
[Total: 6]

2 A student investigated the rate of reaction between dilute nitric acid and marble chips (calcium carbonate). The apparatus below was used.



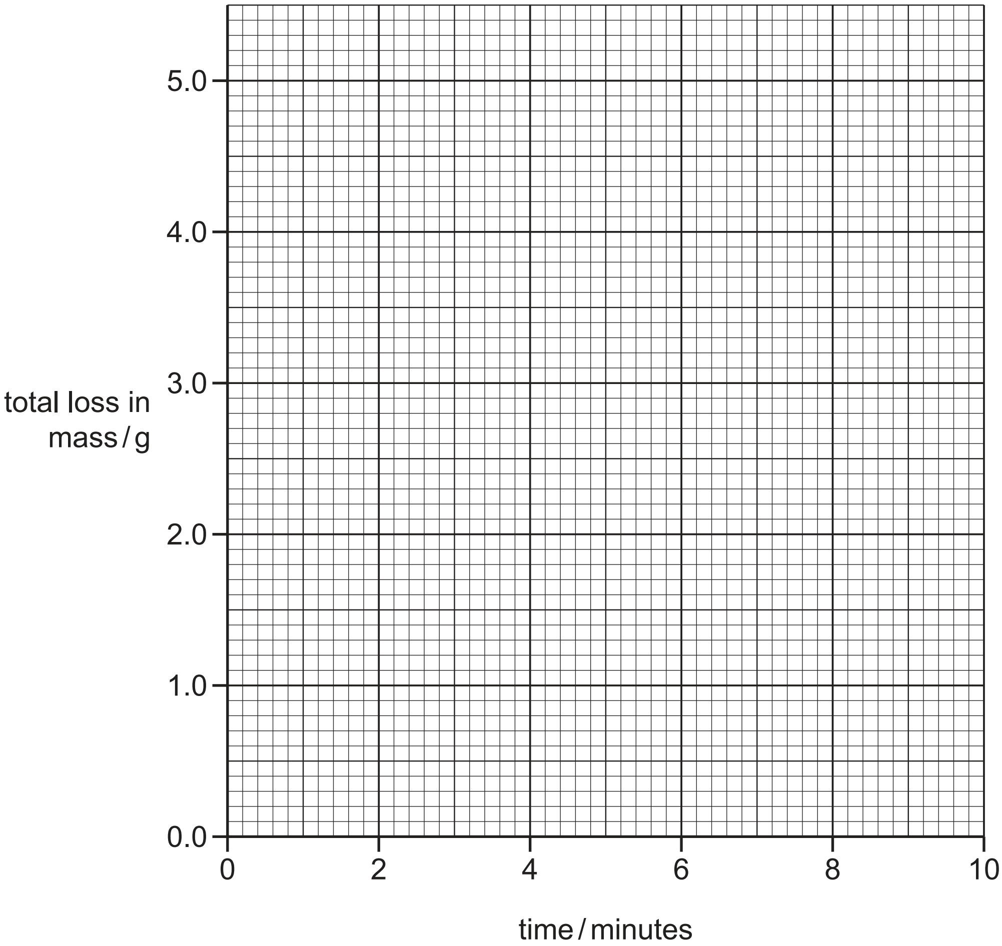
50 cm^3 of dilute nitric acid, an excess, was poured into a beaker. The beaker was placed on a balance and the marble chips added to the beaker. The apparatus was weighed immediately and a timer started. The mass of the beaker and contents was measured every minute for ten minutes.

(a) Use the balance diagrams to record the mass of the beaker and contents in the table. Complete the table to work out the total loss in mass of the beaker and contents.

time / minutes	balance diagram	mass of beaker and contents / g	total loss in mass / g
0		95.0	0.0
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

[3]

(b) Plot the results on the grid and draw a smooth line graph.



[3]

(c) Why does the mass of the beaker and contents decrease?

.... [1]

(d) **(i)** Which result appears to be inaccurate?

.... [1]

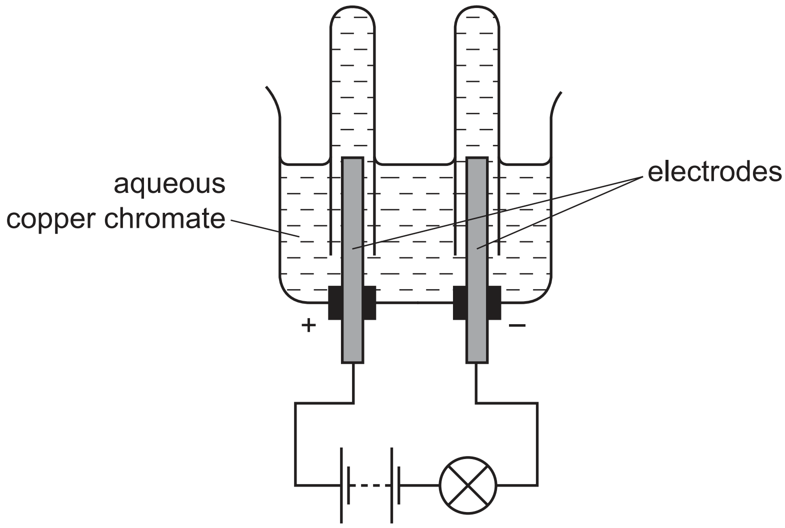
(ii) Use your graph to work out the loss in mass expected at that time.

.... [1]

(e) Sketch on the grid the graph you would expect if the experiment was repeated using the same mass of smaller marble chips. [2]

[Total: 11]

3 Electricity was used to break down an aqueous solution of copper chromate, $CuCrO_4$, which is green.
The apparatus used is shown.



A brown deposit was seen forming at one electrode and oxygen was evolved at the other electrode.

(a) Suggest a suitable non-metal for the electrodes.

.... [1]

(b) Give **one** other observation expected during this experiment.

.... [1]

(c) Name the brown deposit and identify at which electrode it is formed.

.... [2]

(d) Name the process when electricity breaks down aqueous solutions.

.... [1]

[Total: 5]

4 A student investigated the addition of four different solids, **H**, **J**, **K** and **L**, to water.
The same mass of solid, 4 g, was used in each experiment.

Five experiments were carried out.

(a) *Experiment 1*

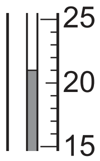
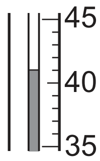
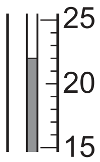
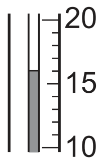
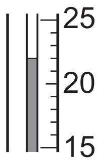
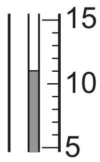
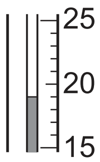
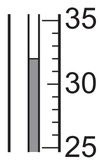
Using a measuring cylinder, 25 cm^3 of distilled water was poured into a polystyrene cup. The initial temperature of the water was measured.
4 g of solid **H** was added to the water in the cup and the mixture stirred with a thermometer.
The temperature of the liquid mixture was measured after 90 seconds.
Use the thermometer diagrams to record the results in the table below.
The thermometer and the cup were rinsed with water.

(b) *Experiment 2*

Experiment 1 was repeated, using solid **J** instead of solid **H**.
Use the thermometer diagrams to record the initial and final temperatures in the table.
Some of this solution was kept in a test-tube for Experiment 5.

(c) *Experiment 3* and *Experiment 4*

Experiment 1 was repeated, using solid **K** and then solid **L**.
Use the thermometer diagrams to record the temperatures in the table. Complete the table.
A little of the solution from Experiment 4 was kept for Experiment 5.

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

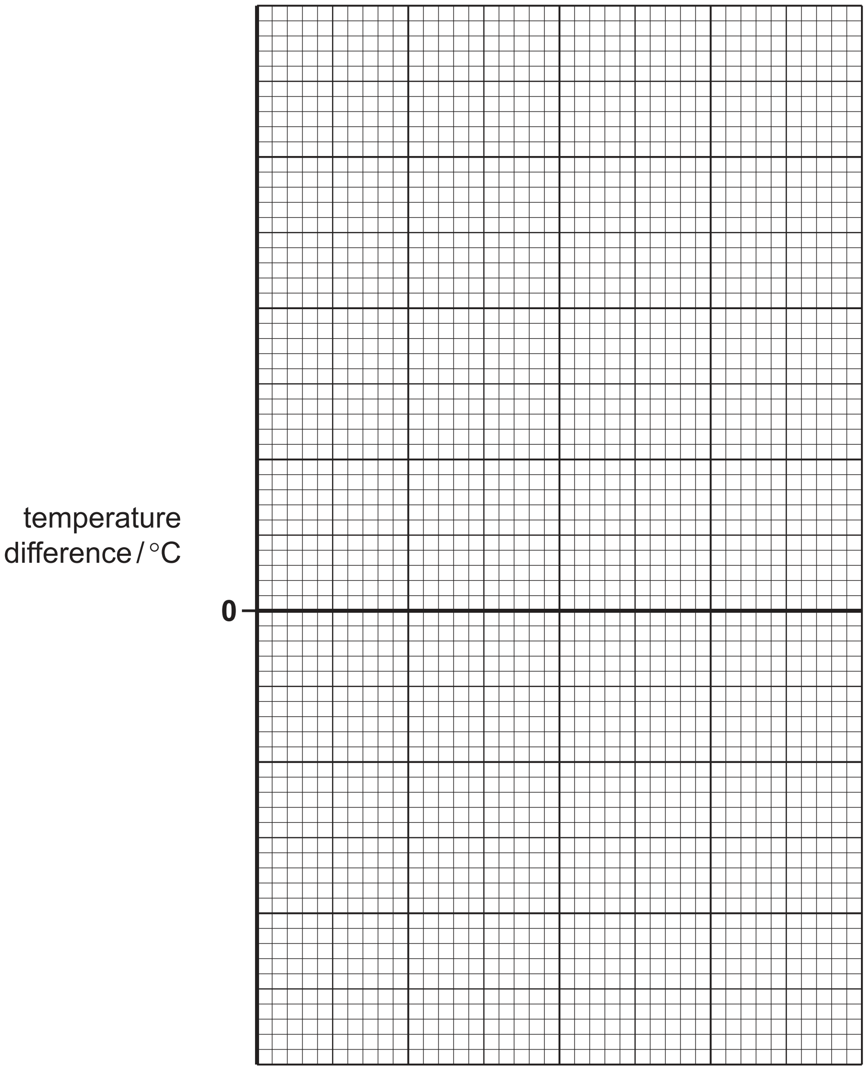
[3]

(d) *Experiment 5*

A little of the solution from Experiment 2 was poured into a test-tube. The solution from Experiment 4 was added to the test-tube. Observations were noted.

observation	rapid effervescence

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



[4]

Use your results and observations to answer the following questions.

(f) Why were the thermometer and polystyrene cup rinsed after each experiment?

....

.... [1]

(g) (i) Which experiment produced the smallest temperature change?

.... [1]

(ii) Which solids dissolve in water to produce an endothermic change? Explain your choice.

....

.... [2]

(h) Suggest the temperature change that would occur if

(i) Experiment 3 was repeated using 50 cm^3 of distilled water,

....

.... [1]

(ii) 2 g of solid **L** were used in Experiment 4.

.... [1]

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

.... [1]

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

....

.... [2]

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

....

.... [2]

(k) Suggest how the reliability of the results could be checked.

....

.... [2]

[Total: 20]

5 Two aqueous solutions, **M** and **N**, were analysed. Solution **N** was aqueous sodium hydroxide.
The tests on **M** and **N**, and some of the observations are in the following table.
Complete the observations in the table.

tests	observations
<u>tests on solution **M**</u> Solution **M** was divided into four equal portions in separate test-tubes. **(a)** Appearance of solution **M**. The pH of the first portion of **M** was tested.	colourless liquid pH 1
(b) Calcium carbonate was added to the second portion of **M**. The gas given off was tested with a splint.	effervescence lighted splint extinguished
(c) Magnesium ribbon was added to the third portion of **M**. The gas given off was tested with a splint.	effervescence lighted splint popped
(d) A few drops of dilute nitric acid and aqueous silver nitrate were added to the fourth portion of **M**.	white precipitate

tests	observations
<u>tests on solution **N**</u> Solution **N** was divided into three equal portions in separate test-tubes. **(e)** Appearance of solution **N**. The pH of the first portion of solution **N** was tested.	.... [1] pH = [1]
(f) Drops of aqueous zinc sulfate were added to the second portion of **N** and the mixture was shaken. Excess aqueous zinc sulfate was then added to the mixture and the mixture was shaken.	.... [1] .... [2]
(g) Ammonium chloride was added to the third portion of **N**. The mixture was warmed and the gas tested with damp red litmus paper.	.... [2]

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

.... [1]

(ii) Identify the gas given off in test **(g)**.

.... [1]

(i) Identify solution **M**.

.... [2]

[Total: 11]

6 **Indicators**

Indicators turn different colours in acidic and alkaline solutions. Many plants contain substances which are indicators. These coloured substances can be extracted from the plant material using water and these substances can then be used to test whether a solution is an acid or an alkali.

You are provided with two plant materials, blueberries and red cabbage leaves, and common laboratory apparatus and chemicals.

(a) Plan an investigation to extract the coloured substances from these plant materials.

....

....

....

....

.... [4]

(b) Plan an experiment to show if the coloured substances obtained in **(a)** are suitable to use as indicators.

....

....

....

....

.... [3]

[Total: 7]