Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

2312854938

CHEMISTRY **0620/62**

Paper 6 Alternative to Practical **May/June 2018**

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.

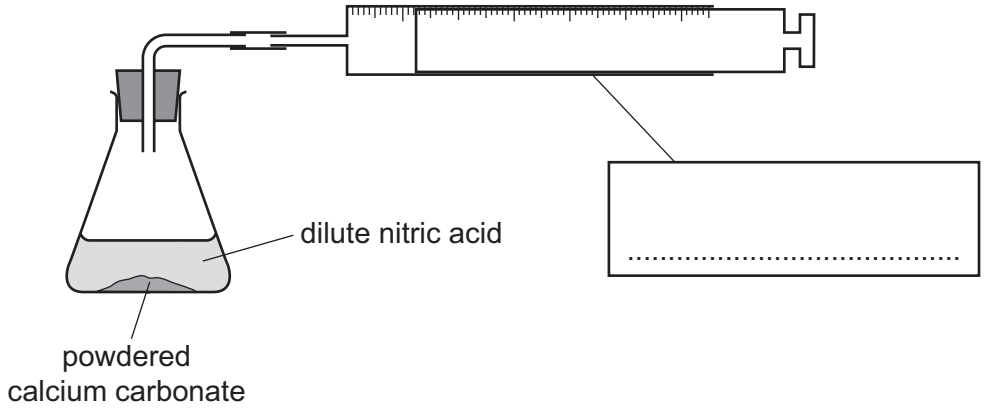
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

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 **9** printed pages and **3** blank pages.

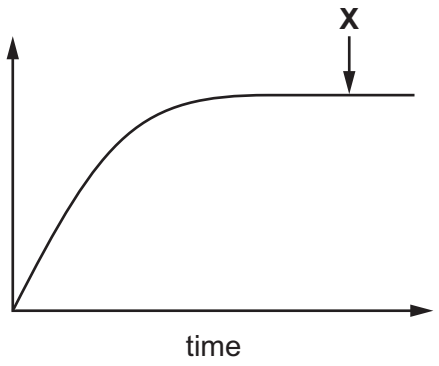
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1 The rate of reaction between an excess of dilute nitric acid and powdered calcium carbonate was investigated. The carbon dioxide produced was collected. The apparatus used is shown.



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

A sketch graph of the results obtained is shown.



(b) (i) Label the *y*-axis. [1]

(ii) Explain why the sketch graph is horizontal at point **X**.

.....

..... [2]

(c) Draw **on the axes** the graph expected if the experiment were repeated using an equal mass of **lumps** of calcium carbonate. All other conditions were kept the same. [2]

(d) Describe a test for carbon dioxide.

test .....

result .....
[2]

[Total: 8]

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

Two experiments were done.

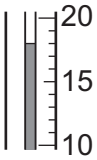
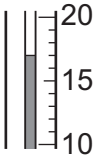
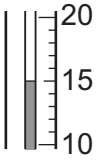
Experiment 1

- Using a measuring cylinder, 40 cm^3 of distilled water was poured into a polystyrene cup. The initial temperature of the distilled water was measured.
- 3 g of solid **C** was added to the polystyrene cup and the mixture was stirred with a thermometer. The temperature of the solution was measured after 1 minute.

- The procedure was repeated using 4 g of solid **C**.
- The procedure was repeated using 6 g of solid **C**.

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

Calculate and record the temperature change in each case, including whether the temperature increased (+) or decreased (–).

mass of solid **C** / g	thermometer diagram	initial temperature of the distilled water / °C	thermometer diagram	temperature of the solution after 1 min / °C	temperature change / °C
3					
4					
6					

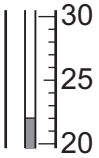
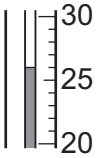
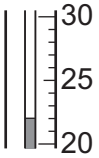
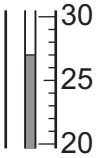
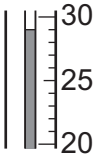
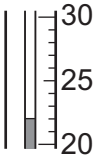
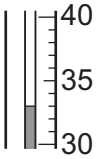
[2]

Experiment 2

- Experiment 1 was repeated but using 3 g, 4 g, 6 g and 8 g of solid **D** .

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

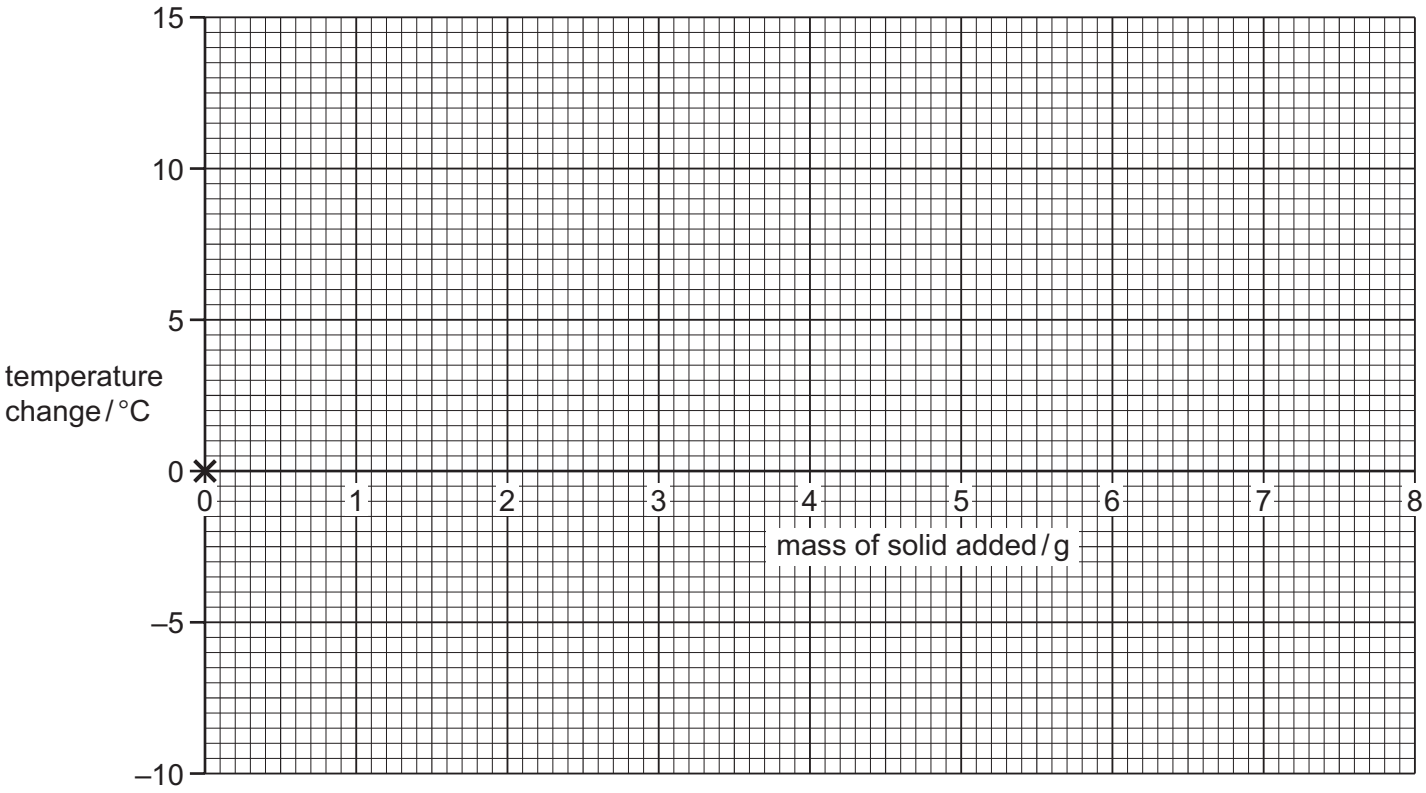
Calculate and record the temperature change in each case, including whether the temperature increased (+) or decreased (–).

mass of solid **D** / g	thermometer diagram	initial temperature of the distilled water / °C	thermometer diagram	temperature of the solution after 1 min / °C	temperature change / °C
3					
4					
6					
8					

[2]

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(c) Plot the results for Experiments 1 and 2 on the grid. The (0,0) point has been plotted for you.
Draw **two** straight lines of best fit.
Clearly label your graphs.



[4]

(d) **Use your graph** to estimate the temperature change after 1 minute if 8 g of solid **C** were added to 40 cm^3 of distilled water.

Show clearly **on the grid** how you worked out your answer.

..... °C [2]

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

..... [1]

(f) Suggest the temperature of the solution containing 8 g of solid **D**, if the solution were left for 2 hours.
Explain your answer.

.....

..... [2]

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[Turn over

(g) How would the temperature changes measured after 1 minute differ if the experiments were repeated using 80 cm^3 instead of 40 cm^3 of distilled water in each case?

.....

..... [2]

(h) Suggest **one** change you could make to the experiments to obtain more accurate results. Explain how this change would make the results more accurate.

change .....

explanation .....

.....

[2]

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

.....

..... [2]

[Total: 19]

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3 Two substances, solid **E** and solution **F**, were analysed. Solid **E** was iron(II) sulfate. Tests were done on solid **E** and solution **F**.

tests on solid E

Complete the expected observations.

(a) Describe the appearance of solid **E**.

..... [1]

Solid **E** was added to distilled water in a test-tube. The test-tube was shaken to dissolve solid **E** and form solution **E**. Solution **E** was divided into four equal portions in four test-tubes.

(b) Dilute nitric acid and aqueous silver nitrate were added to the first portion of solution **E**.

observations ..... [1]

(c) Dilute nitric acid and aqueous barium nitrate were added to the second portion of solution **E**.

observations ..... [1]

(d) An excess of aqueous sodium hydroxide was added to the third portion of solution **E**.

observations ..... [2]

(e) An excess of aqueous ammonia was added to the fourth portion of solution **E**.

observations ..... [1]

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[Turn over

tests on solution F

Solution **F** was an aqueous salt solution.

Some of the tests and observations are shown.

tests on solution **F**	observations
Solution **F** was divided into two equal portions in two test-tubes. **test 1** Drops of aqueous sodium hydroxide were added to the first portion of solution **F**. An excess of aqueous sodium hydroxide was then added to the mixture.	white precipitate formed white precipitate was insoluble
test 2 An excess of aqueous ammonia was added to the second portion of solution **F**.	no precipitate formed

(f) What conclusion can you draw about the cation present in solution **F**?

.....

..... [1]

[Total: 7]

4 Aqueous solutions of barium hydroxide are alkaline.
Plan an investigation to find the concentration of an aqueous solution of barium hydroxide.

You are provided with an aqueous solution of barium hydroxide, dilute hydrochloric acid of known concentration and common laboratory apparatus.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 6]

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