Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

2909684625

CHEMISTRY **0620/61**

Paper 6 Alternative to Practical **October/November 2019**

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.

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

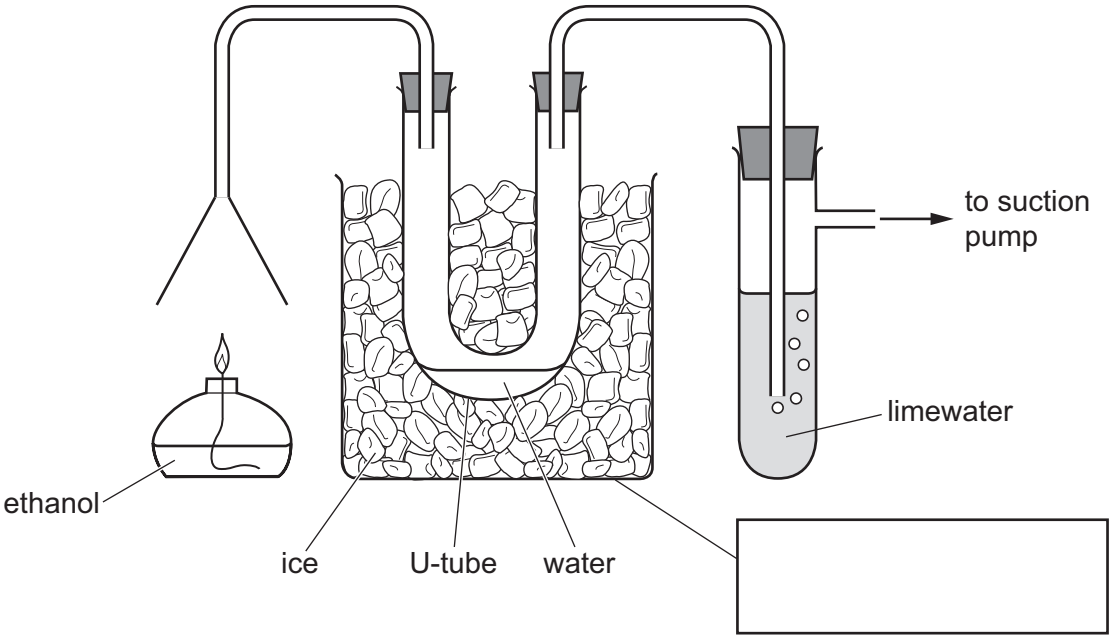
This document consists of **8** printed pages.

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[Turn over

1 The apparatus shown was used to investigate the products formed when ethanol, C_2H_5OH, burns in air.



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

(b) Explain why water collects in the U-tube.

.....

..... [2]

(c) State a chemical test for water.

test .....

observations .....
[2]

(d) What is the purpose of the suction pump?

.....

..... [1]

(e) Predict the change seen in the test-tube containing the limewater. Explain your prediction.

.....

.....

..... [2]

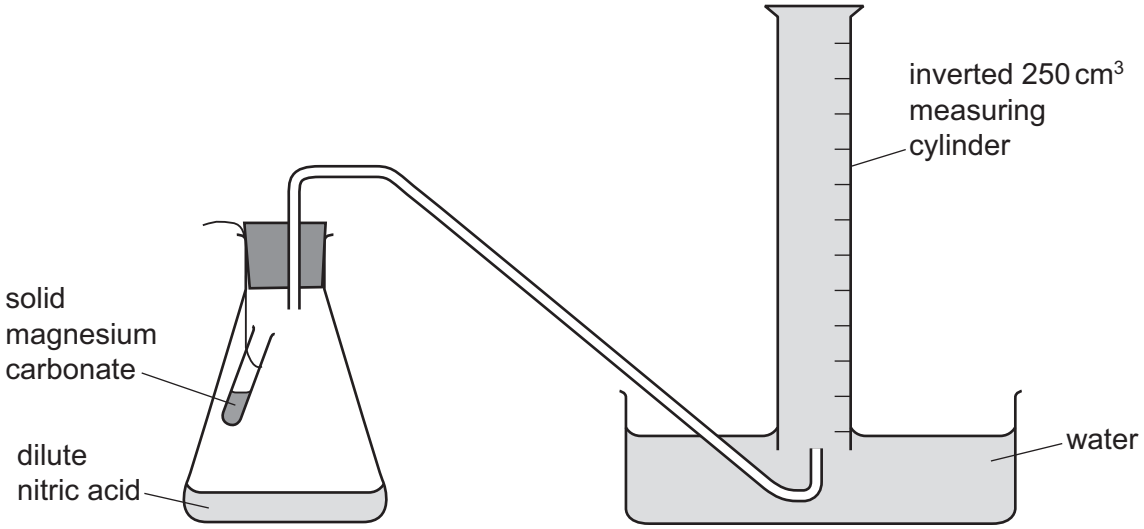
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2 A student investigated the rate of reaction between dilute nitric acid and an excess of solid magnesium carbonate at room temperature.

The apparatus was set up as shown in the diagram.

A small test-tube containing magnesium carbonate was suspended in the conical flask.

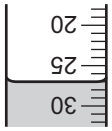
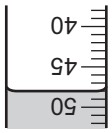
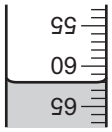
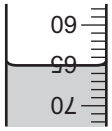
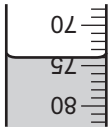
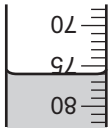
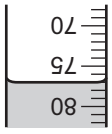
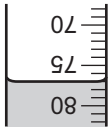


50 cm^3 of dilute nitric acid was added to the conical flask. The contents of the test-tube were released, allowing the solid magnesium carbonate to mix with the dilute nitric acid. A stop-clock was started and the volume of gas collected in the inverted measuring cylinder was measured every 10 seconds for 80 seconds.

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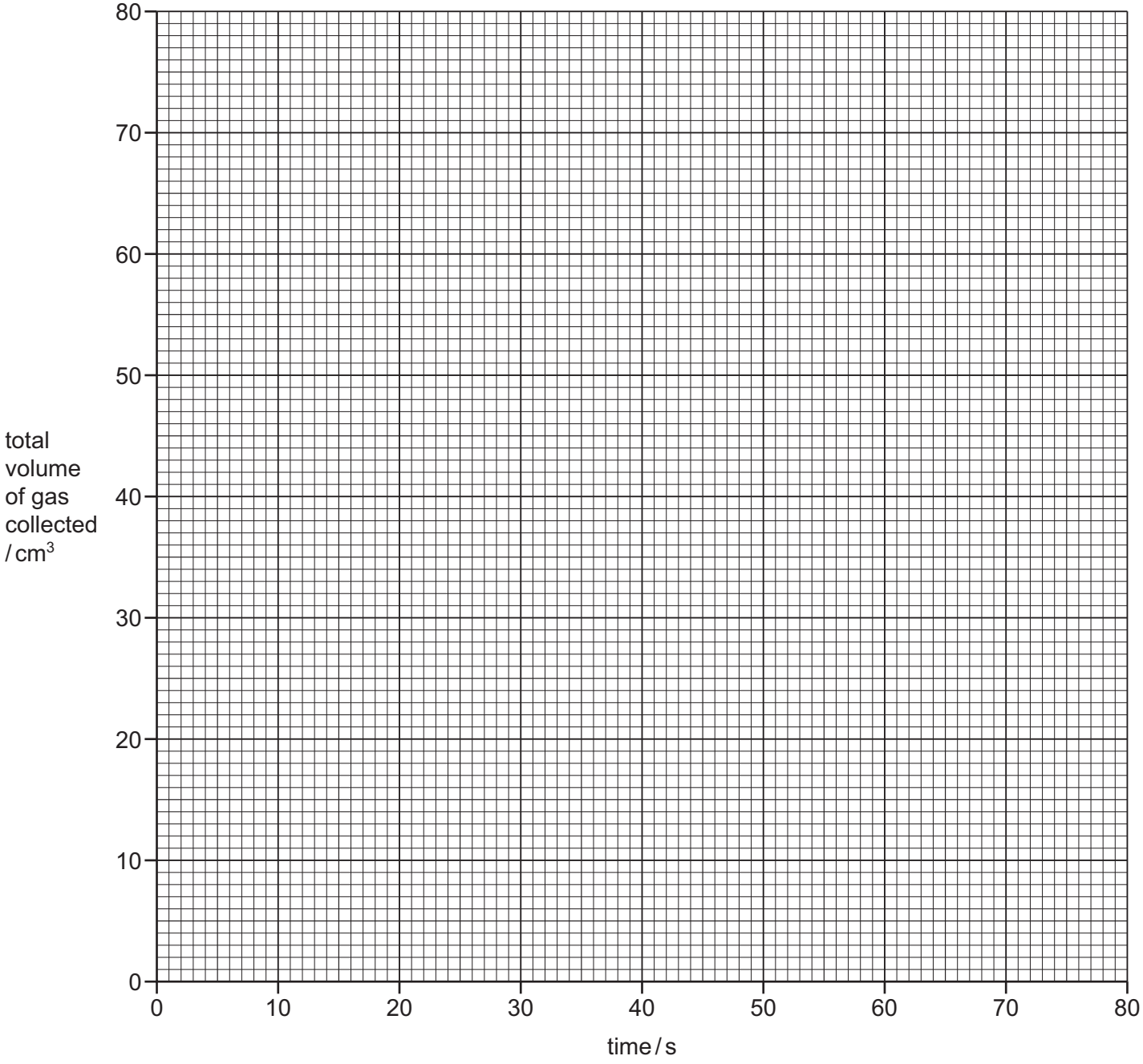
[Turn over

(a) Use the inverted measuring cylinder diagrams to record the volume of gas collected in the table.

time / s	inverted measuring cylinder diagram	total volume of gas collected / cm^3
0		
10		
20		
30		
40		
50		
60		
70		
80		

[2]

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



[3]

(c) (i) One of the points is anomalous.

Circle this point on your graph. [1]

(ii) **From your graph**, deduce the time taken to collect 40 cm^3 of gas.
Show clearly **on the grid** how you worked out your answer.

..... s [2]

(d) State **one** possible source of error in this experiment. Suggest **one** improvement to reduce this source of error.

source of error .....

improvement .....
[2]

(e) The average rate of the reaction can be calculated using the equation shown.

$$\text{average rate of reaction} = \frac{\text{volume of gas collected / cm}^3}{\text{time taken / s}}$$

(i) Calculate the volume of gas collected between 10 seconds and 30 seconds.

..... [1]

(ii) Calculate the average rate of reaction between 10 seconds and 30 seconds. Include the unit in your answer.

average rate of reaction = ...

unit = ...
[2]

(f) The student calculated that the total volume of gas collected in this reaction would be 85 cm^3.

Suggest and explain why the actual volume of gas collected was different from 85 cm^3.

.....

.....

..... [2]

(g) Sketch **on the grid** the graph you would expect if the experiment were repeated at a **lower** temperature. Label this graph as **L**. [2]

[Total: 17]

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3 Two substances, solid **A** and solid **B**, were analysed. Solid **A** was zinc nitrate.
Tests were done on the substances.

tests on solid A

Complete the expected observations.

Solid **A** was added to distilled water and the mixture shaken to dissolve solid **A** and produce solution **A**. Solution **A** was divided into three equal portions in three test-tubes.

(a) (i) A few drops of aqueous sodium hydroxide were added to the first portion of solution **A**.

observations ..... [2]

(ii) An excess of aqueous sodium hydroxide was then added to this mixture.

observations ..... [1]

(b) (i) A few drops of aqueous ammonia were added to the second portion of solution **A**.

observations ..... [1]

(ii) An excess of aqueous ammonia was then added to this mixture.

observations ..... [1]

(c) Aluminium foil and aqueous sodium hydroxide were added to the third portion of solution **A**. The mixture was heated and the gas produced was tested with litmus paper.

observations .....

..... [2]

tests on solid B

Some of the tests and observations are shown.

tests on solid **B**	observations
test 1 A flame test was done on solid **B**.	red flame
test 2 Solid **B** was dissolved in water. Dilute nitric acid and aqueous silver nitrate were added to the solution.	yellow precipitate formed

(d) Identify solid **B**.

..... [2]

[Total: 9]

4 Iodine dissolves in two different solvents: ethanol and hexane.

Plan an experiment to find out in which solvent iodine is the most soluble at room temperature.

You are provided with iodine, the two solvents and common laboratory apparatus.

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..... [6]

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