Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

CHEMISTRY **0620/63**

Paper 6 Alternative to Practical **May/June 2017**

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.

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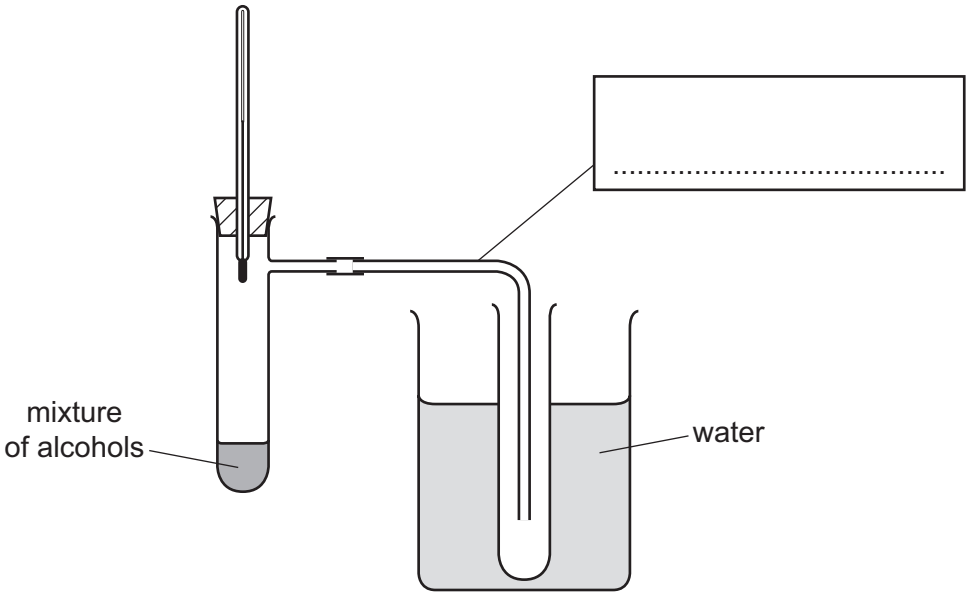
1 A mixture of alcohols can be separated by fractional distillation. The apparatus shown was used to separate ethanol from the mixture.



View solution

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

(ii) Indicate with an arrow where heat is applied. [1]

(b) What is the purpose of the water?

View solution

.....

..... [2]

(c) Why is the thermometer bulb placed as shown and **not** in the mixture of alcohols?

View solution

.....

..... [1]

(d) Use the letter **E** to indicate on the diagram where ethanol would collect. View solution [1]

(e) (i) Suggest a simple chemical test to show that the liquid collected is ethanol and **not** water.

..... [1]

(ii) Give a physical test to identify pure ethanol. View solution

..... [1]

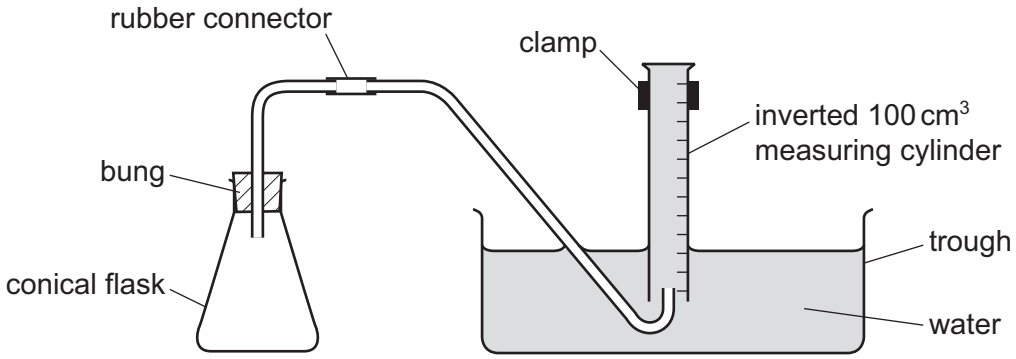
[Total: 8]

2 A student investigated the rate of reaction between magnesium ribbon and two different solutions of dilute sulfuric acid, solution **G** and solution **H**. The acid was in excess in both experiments.

Two experiments were carried out.

Experiment 1

- The apparatus was set up as shown in the diagram.



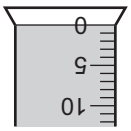
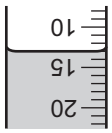
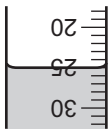
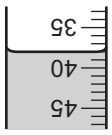
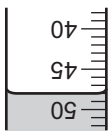
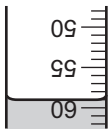
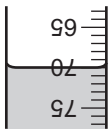
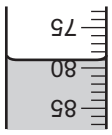
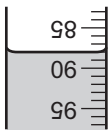
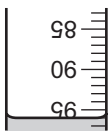
- Using a measuring cylinder, 50 cm^3 of solution **G** were poured into the conical flask. A piece of magnesium ribbon was added to the conical flask and the bung replaced.
- The timer was started immediately and the total volume of gas collected in the measuring cylinder was measured every 20 seconds for 180 seconds (3 minutes).

Experiment 2

- Experiment 1 was repeated using 50 cm^3 of solution **H** instead of solution **G**.

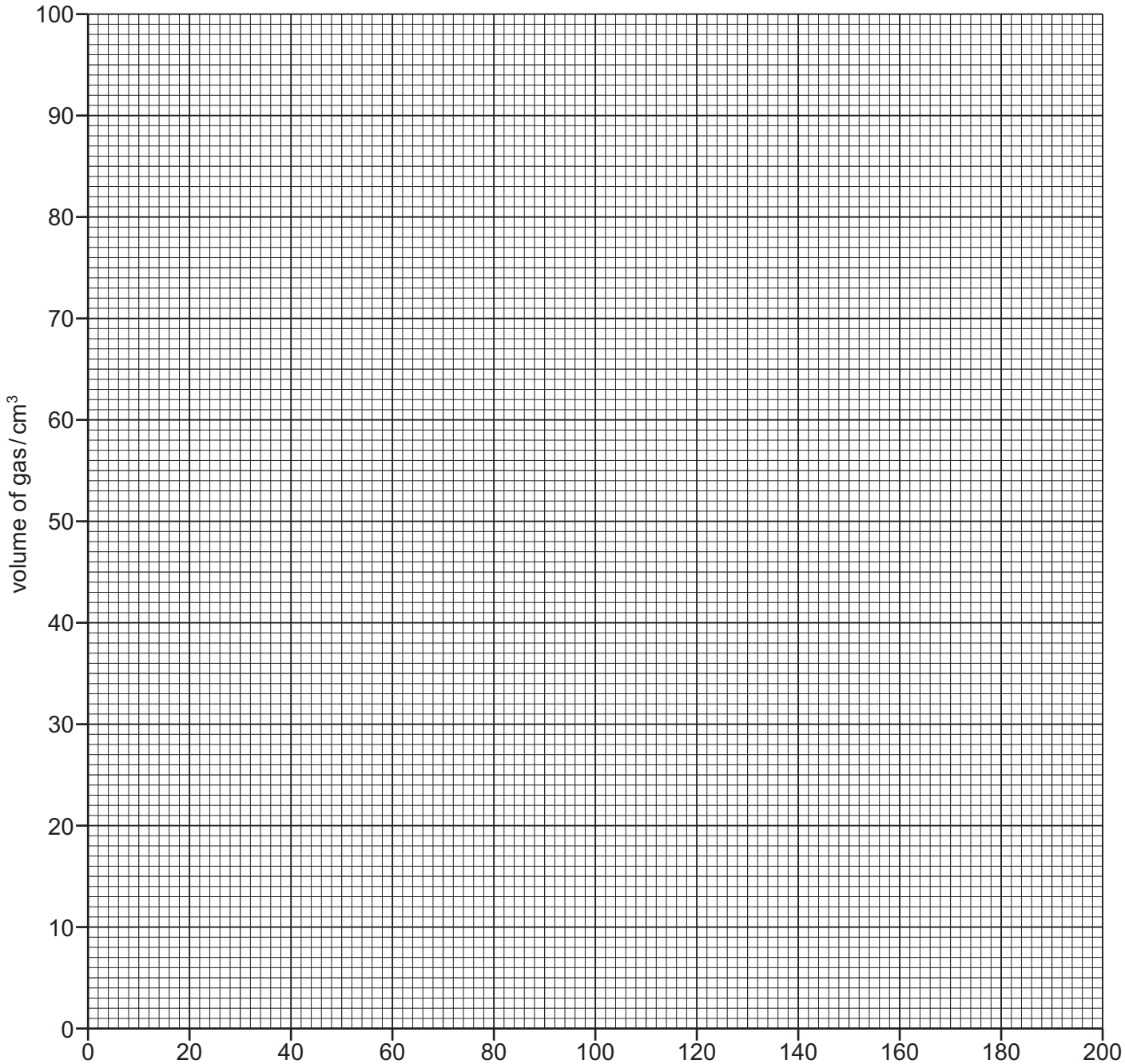
(a) Use the measuring cylinder diagrams to record the volumes of gas collected in Experiment 1.

View solution

	Experiment 1		Experiment 2
time / s	measuring cylinder diagram	volume of gas / cm^3	volume of gas / cm^3
0			0
20			8
40			14
60			21
80			27
100			33
120			39
140			45
160			50
180			55

[3]

(b) Plot the results for Experiments 1 and 2 on the grid and draw **two** smooth line graphs. Clearly label your graphs.



View solution [4]

(c) Which experiment had the faster rate of reaction? Suggest a reason why the rate was faster in this experiment.

.....

..... [2]

View solution

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

View solution

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

For Experiment 1, calculate the average rate of reaction for the first 30 seconds of the reaction. Include the units.

rate = ...

units = ...
[3]

(e) Why, eventually, will no more gas be produced?

View solution

..... [1]

(f) Suggest the effect on the rate of reaction of using the same mass of magnesium powder instead of magnesium ribbon. Explain your answer.

.....

.....

..... [2]

(g) Give **one** advantage and **one** disadvantage of using a measuring cylinder to measure the volumes of solution **G** and solution **H**.

advantage .....

disadvantage .....
[2]

(h) Suggest **one** improvement to these experiments.

View solution

.....

..... [1]

[Total: 18]

3 Two substances, solid **J** and solution **K**, were analysed. Solution **K** was hydrogen peroxide. Tests on each substance were carried out. The observations are shown.

tests	observations
tests on solid J Appearance of solid **J**.	black solid
test 1 Dilute hydrochloric acid was added to solid **J**. The mixture was heated and the gas given off was tested with damp litmus paper.	blue litmus turned white
tests on solution K Solution **K** was divided into two equal portions in two test-tubes. **test 2** Iron(II) sulfate crystals were added to the first portion of the solution. The mixture was shaken and aqueous sodium hydroxide was added to the mixture.	red-brown precipitate formed
test 3 Solid **J** was added to the second portion of the solution. The gas given off was tested with a splint.	glowing splint relit solid **J** was unchanged

(a) Name the gas given off in **test 1**.

View solution 

..... [1]

(b) (i) Name the precipitate formed in **test 2**.


View solution

..... [2]

(ii) A new **test 2** was carried out. Iron(II) sulfate crystals were added to **water**, the mixture was shaken and then aqueous sodium hydroxide was added.

What would be observed?


View solution

..... [2]

(c) Name the gas given off in **test 3**.

..... [1]

(d) What conclusions can you draw about solid **J**?

View solution

.....

..... [2]

[Total: 8]

View solution

4 Cassiterite is a naturally occurring form of tin oxide.

Describe how you would
- obtain a sample of tin from a large lump of cassiterite in the laboratory,
- determine the percentage by mass of tin present in cassiterite.

Tin is similar in reactivity to iron.

Your answer should include any apparatus and chemicals used and the conditions required.

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..... [6]

[Total: 6]

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