Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

* 7 3 6 2 2 2 6 5 2 6 *

CHEMISTRY **0620/62**

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.

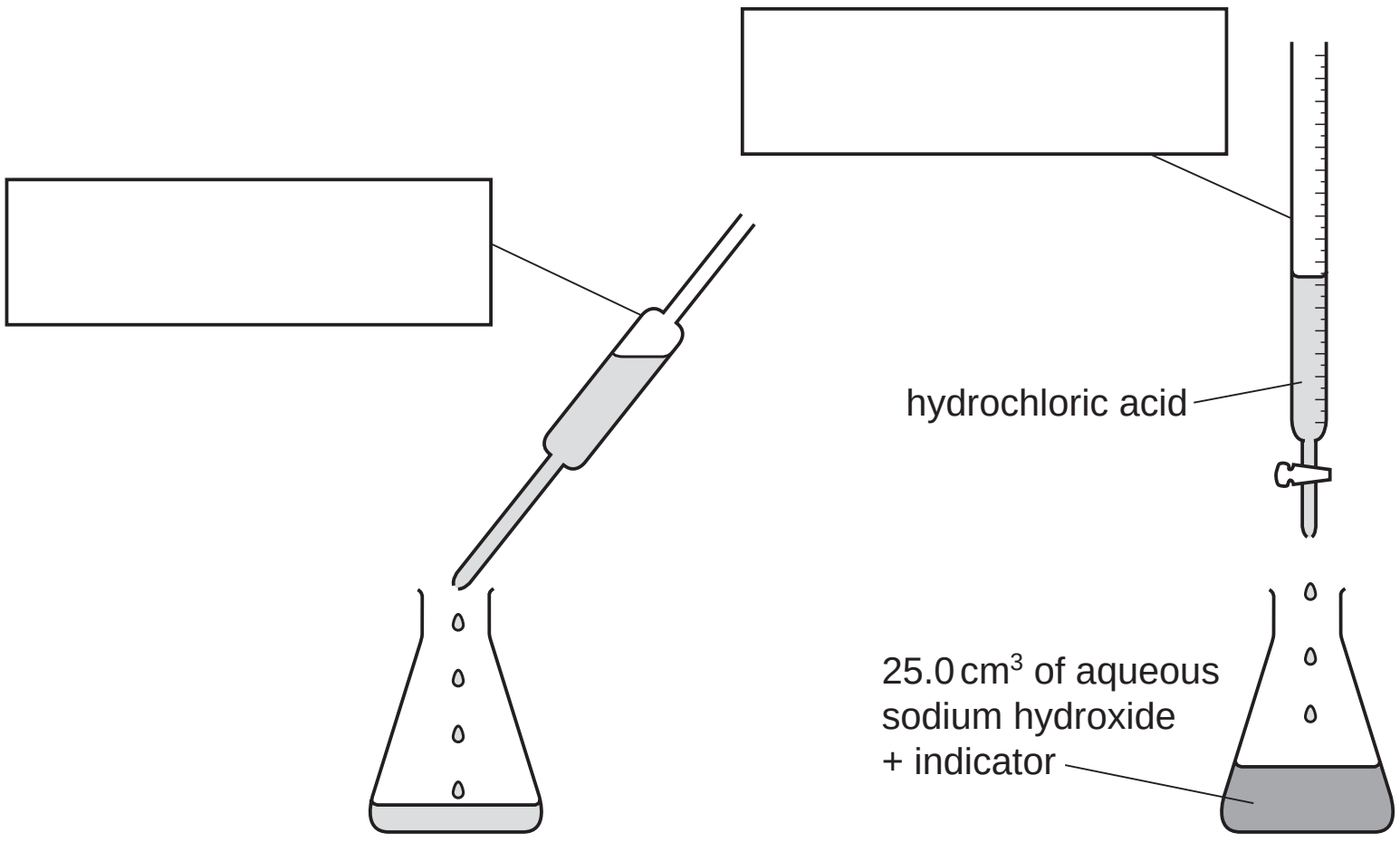
The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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

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1 The volume of hydrochloric acid that reacts with 25.0 cm^3 of aqueous sodium hydroxide can be found using the apparatus below.



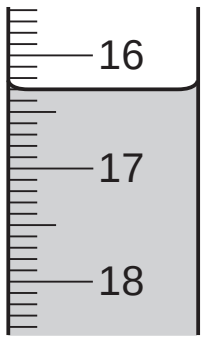
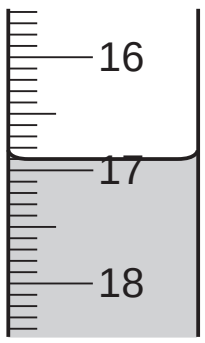
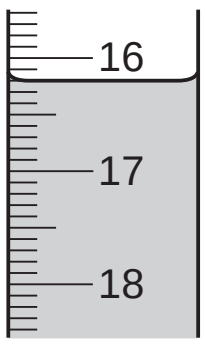
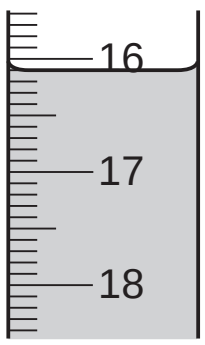
(a) Complete the boxes to identify the pieces of apparatus labelled. [2]

(b) Name a suitable indicator that could be used.

..... [1]

(c) A student did the experiment four times and the volume of hydrochloric acid added each time was measured.

Use the burette diagrams in the table to record the volumes of hydrochloric acid added.

experiment	burette diagram	volume of acid added / cm^3
1		
2		
3		
4		

[2]

(d) (i) What type of chemical reaction occurs when hydrochloric acid reacts with sodium hydroxide?

..... [1]

(ii) How did the student know when all of the sodium hydroxide had reacted?

..... [1]

(e) **(i)** Which **one** of the results is anomalous?

..... [1]

(ii) Suggest what may have caused this result to be anomalous.

..... [1]

(iii) Use the other results to calculate the average amount of hydrochloric acid that reacted with the sodium hydroxide solution.

.....

..... [2]

(f) Which of the solutions was more concentrated? Explain your answer.

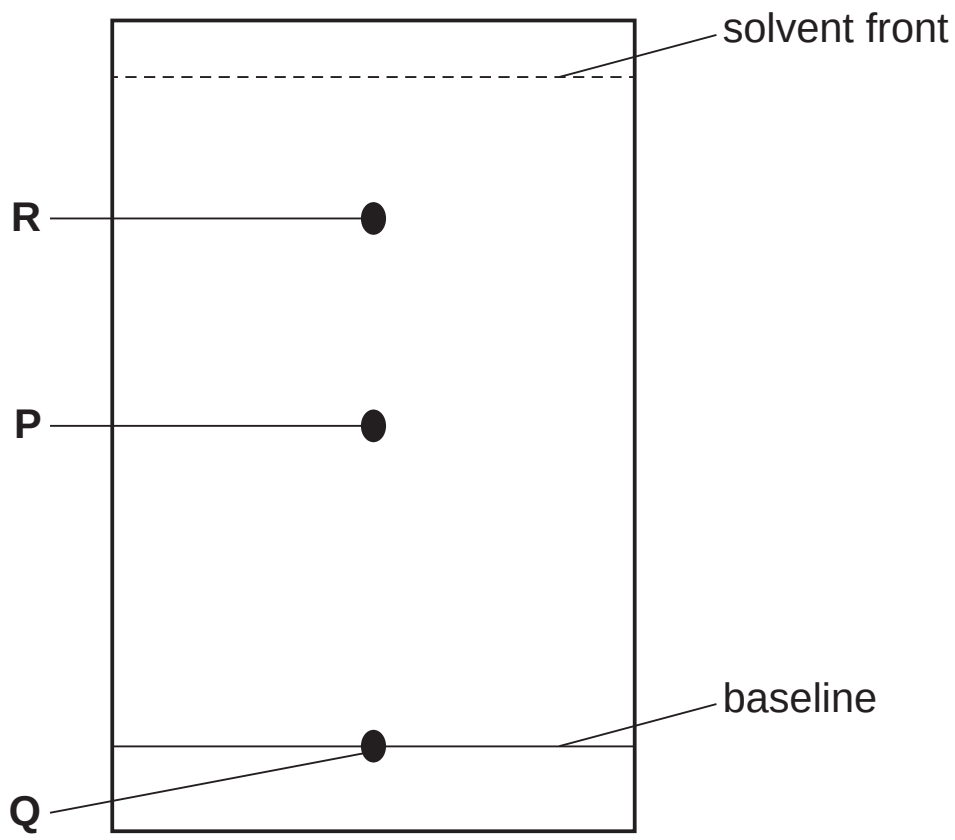
.....

..... [2]

[Total: 13]

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2 A mixture of three compounds, **P**, **Q** and **R**, was separated using a piece of paper.



(a) Name this method of separation.

..... [1]

(b) What could have been used to apply the mixture onto the paper?

..... [1]

(c) Suggest a possible solvent that could be used for this separation.

..... [1]

(d) Suggest why compound **Q** remained on the baseline.

.....

..... [1]

(e) R_f values are used to identify compounds.

$$R_f = \frac{\text{distance travelled by compound}}{\text{distance travelled by the solvent}}$$

Use the diagram to work out the R_f value of compound **R**.

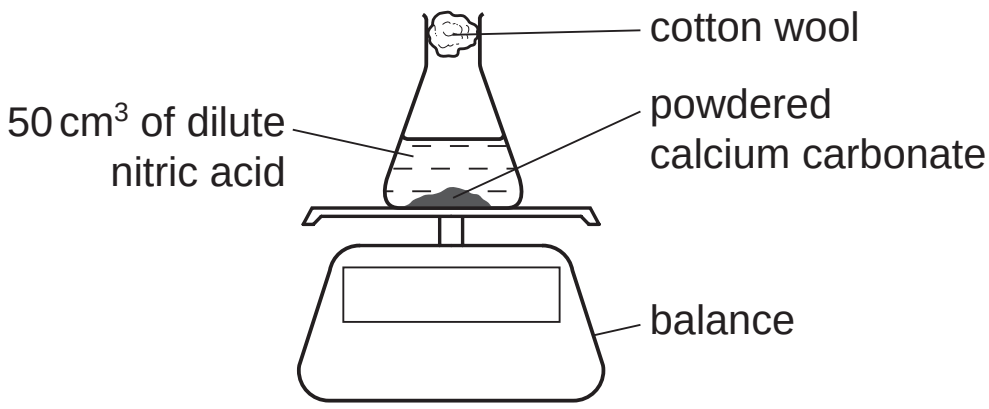
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[Total: 6]

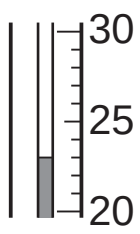
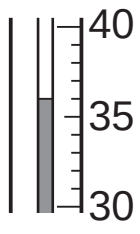
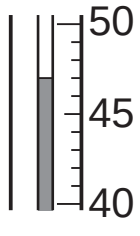
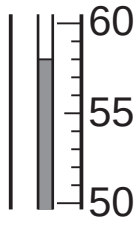
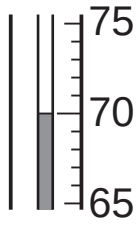
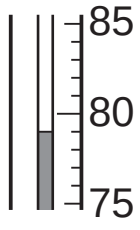
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3 A teacher demonstrated the rate of reaction of dilute nitric acid with powdered calcium carbonate at different temperatures.
50 cm^3 of dilute nitric acid was heated to a known temperature and placed on a balance.



Excess powdered calcium carbonate was added to the nitric acid and the mass of the beaker and contents recorded. The time taken for the mass to decrease by 1 g was measured. The experiment was repeated at different temperatures.

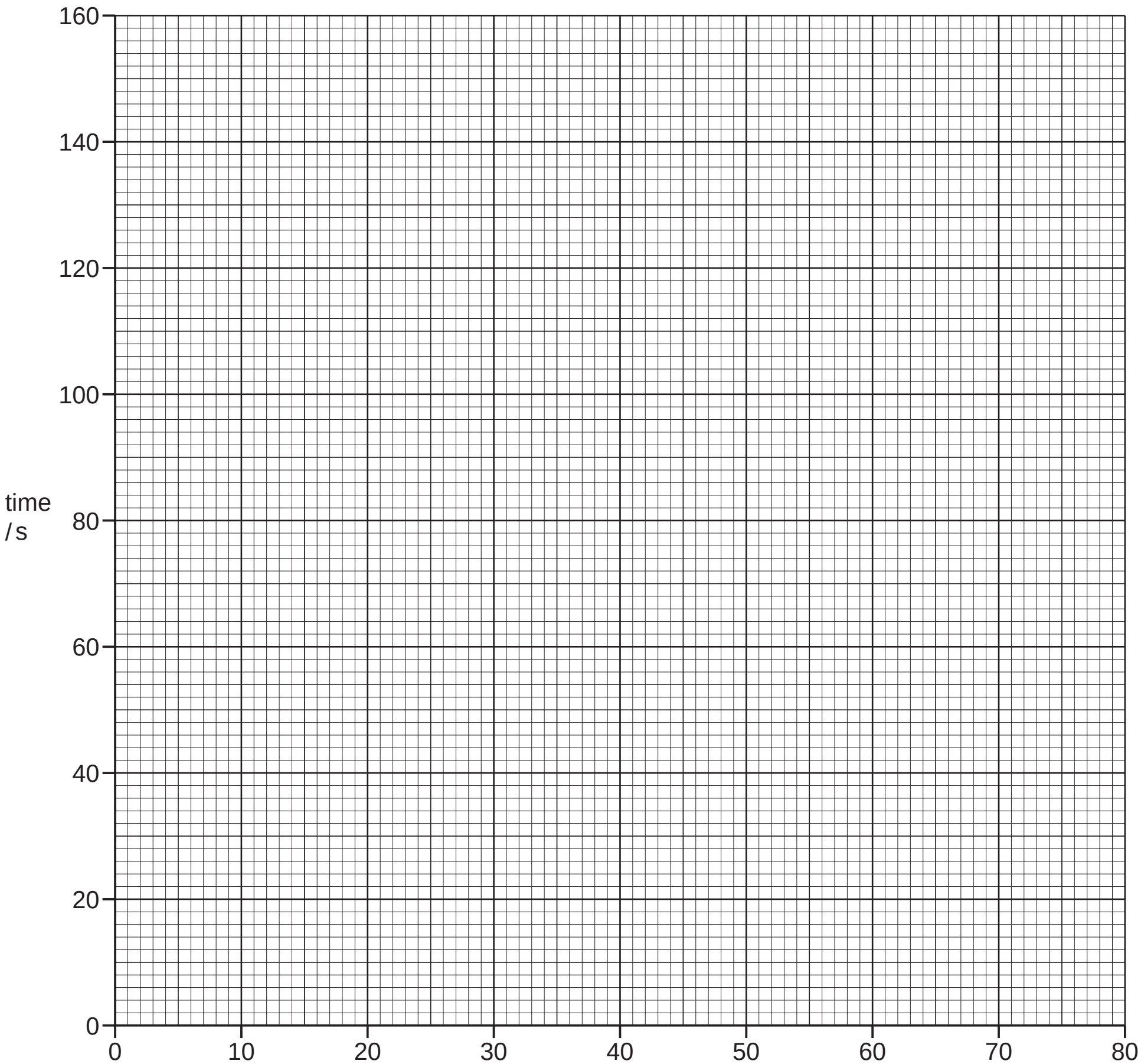
(a) Using the thermometer diagrams, record the temperatures in the table.

thermometer diagram	temperature of nitric acid / °C	time for mass to decrease by 1 g in seconds
		139
		102
		99
		60
		45
		38

[3]

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



[3]

(c) Which point is inaccurate? Explain why you chose this point.

.....

..... [2]

(d) **Use your graph** to find out the time of reaction at a temperature of 30 °C. Show clearly on the grid how you obtained your answer.

..... [3]

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(e) **(i)** How does the rate of this reaction vary with the change in temperature?

..... [1]

(ii) Explain why.

.....

.....

..... [2]

(f) **(i)** What would be the effect of repeating the experiments using lumps of calcium carbonate instead of powdered calcium carbonate? Explain your answer.

.....

..... [2]

(ii) Sketch on the grid the curve you would expect. [1]

(g) Explain why cotton wool was used in the neck of the conical flask.

.....

..... [2]

[Total: 19]

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4 Three jars of gas have lost their labels. The gases are known to be

- ethene,
- ammonia,
- oxygen.

Complete the table to show the chemical tests that could be used to identify each of these gases.

gas	chemical test	result of test
ethene	....	.... [2]
ammonia	....	.... [2]
oxygen	....	.... [2]

[Total: 6]

5 Two aqueous solutions, **K** and **L**, were analysed. Solution **L** was aqueous calcium iodide. Tests on the solutions and some of the observations are in the following tables. Complete the observations in the second table.

tests	observations
<u>tests on solution **K**</u> **(a)** Colour of solution **K**.	green / blue
(b) The solution was divided into four equal portions. **(i)** Aqueous sodium hydroxide was added to the first portion drop by drop and shaken. An excess of aqueous sodium hydroxide was then added to the mixture. **(ii)** Aqueous ammonia was added to the second portion drop by drop and shaken. An excess of aqueous ammonia was then added to the mixture. **(iii)** Dilute nitric acid and barium nitrate solution were added to the third portion. **(iv)** Dilute nitric acid and silver nitrate solution were added to the fourth portion.	pale blue precipitate the precipitate was insoluble blue precipitate the precipitate dissolved to form a deep blue solution no visible change white precipitate formed

(c) Identify solution **K**.

..... [2]

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tests	observations
<u>tests on solution **L**</u> **(d)** Colour of solution **L**.	..... [1]
(e) The solution was divided into three equal portions. **(i)** Aqueous sodium hydroxide was added to the first portion of the solution drop by drop and shaken. An excess of aqueous sodium hydroxide was then added to the mixture. **(ii)** Aqueous ammonia was added to the second portion of the solution drop by drop and shaken. An excess of aqueous ammonia was then added to the mixture and shaken. **(iii)** Dilute nitric acid and silver nitrate solution were added to the third portion of the solution.	.... [2] .... [1] .... [1] .... [2]

[Total: 10]

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6 You are provided with samples of three metals, tin, zinc and silver.

Plan an investigation to show the order of reactivity of these three metals.
You are provided with common laboratory apparatus and dilute acids.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 6]

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