



General Certificate of Secondary Education
2025

Centre Number

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Candidate Number

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Single Award Science

Unit 4

Booklet A

Foundation Tier

[GSA41]

TIME

2 hours.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **both** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is **30**.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Follow all health and safety instructions.
Safety glasses must be worn at all times.
You may not have access to notes, textbooks and other material to assist you.
You may use a ruler and scientific calculator if required.
The apparatus and materials required to complete the task(s) are provided.

For Examiner's
use only

Question Number	Marks
1	
2	

Total
Marks

Section A – Chemistry

Examiner Only	
Marks	Remark

- 1 (a) To investigate the reaction of an acid with a metal, you have been given strips of magnesium metal and a beaker of acid.

(i) Describe the appearance of the acid.

_____ [1]

(ii) Name the hazard symbol shown on the beaker of acid.

Circle your answer.

corrosive **caution** **flammable** [1]

(iii) State **one** safety precaution needed when using the acid.

_____ [1]

- (b) When a metal is added to an acid there is a rise in temperature. Use the method below to investigate if the amount of metal affects the rise in temperature.

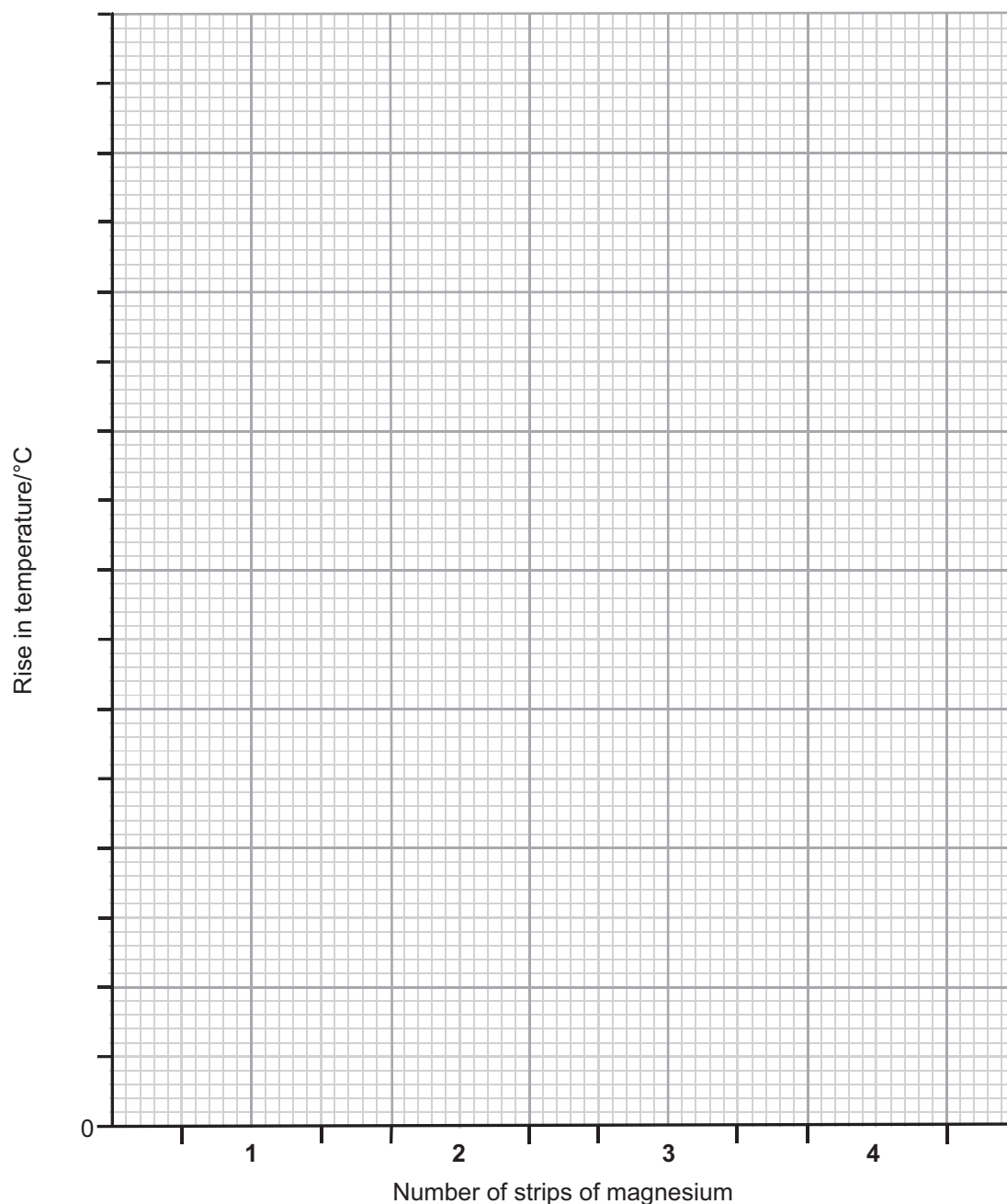
1. Use a measuring cylinder to measure 25 cm³ of acid.
2. Pour the acid into the polystyrene cup which is inside the beaker.
3. Place the thermometer in the acid for 1 minute.
4. Measure the initial temperature of the acid and record this in the table below.
5. Add **one** strip of magnesium to the acid and gently stir using the thermometer.
6. Measure and record the **highest** temperature reached by the acid, then remove the thermometer from the acid.
7. Using a new polystyrene cup each time, repeat steps **1–6** using 2, 3 and then 4 strips of magnesium.
8. Complete the table by calculating the rise in temperature.

Number of strips of magnesium	Initial temperature/°C	Highest temperature/°C	Rise in temperature/°C
1			
2			
3			
4			

[3]

(c) (i) On the grid below:

- add a suitable scale to the y-axis (rise in temperature); and
- draw a **bar chart** of your results.



[3]

(ii) Use your results to predict the rise in temperature if **five** strips of magnesium were added to the acid.

Rise in temperature _____ °C [1]

Examiner Only	
Marks	Remark

- (d) Give **one** observation that showed a gas was produced in this reaction.

_____ [1]

- (e) Give **one** variable that was kept constant during this investigation to make sure that the results were valid (fair test).

_____ [1]

- (f) Why was it important, in step **5**, to stir the mixture?

_____ [1]

- (g) Polystyrene is an insulator. Suggest why a polystyrene cup was used in this investigation.

_____ [1]

- (h) This investigation was repeated with a **more** concentrated acid. Suggest what effect, if any, this may have on how quickly the temperature rises.

Circle your answer.

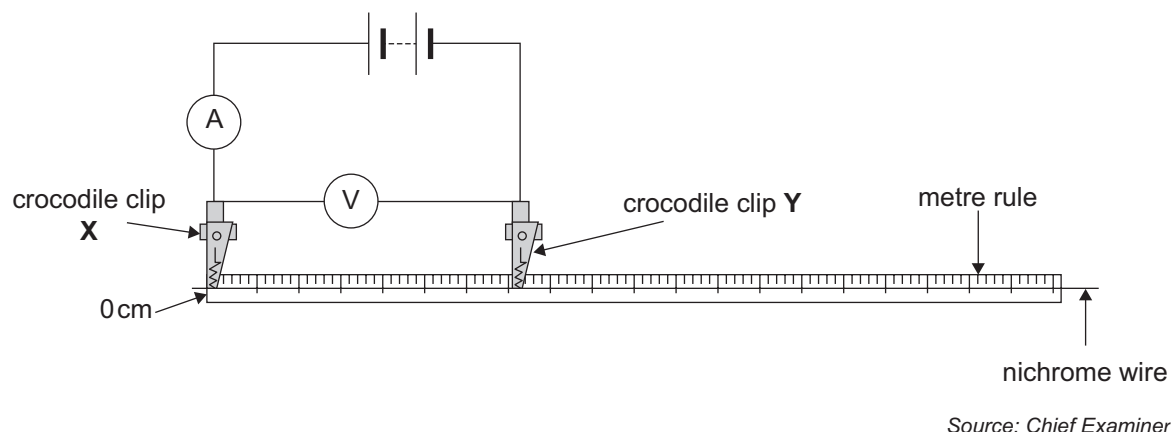
no effect : **rises more quickly** : **rises more slowly** [1]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

Section B – Physics

- 2 The diagram below shows the electrical circuit used to investigate the effect of length on the resistance of a nichrome wire.



- (a) Carry out the investigation, using the circuit provided, by following the method below.

Do not change the setting on the power supply or the position of crocodile clip X during the investigation.

1. Attach crocodile clip Y, 20 cm along the wire.
2. Turn on the power supply.
3. Record the voltage and current in the table below.
4. Turn off the power supply for 1 minute.
5. Repeat steps 1–4 with crocodile clip Y and set at 40 cm, 60 cm and 80 cm along the wire.
6. Use the equation:

$$\text{resistance} = \frac{\text{voltage}}{\text{current}}$$

to calculate the resistance of each length of wire, and record your results in the table below to **one decimal place**.

Length of wire/ cm	Voltage/ V	Current/ A	Resistance/ Ω
20			
40			
60			
80			

[3]

(b) (i) Name the meter that is connected in parallel to the nichrome wire.

_____ [1]

(ii) Complete the sentence below to describe the trend shown by your results.

As the length of the wire increases, the resistance

_____ . [1]

(iii) Complete the table below, using ticks (✓), to identify the dependent, independent and controlled variables in this investigation.

One has been done for you.

	Dependent variable	Independent variable	Controlled variable
thickness of wire			✓
resistance of wire			
length of wire			
temperature of wire			

[3]

(iv) Which step **1**, **2**, **3** or **4**, in the method, prevented the wire from getting too hot?

_____ [1]

Examiner Only

Marks Remark

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**General Certificate of Secondary Education
2025**

Single Award Science

Unit 4: Practical Skills

Booklet A

Foundation Tier

[GSA41]

APPARATUS AND MATERIALS LIST

To be accessed by Head of Department only

It is the responsibility of the centre to ensure that appropriate risk assessments are carried out for all practical skills assessments.

Section A – Chemistry

Apparatus List

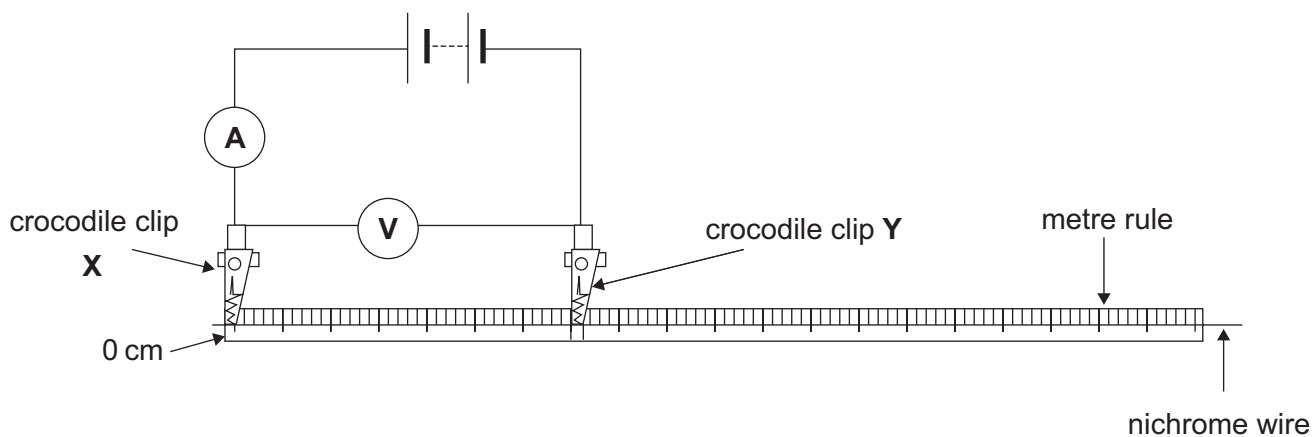
- Safety goggles
- Measuring cylinder (to measure 25 cm^3)
- 4 Beakers (250 cm^3) each containing a polystyrene cup
- Alcohol thermometer
- 10 Magnesium strips – each 1 cm in length
- Approx. 125 cm^3 of 2.0 M hydrochloric acid in a beaker labelled **Acid** with corrosive hazard **symbol**
- Stopwatch
- Calculator

Section B – Physics

- Power supply of at least 6 V (variable power supply set to 4 V)
- Ammeter (digital, capable of measuring 0–2 A minimum)
- Voltmeter (digital, capable of measuring 0–6 V minimum)
- 110 cm of 28 SWG nichrome wire attached to a metre rule with Sellotape – 0 cm labelled
- Connecting leads (× 5)
- Crocodile clips (× 2) – labelled **X** and **Y**
- Stopwatch
- Calculator

Notes on set-up for physics

Set up the circuit as shown below:



Source: Chief Examiner

Straighten the nichrome wire and tape it to the metre rule so that 0 cm, 20 cm, 40 cm, 60 cm and 80 cm are easily connected into the circuit using the crocodile clips.

Set the power supply at 4 V and tape over the controls so that the voltage cannot be changed.

