



General Certificate of Secondary Education
2025–2026

Centre Number

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Candidate Number

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Single Award Science: Physics

Unit 3
Higher Tier



[GSA32]

GSA32

WEDNESDAY 12 NOVEMBER 2025, MORNING

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete questions in black ink and use a dark HB pencil for drawings and graphs.

Do not write with a gel pen.

Answer **all nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You may use a scientific calculator.

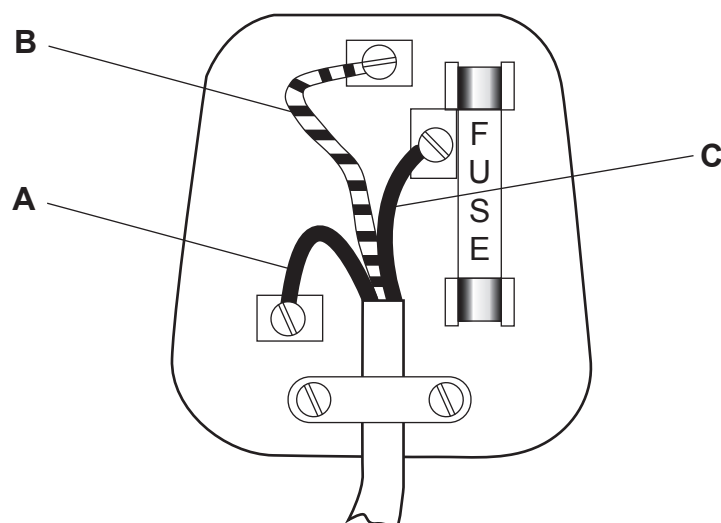
Quality of written communication will be assessed in Question **3(a)**.

14913



20GSA3201

- 1 The diagram below shows the inside of a three-pin plug.



- (a) Name the wire labelled **A**.

_____ [1]

Double insulated appliances have only two wires in their plugs.

- (b) Which **two** wires **A**, **B** or **C** are needed in these plugs?

_____ [1]

Sophie has a kettle which uses a current of 9 A. The plug fitted to the kettle has a 5 A fuse and she finds the kettle does not work.

- (c) Explain why the kettle does not work.

_____ [1]



2 The photograph below shows a heater.



(a) Name the process which causes the hot air beside this heater to rise.

_____ [1]

Heat can be lost from a house by conduction and convection.

(b) Suggest **one** way of reducing heat loss from a house by:

Conduction: _____

Convection: _____ [2]

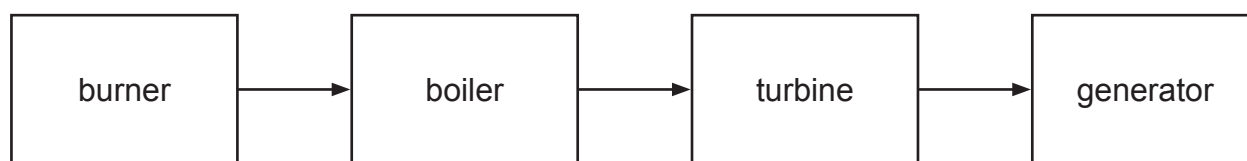
(c) In hot countries people **do not** usually paint the outside of their houses with dark, matt colours. Explain why.

_____ [2]

[Turn over



3 The diagram below shows the main parts of a fossil fuel power station.



(a) Describe how the parts above are used to generate electricity in a power station.

Your answer should include:

- the name of a fuel used in the burner;
- what happens in each part; and
- the energy changes taking place in each part.

In this question you will be assessed on the quality of your written communication skills including the use of specialist scientific terms.

[6]

An alternative method of generating electricity uses wind turbines.

- (b) State **one** advantage and **one** disadvantage of using a wind turbine to generate electricity.

Advantage

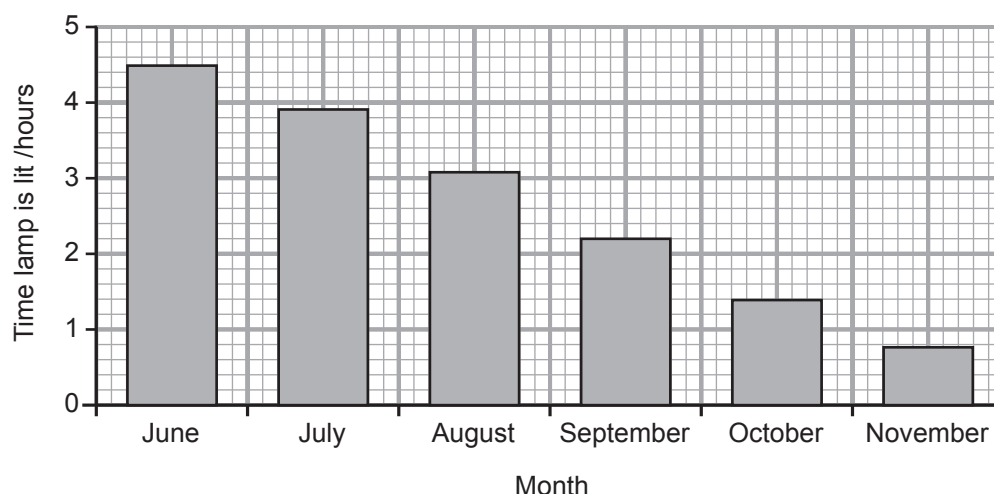
Disadvantage

[2]

A solar powered lamp uses sunlight to charge a battery. At night the battery provides electricity to light the lamp.

A student investigated how long the lamp stayed lit each night for six months.

The results are shown below.



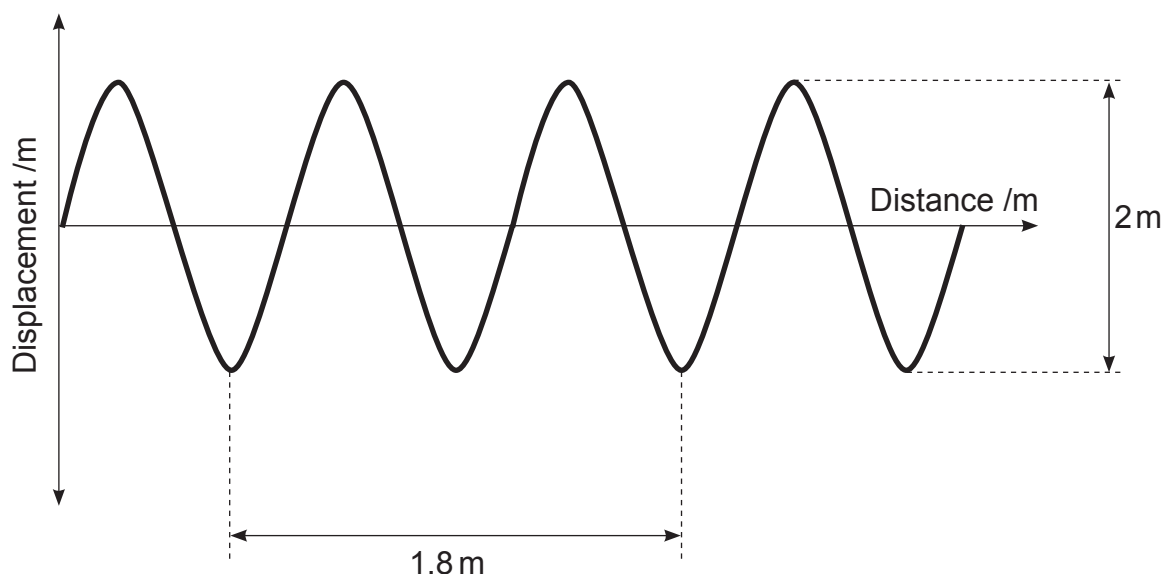
- (c) Describe and explain the results of this investigation.

[3]

[Turn over



- 4 The graph below shows how the displacement of a wave changes with distance.



- (a) What is the wavelength of this wave?

Wavelength = _____ m [1]

- (b) What is the amplitude of this wave?

Amplitude = _____ m [1]

- (c) How do waves transfer energy from one place to another?

_____ [1]

There are two different types of wave.

- (d) Name an example of each type:

transverse: _____

longitudinal: _____

[2]



- (e) A wave has a frequency of 20 Hz and wavelength 3.5 m.

Use the equation:

$$\text{velocity} = \text{frequency} \times \text{wavelength}$$

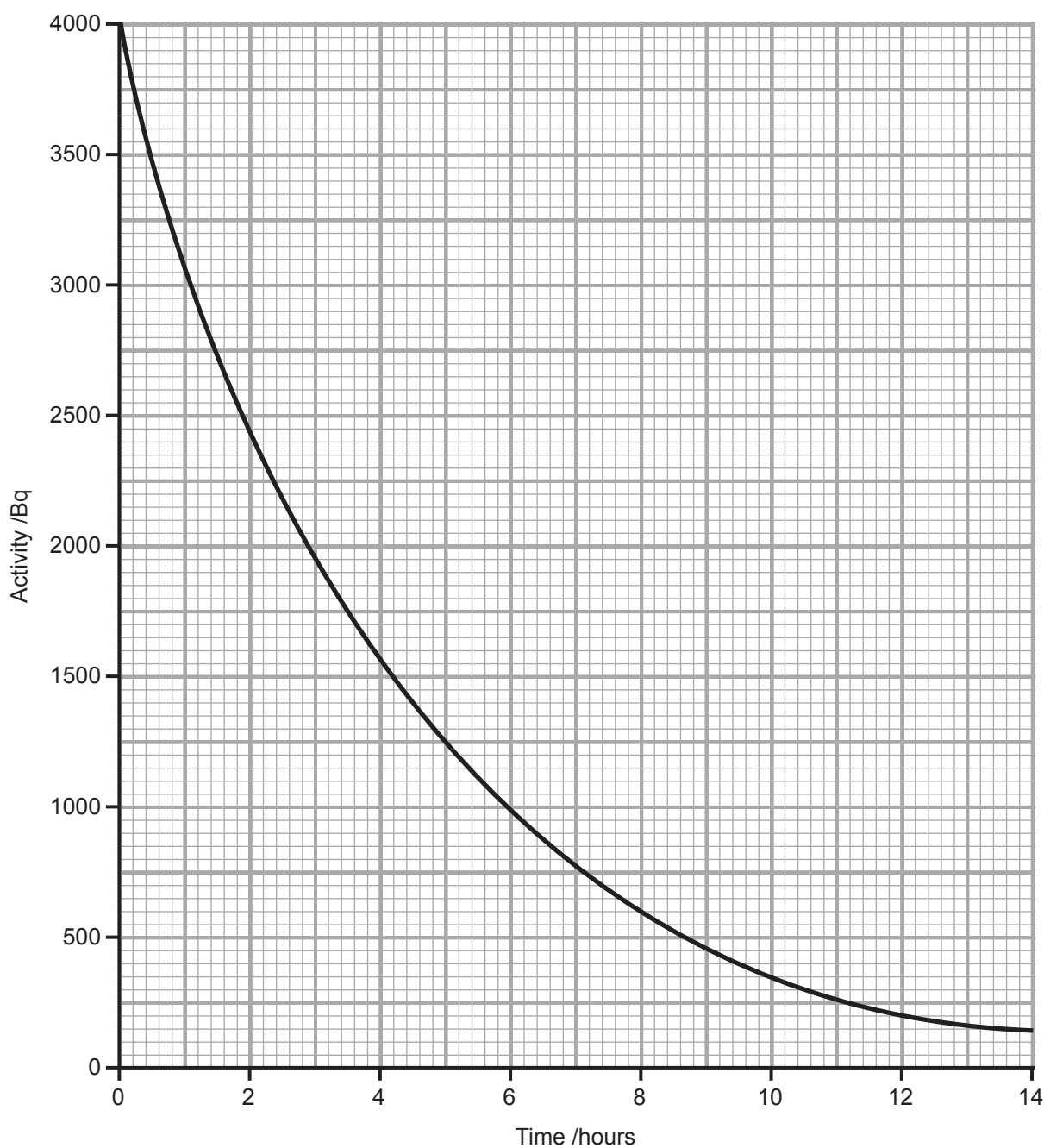
to calculate the velocity of this wave.

Show your working out.

Velocity = _____ m/s [2]



- 5 An investigation was completed to measure the count rate of a radioactive source. The activity of this source was measured over 14 hours and the results are shown in the graph below.



(a) What is meant by the term half-life?

[1]



(b) Use the graph opposite to calculate the half-life of this source.

Show your working out.

Half-life = _____ hours [2]

(c) (i) When alpha or beta particles collide with air molecules, the air molecules become charged. What is the name of this process?

_____ [1]

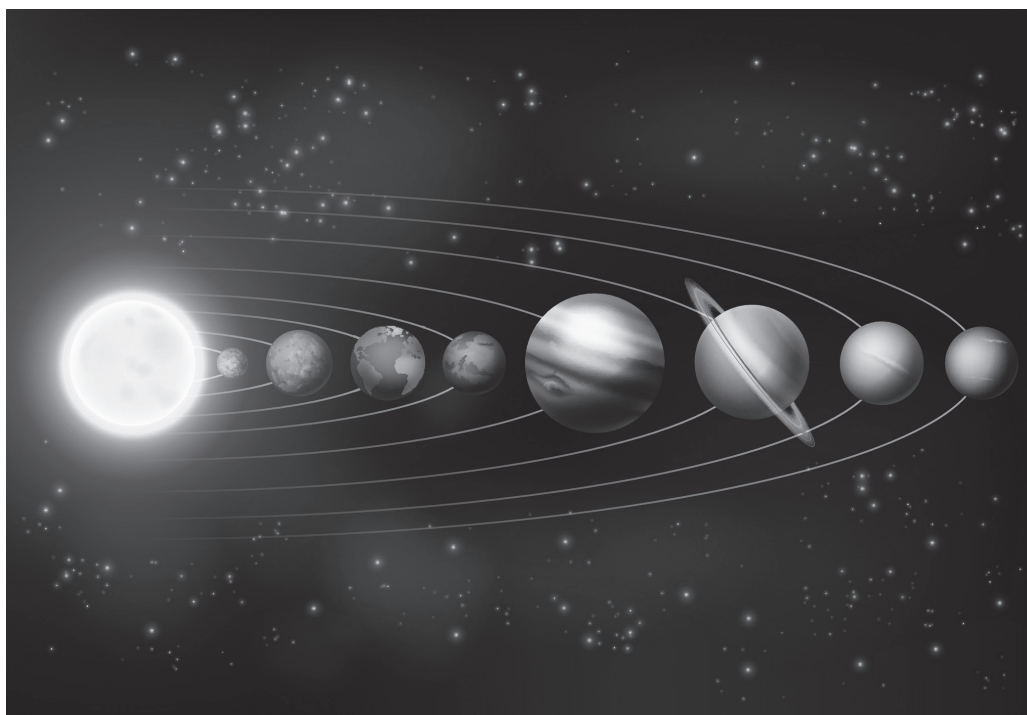
(ii) State a danger associated with this process and give **one** method a scientist could use to protect themselves when using radioactive materials.

_____ [2]

[Turn over



6 The diagram below shows the Solar System.



At the centre of the Solar System is a star called the Sun.

(a) Describe how a star is formed.

[3]



The table below gives information about five galaxies in the Universe.

Galaxy	Red shift	Speed away from Earth / m/s ($\times 10^3$)
A	0.67	20
B	0.77	23
C	0.20	6
D	0.70	21
E	0.30	10

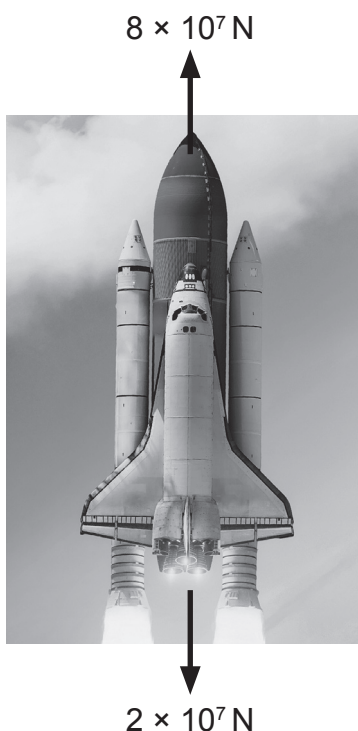
(b) Which galaxy is closest to Earth? Explain your answer.

[2]

[Turn over



- (c) To explore distant objects, such as planets and moons, it is necessary to launch spacecraft using a rocket such as the one shown below. The mass of the rocket is 2×10^6 kg.



- (i) Calculate the resultant force acting on this rocket.

Resultant force = _____ N [1]

- (ii) Use the equation:

resultant force = mass $\times$ acceleration

to calculate the acceleration of the rocket.

Show your working out.

Acceleration = _____ m/s^2 [2]



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(Questions continue overleaf)

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[Turn over



20GSA3213

- 7 The diagram below shows the horizontal forces acting on a car moving forwards at a constant speed.



- (a) What is the name of the force **F**?

_____ [1]

- (b) What is the size of this force? Explain your answer.

_____ [2]

The size of the forward force increases to 8500 N. The size of the backwards force does not change.

- (c) Explain, in terms of forces, what will happen to the car.

_____ [2]



The driver sees a hazard and applies the brakes to stop the car.

- (d) Give **one** factor which will increase the **braking** distance of the car. Explain why this factor increases the braking distance.

[2]

- (e) State **one** safety feature of a car's design and explain how it protects the driver.

[2]

[Turn over



- 8 The government is promoting the use of electric cars rather than petrol or diesel cars.

(a) Give one advantage of using an electric car.

[1]

The table below shows how the percentage of cars registered in the UK has changed from 2016 to 2021.

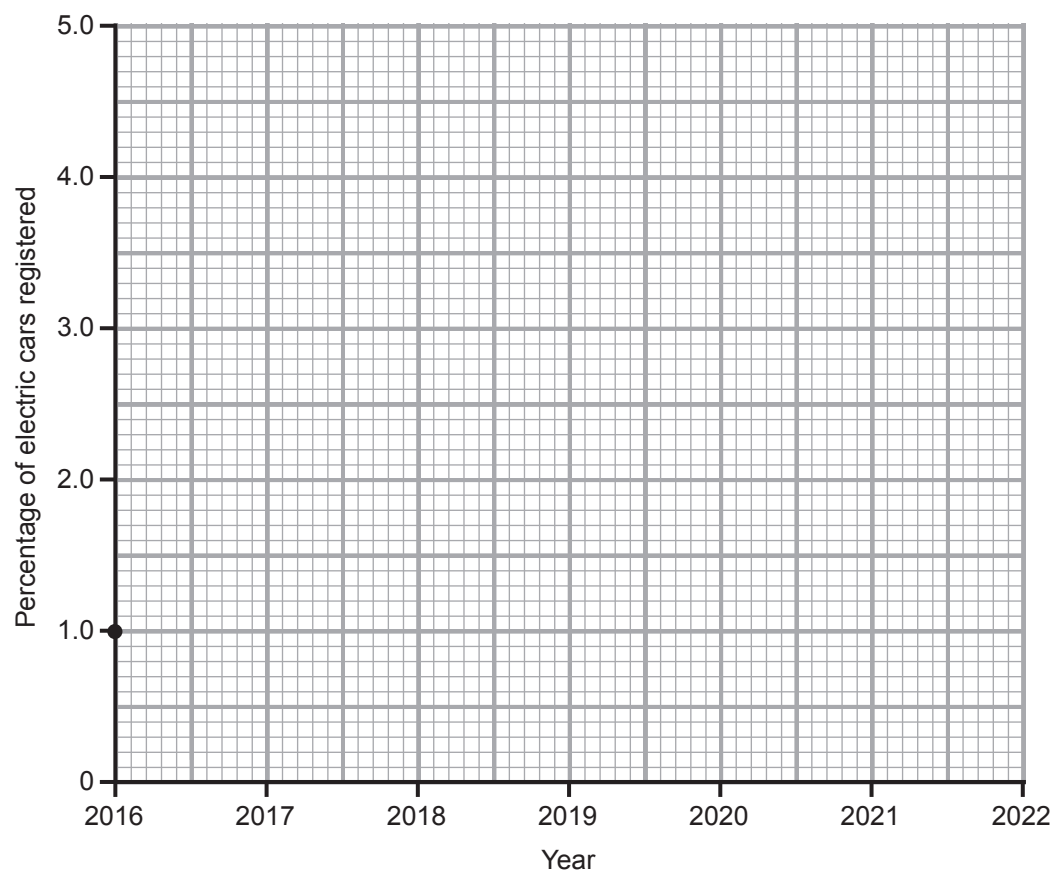
Year	Petrol or diesel cars /%	Electric cars /%
2016	99.0	1.0
2017	98.8	1.2
2018	98.4	1.6
2019	98.1	1.9
2020	97.4	2.6
2021	96.7	3.3

(b) State the trend shown by the information in the table above.

[1]



- (c) On the grid below, plot and draw a line graph to show how the percentage of **electric** cars has changed with time.
One point has been plotted for you.



[3]

- (d) Suggest what percentage of electric cars were registered in the UK in 2022.

_____ % [1]

Another method of reducing the use of petrol and diesel in cars is to use fuel extenders.

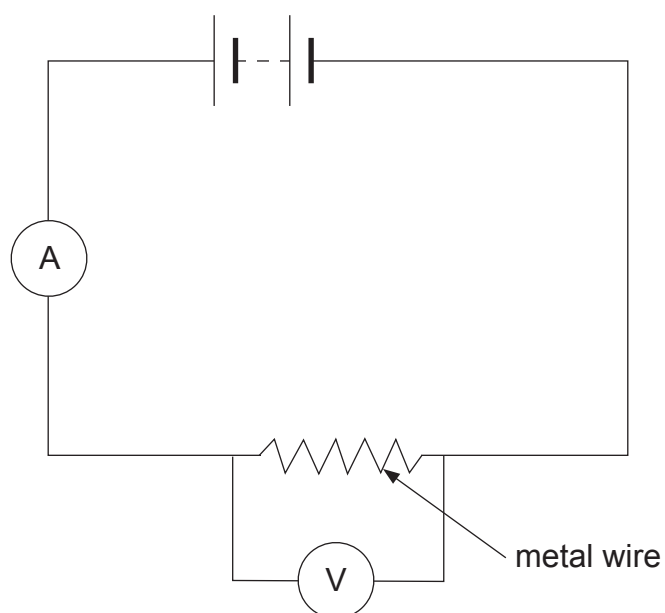
- (e) Explain the term fuel extender and give **one** example.

_____ [2]

[Turn over]



- 9 The circuit below was used to investigate the resistance of wires made from different metals.



The results of the investigation are shown below.

Metal wire	Resistance/ Ω
copper	0.017
gold	0.024
silver	0.016
tungsten	0.056



(a) Use the equation:

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

to calculate the current through the gold wire when the voltage was 0.24 V.

Show your working out.

Current = _____ A [2]

(b) Give one factor which must have been kept constant during this investigation.

_____ [1]

THIS IS THE END OF THE QUESTION PAPER



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Question Number	Marks
1	
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Examiner Number

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