



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
Foundation Tier



[GSA31]

GSA31

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 **9(a)**.

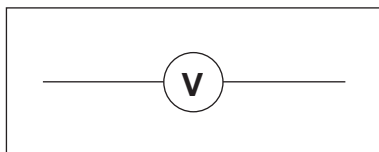
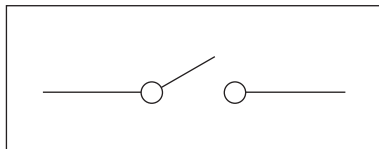
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20GSA3101

- 1 (a) Below are two electrical symbols. Use lines to match each symbol with its description.

Symbol



Description

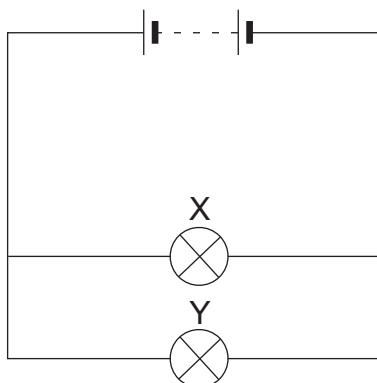
variable resistor

voltmeter

switch

[2]

The diagram below shows a simple electrical circuit with two identical bulbs.



- (b) (i) Which of the following terms describes how the two bulbs are connected in this circuit?

Circle your answer.

series

parallel

short

[1]



- (ii) A current of 2 A flows through bulb **X**.
How much current will flow through bulb **Y**?

Circle your answer.

1 A

2 A

4 A

[1]

- (iii) If bulb **X** breaks what, if anything, will happen to bulb **Y**?

[1]

The voltage across bulb **X** is measured as 4 V.

- (iv) Use the equation:

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

to calculate the power of the bulb.

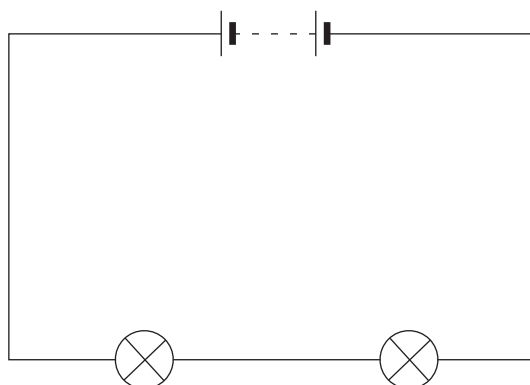
Show your working out.

Power = _____ W [2]

[Turn over]



The diagram below shows a different circuit containing two bulbs.



A student investigated how changing the number of bulbs affected their brightness.

The table below shows the results of the experiment.

Number of bulbs	Voltage across each bulb/V	Brightness of bulbs
2	6	very bright
3	4	bright
4	3	dim
6	2	very dim

(c) Give **two** trends shown by this data.

1. _____

2. _____

[2]





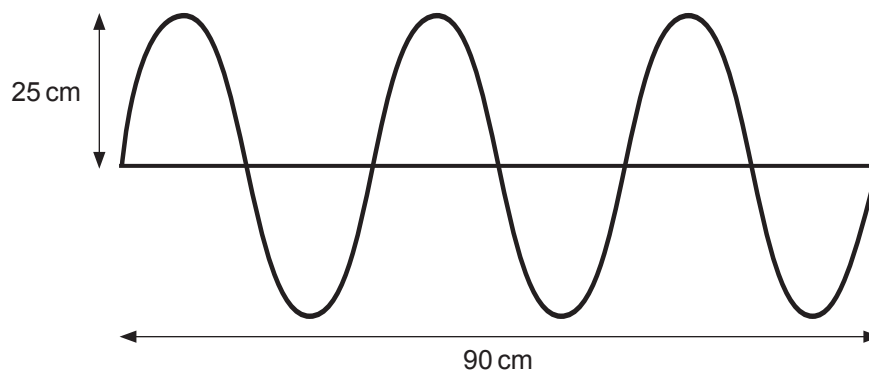
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(Questions continue overleaf)



2 The diagram below represents a water wave.



(a) What is the wavelength of this wave?

Circle your answer.

90 cm

30 cm

25 cm

[1]

(b) What is the amplitude of this wave?

Circle your answer.

25 cm

50 cm

90 cm

[1]

(c) What do all waves transfer from one place to another?

[1]



- (d) A water wave has a frequency of 4 Hz. The velocity of the water wave is 6 m/s.

Use the equation:

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

to calculate the wavelength of this water wave.

Show your working out.

Wavelength = _____ m [2]

The diagram below shows the electromagnetic spectrum.

Radio	Microwave	Infrared	Visible light	Ultraviolet	X-ray	Gamma
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- (e) State the type of electromagnetic wave used in each process below.

(i) Mobile phone communication _____ [1]

(ii) Detecting forged money _____ [1]

- (f) Complete the following sentence.

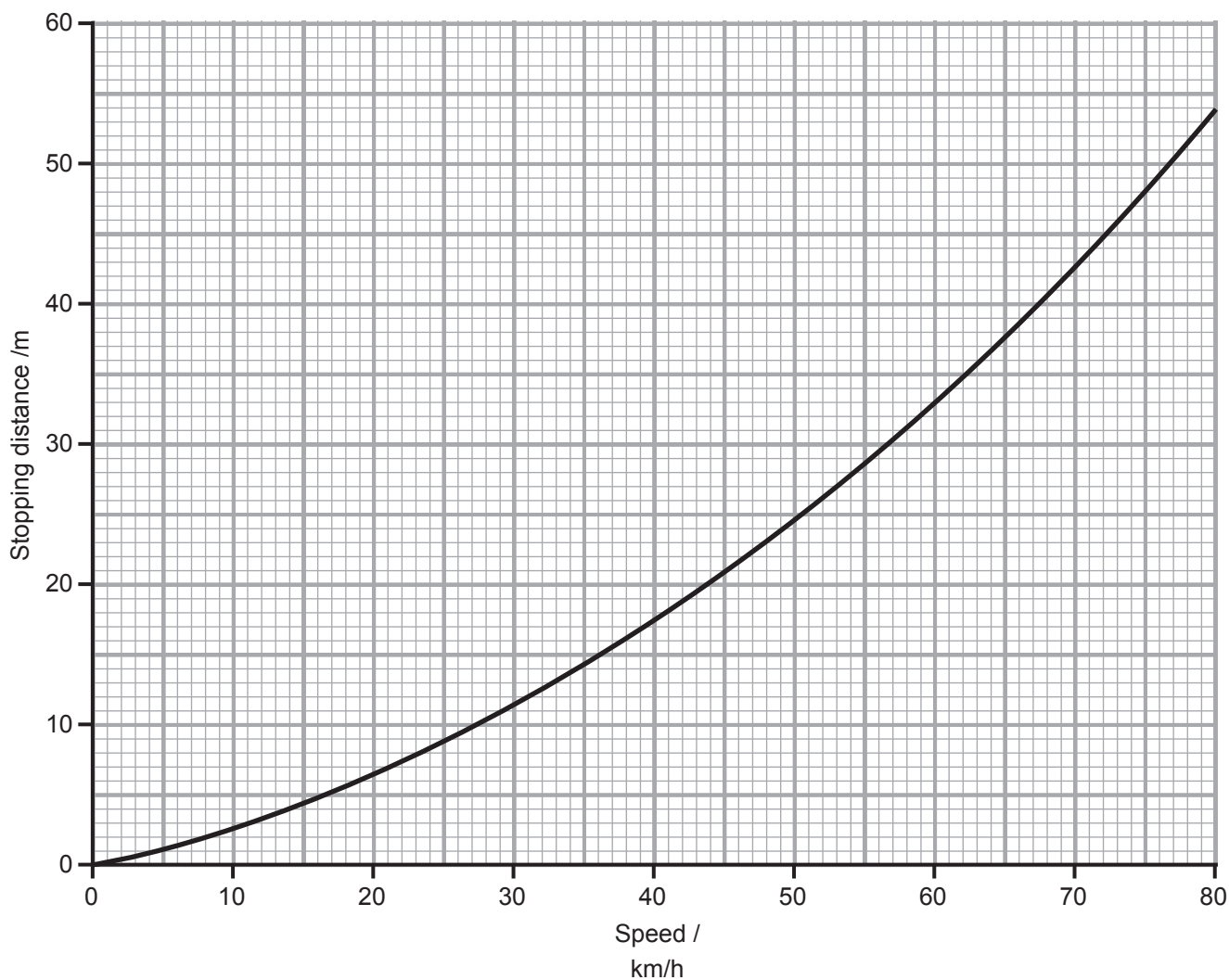
All waves in the electromagnetic spectrum travel at the

same _____ in a vacuum. [1]

[Turn over



3 The graph below shows how the speed of a car affects its stopping distance.



(a) What effect, if any, does increasing the speed have on stopping distance?

_____ [1]

(b) Use the graph to find the stopping distance for a car travelling at 40 km/h.

Stopping distance = _____ m [1]



(c) Name the force which acts between the tyres and the road surface.

_____ [1]

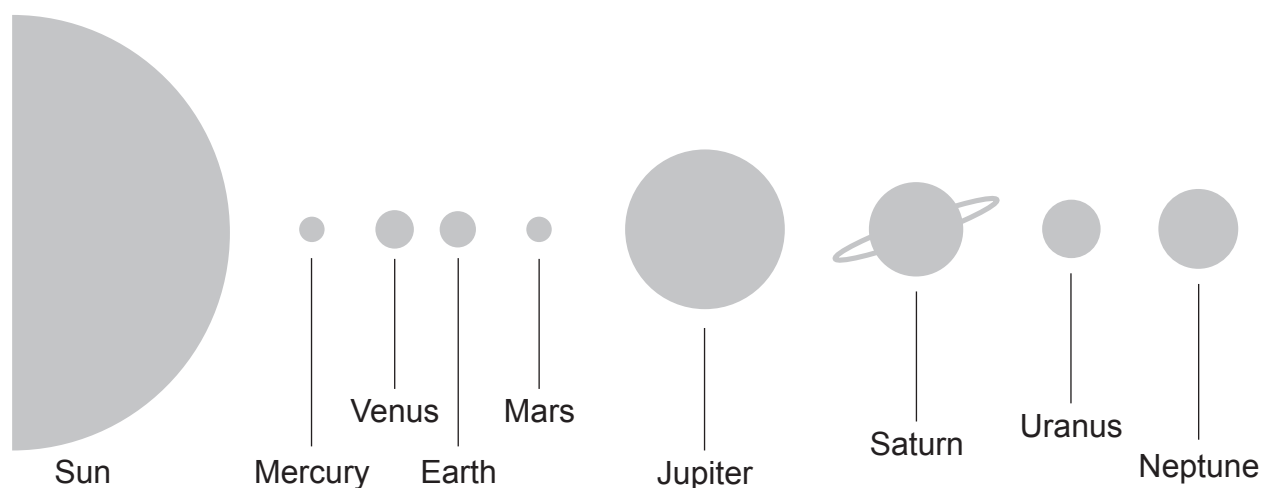
(d) What effect, if any, would the driver's consumption of alcohol have on their thinking distance?

_____ [1]

[Turn over



4 The diagram below represents our Solar System.



(a) Which planet will take the longest time to orbit the Sun?

_____ [1]

(b) Name **one** gas planet.

_____ [1]

(c) Complete the following sentences about some other objects in the Solar System.

Choose from:

asteroid

comet

moon

A _____ is an object made of dust and ice which orbits the Sun.

A large, natural satellite in orbit around a planet is called

a _____. [2]

(d) Give **one** use of an artificial satellite.

_____ [1]



- (e) The table below gives information about some of the planets in our Solar System.

Planet	Distance from the Sun /million km	Surface temperature /°C	Gravity / N/kg
Mercury	58	430	4
Earth	150	22	10
Jupiter	778	−150	26
Neptune	4497	−220	12

- (i) Complete the following sentence.

As the distance from the Sun increases, the surface temperature

_____ .

[1]

- (ii) Use the equation:

$$\text{weight} = \text{mass} \times \text{gravity}$$

to calculate the weight of a 55 kg astronaut on Mercury.

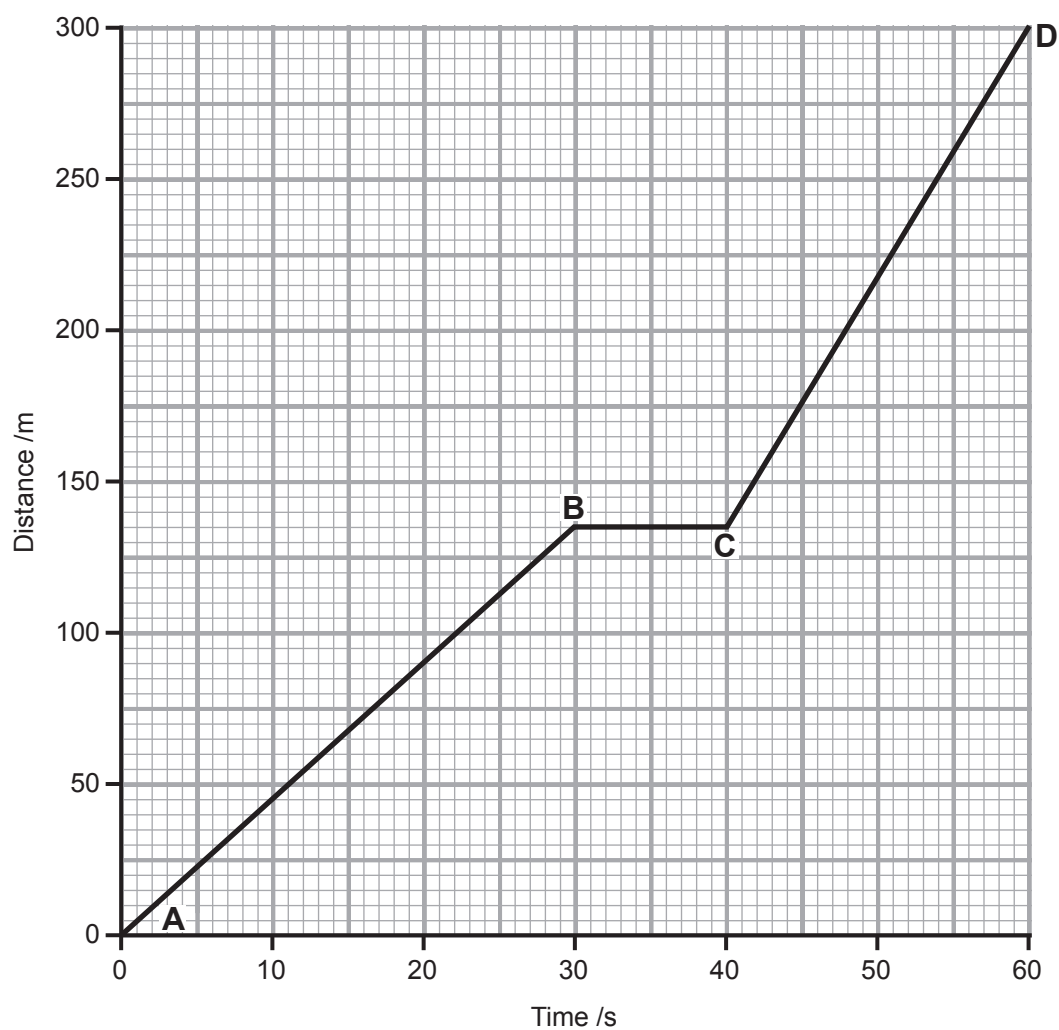
Show your working out.

Weight of astronaut = _____ N [2]

[Turn over



5 Shown below is a distance-time graph for a person running.



(a) Describe the motion of the runner from **A** to **B**.

_____ [1]

(b) What is the distance travelled by the runner during the first 40 seconds?

Distance travelled by runner = _____ m [1]



- (c) Between which two points **A–B**, **B–C** or **C–D** is the runner moving fastest?
Explain your answer.

[2]

- (d) Use the equation:

$$\text{average speed} = \frac{\text{distance travelled}}{\text{time taken}}$$

to calculate the average speed of the runner for the whole journey from **A** to **D**.

Show your working out.

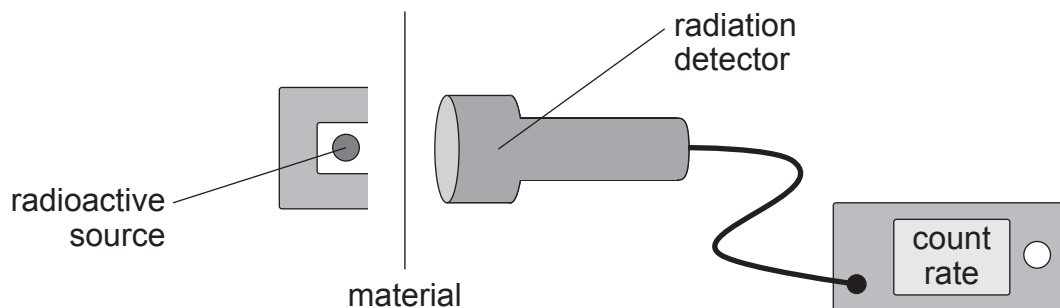
Average speed of runner = _____ m/s [2]

[Turn over



- 6 A student carried out an investigation to determine the type of radiation emitted by an unknown radioactive source.

The apparatus is shown below.



- (a) Complete the table below, using ticks (✓), to show which material(s) each type of radiation **will** be stopped by.

The first row has been completed for you.

Type of radiation	Material		
	Paper	Aluminium	Lead
alpha	✓	✓	✓
beta			
gamma			

[2]



(b) Before completing the investigation, a measurement of the background radiation was recorded.

(i) What is background radiation?

_____ [1]

(ii) Give one **natural** source of background radiation.

_____ [1]

(c) Complete the following sentence.

Some nuclei are radioactive because their combination

of protons and _____ is unstable. [1]

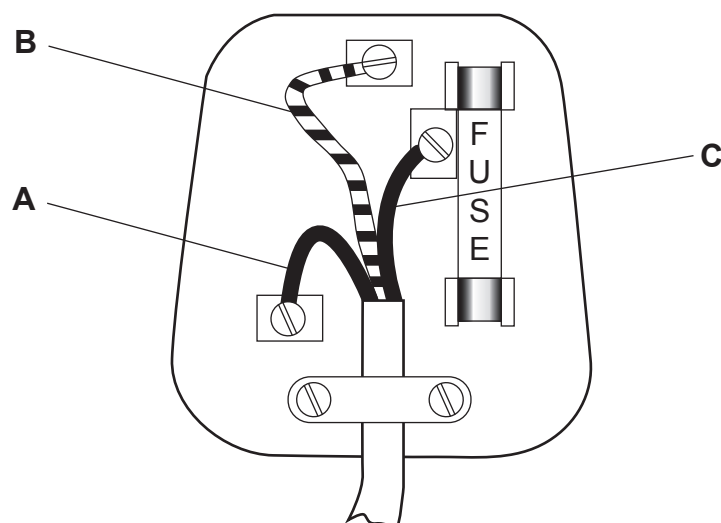
(d) Give **one** use of radioactivity in industry.

_____ [1]

[Turn over



7 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]



8 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]

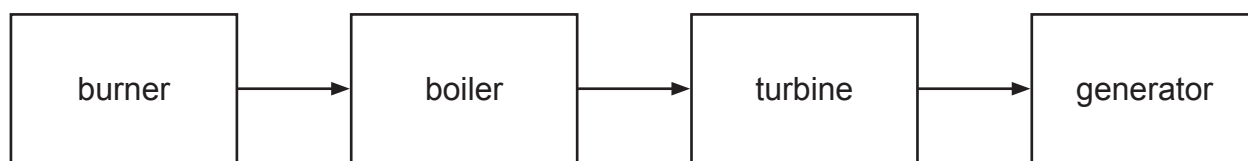
(c) In hot countries people **do not** usually paint the outside of their houses with dark, matt colours. Explain why.

_____ [2]

[Turn over



9 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]

[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

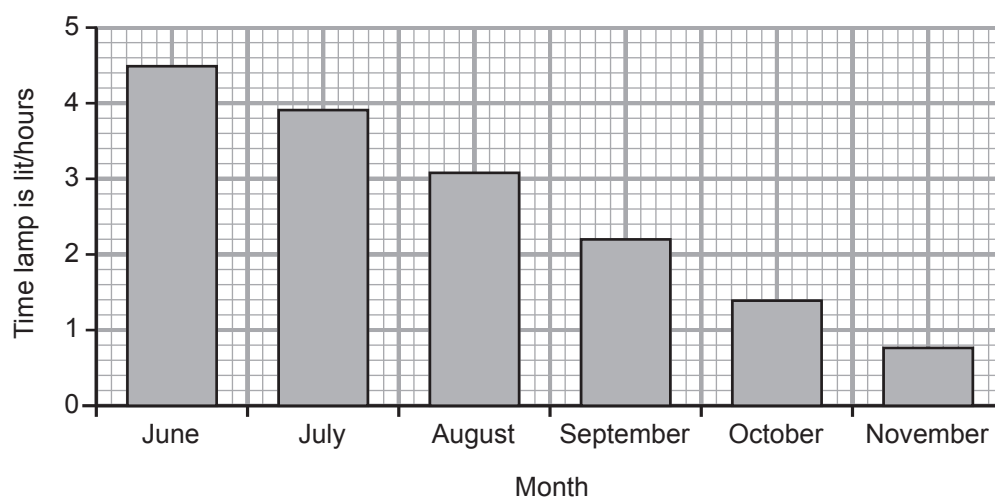
Disadvantage

[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]



Sources:

- Question 1(a). . . Principal Examiner
Question 1(c). . . Principal Examiner
Question 2 . . . Principal Examiner
Question 4 . . . Principal Examiner
Question 6 . . . Principal Examiner
Question 7 . . . Principal Examiner
Question 8 . . . © Getty Images

THIS IS THE END OF THE QUESTION PAPER

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For Examiner's use only	
Question Number	Marks
1	
2	
3	
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9	

Total Marks	
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Examiner Number

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