



General Certificate of Secondary Education
2024–2025

Centre Number

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Candidate Number

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Single Award Science: Physics

Unit 3
Foundation Tier



[GSA31]

GSA31

THURSDAY 22 MAY 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 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.

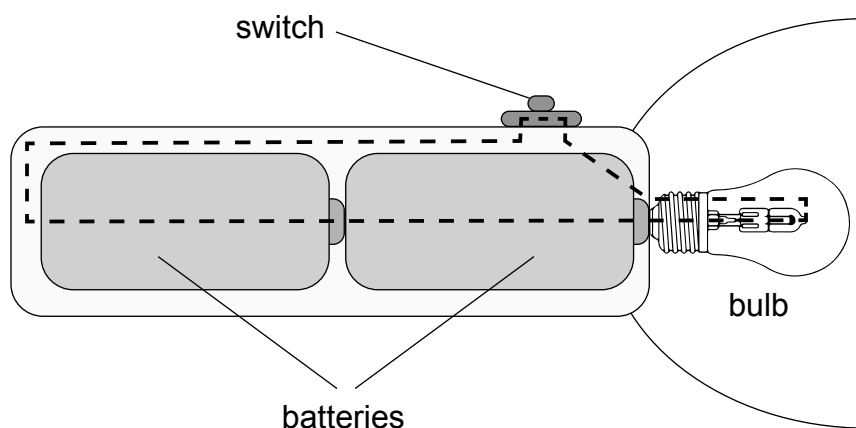
Quality of written communication will be assessed in Question 9.

14907



20GSA3101

- 1 The torch shown below consists of batteries, a switch, and a bulb.



- (a) (i) Use lines to match the part to its useful energy change.

Part	Useful energy change
battery	chemical to electrical
bulb	chemical to light
	electrical to light

[2]

- (ii) Name **one** form of waste energy produced by a torch.

_____ [1]



(b) Complete the sentence below stating the Principle of Conservation of Energy.

Energy cannot be _____ or _____,
it can only _____ from one form to another. [2]

(c) Name the unit of energy.

Circle your answer.

Volt

Watt

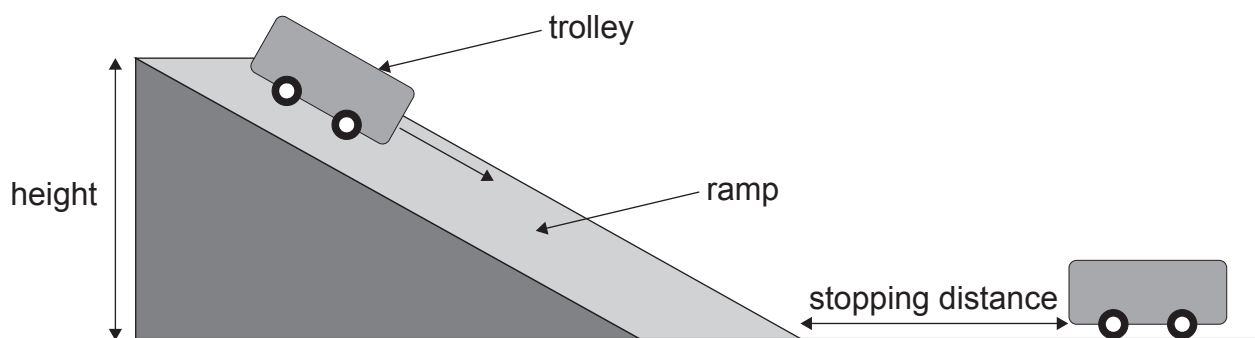
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[1]

[Turn over



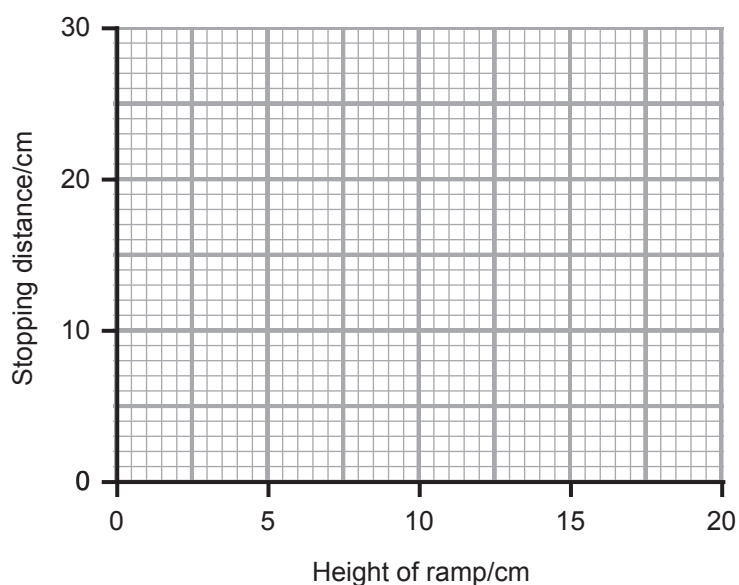
- 2 (a) The diagram below shows the apparatus used to investigate how the height of a ramp affects the stopping distance of a trolley.



The results of the investigation are given below.

Height of ramp/cm	Stopping distance/cm
5	0
10	8
15	16
20	24

- (i) Plot and draw a line graph for these results on the grid below.



[3]



(ii) Why were the **same** ramp and trolley used during the investigation?

Circle your answer.

to get accurate results

to make it a fair test

to get reliable results

[1]

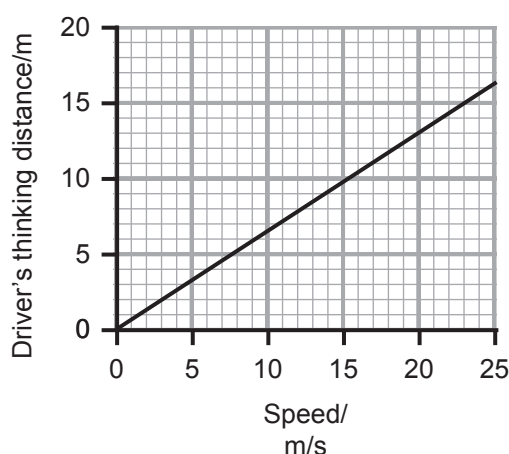
(iii) Name the force that causes the trolley to slow down.

[1]

[Turn over



(b) The graph below shows how speed affects a driver's thinking distance.



(i) Describe the effect speed has on a driver's thinking distance.

[1]

(ii) Draw a line on the grid above to show how the thinking distance would change with speed if a driver was **tired**.

[2]

(iii) Give **one** other factor, apart from tiredness or speed, that would affect thinking distance. Describe this effect.

[2]

(c) Which mathematical symbol is missing in the equation below?

Choose from:

+

−

×

÷

stopping distance = thinking distance braking distance

[1]





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(Questions continue overleaf)

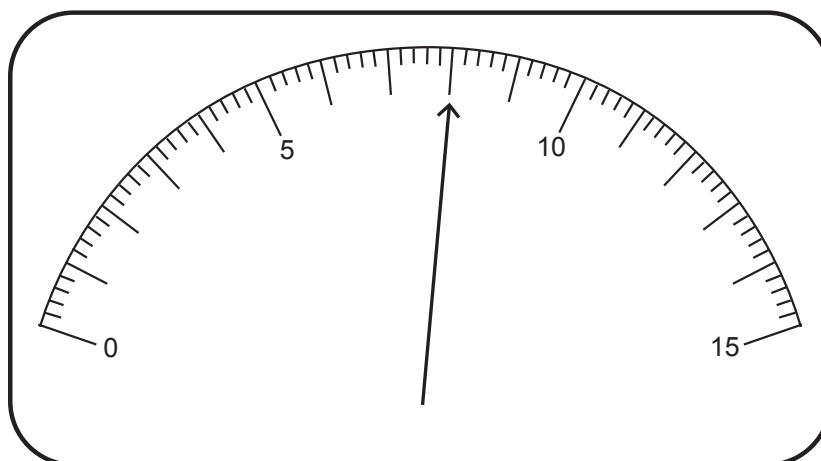
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[Turn over



20GSA3107

- 3 (a) The diagram below shows an ammeter scale.



- (i) What is the reading on this ammeter?

_____ A [1]

- (ii) What is an ammeter used to measure?

Circle your answer.

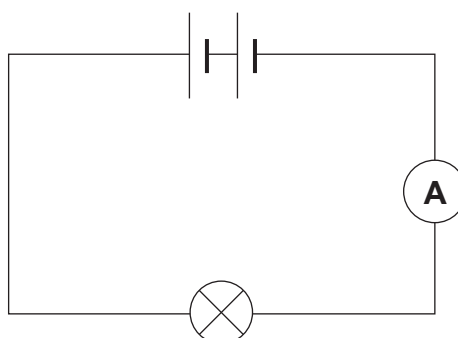
resistance

current

voltage

[1]

The diagram below shows an ammeter connected in a simple electrical circuit.

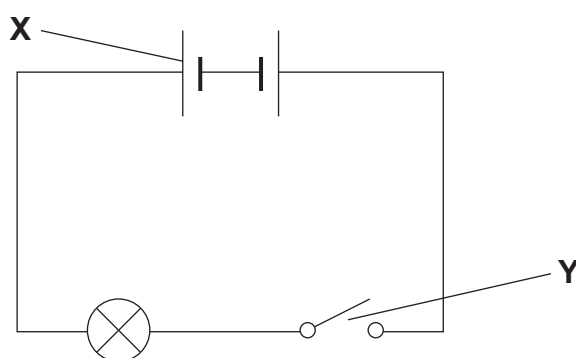


- (iii) What term describes how the ammeter is connected in this circuit?

_____ [1]



(b) The circuit diagram below shows another simple electrical circuit.



(i) Name the two symbols labelled **X** and **Y** in the circuit diagram.

X _____

Y _____ [2]

(ii) Give **two** reasons why the lamp in this circuit will **not** light.

1 _____

2 _____

_____ [2]

[Turn over



- 4 The diagram below shows a tuning fork.

256 Hz



This tuning fork produces sound with a frequency of 256 Hz and wavelength of 1.3 m.

- (a) Use the equation:

$$\text{wave speed} = \text{frequency} \times \text{wavelength}$$

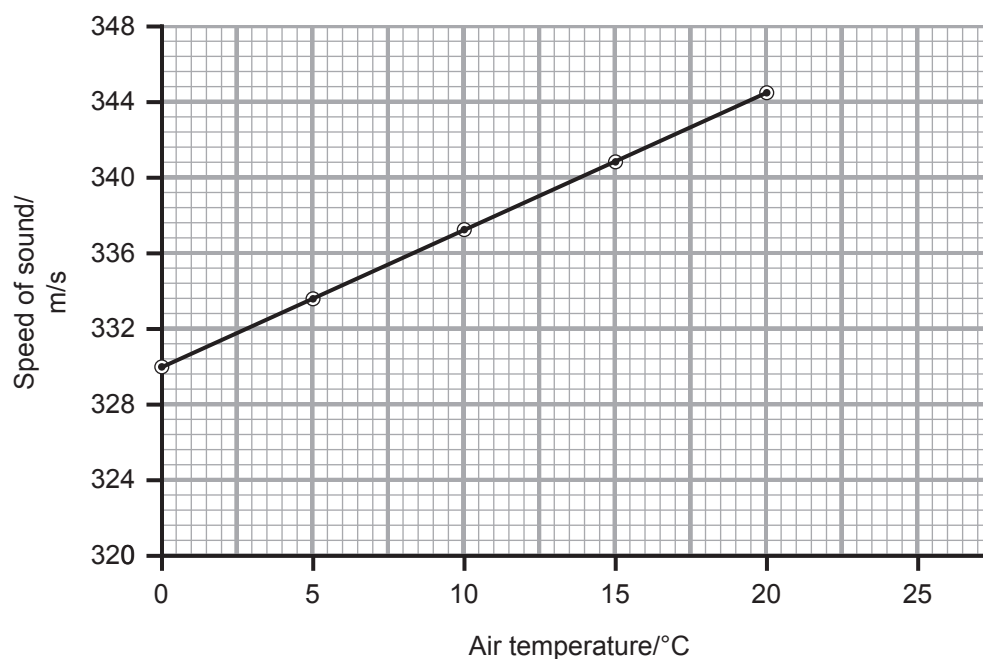
to calculate the speed of sound.

Show your working out.

_____ m/s [2]



(b) The graph below shows how the speed of sound changes with air temperature.



(i) What conclusion can be drawn from this graph?

_____ [1]

(ii) Use the graph to find the air temperature when the speed of sound is 338 m/s.

_____ °C [1]

(c) Complete the sentence below about sound waves.

Choose from:

frequency

energy

movement

vibrations

Sound waves transfer _____ from one point to another
through _____ . [2]

[Turn over



- 5 Shown below are some of the planets in the Solar System in order of distance from the Sun.

Mercury		Earth		Jupiter		Uranus	Neptune
---------	--	-------	--	---------	--	--------	---------

- (a) Complete the table by inserting the names of the missing planets in their correct position. [2]

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

_____ [1]

- (c) Name the force that keeps the planets in orbit around the Sun.

_____ [1]

- (d) Which planet will take the longest to orbit the Sun?

_____ [1]

- (e) Earth has both natural and artificial satellites orbiting it.

- (i) Name Earth's natural satellite.

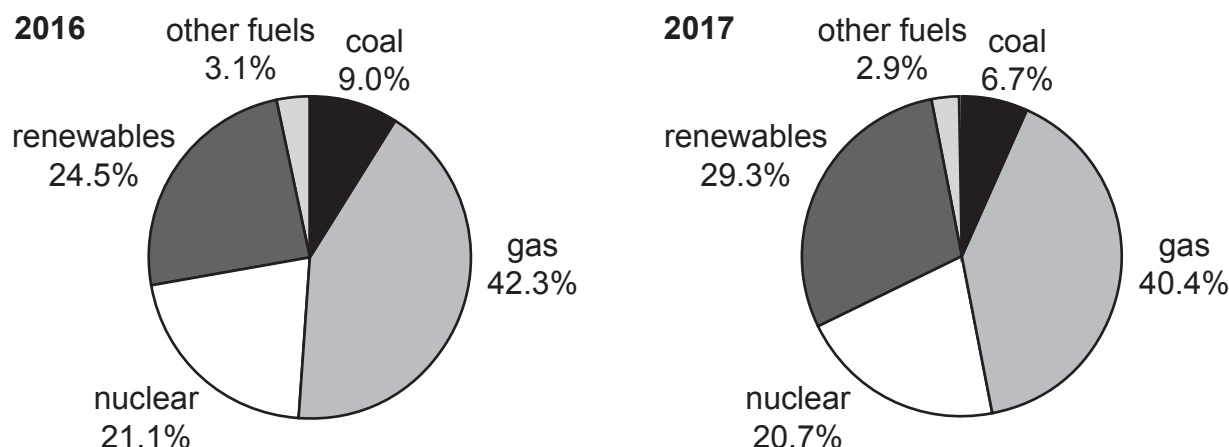
_____ [1]

- (ii) Give **one** use of artificial satellites.

_____ [1]



- 6 (a) The pie charts below compare the energy sources used to make electricity in 2016 and 2017.



- (i) Which energy source **decreased** in use the most from 2016 to 2017?

_____ [1]

- (ii) Name the fossil fuel **not** shown in the pie charts.

_____ [1]

- (iii) Calculate the percentage increase in the use of renewables to generate electricity.

_____ % [1]

- (b) (i) What is meant by the term renewable energy source?

 _____ [1]

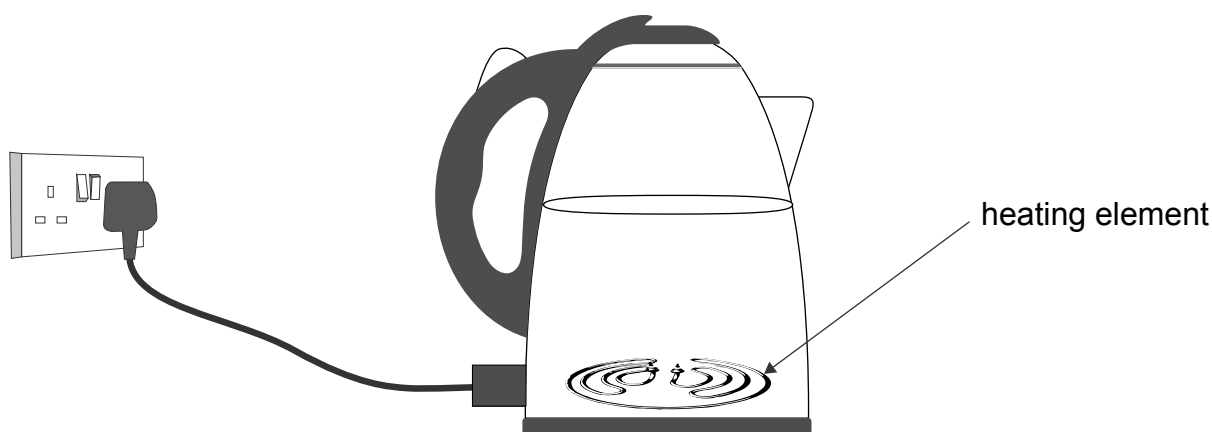
- (ii) Name **one** renewable energy source.

_____ [1]

[Turn over]



7 The diagram below shows the inside of an electric kettle.



(a) What method of heat transfer is used to heat all the water inside the kettle?

_____ [1]

(b) The table below shows how long a kettle took to boil different volumes of water. For each volume of water, the kettle was boiled twice within five minutes so that an average time could be calculated.

Volume of water/ ml	First time to boil/s	Second time to boil/s	Average time to boil/s
250	46	42	44
500	84	78	81
750	117	109	
1000	155	143	149
1250	208	196	202
1500	256	238	247



- (i) Calculate the average time for the kettle to boil **750 ml** of water.

Show your working out.

_____ s [2]

- (ii) Suggest why the times were shorter when the kettle was boiled for the second time.

_____ [1]

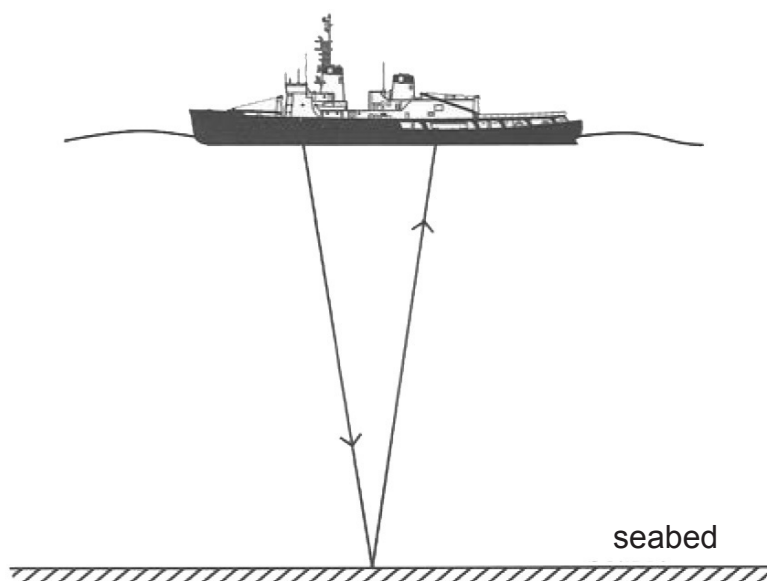
- (iii) What effect, if any, does the volume of water have on the time to boil?

_____ [1]

[Turn over



- 8 (a) The diagram below shows a ship sending out a pulse of ultrasound which is reflected from the seabed and detected 0.8 s later. Ultrasound travels at a speed of 1500 m/s through water.



- (i) What is meant by the term ultrasound?

[2]

- (ii) Use the equation:

$$\text{distance} = \text{speed} \times \text{time}$$

to calculate the depth of the seabed below the ship.

Show your working out.

_____ m [3]



(b) The diagram below shows the electromagnetic spectrum.

gamma rays	X-ray	ultraviolet	visible light	infrared	microwave	radio waves
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(i) Give **one** property that is the **same** for each of these waves.

_____ [1]

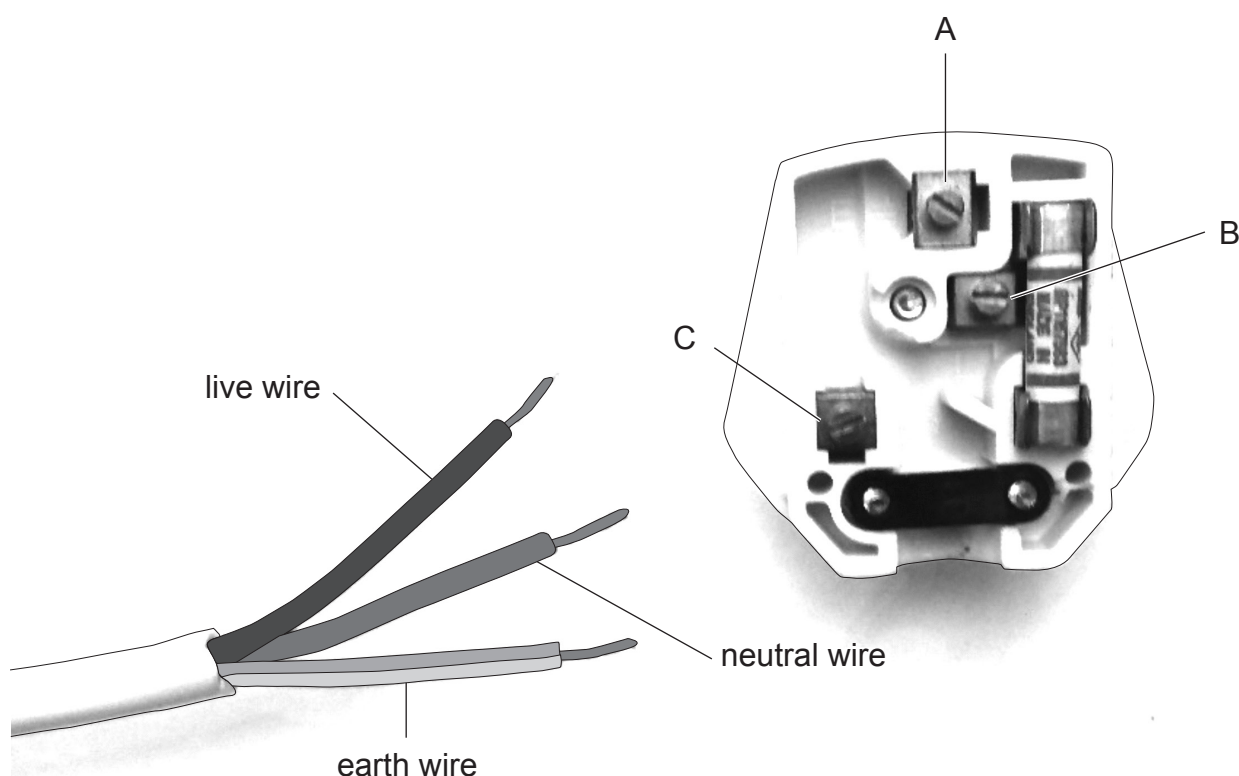
(ii) Give **one** property that is **different** for each of these waves.

_____ [1]

[Turn over



9 The picture below shows an open three-pin plug about to be wired.



Describe how this plug should be correctly wired.

Your answer should include:

- the names of the pins **A**, **B** and **C**;
- the colour of the wires that should be connected to each pin; and
- **two** safety features.

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





[6]

THIS IS THE END OF THE QUESTION PAPER



Sources:

- Question 1 Chief Examiner
- Question 2(a). Chief Examiner
- Question 2(a)(i). . . . Chief Examiner
- Question 2(b). Chief Examiner
- Question 3(a). Chief Examiner
- Question 3(a)(iii) . . . Chief Examiner
- Question 3(b). Chief Examiner
- Question 4 Chief Examiner
- Question 4(b). Chief Examiner
- Question 6(a). Chief Examiner
- Question 7 Chief Examiner
- Question 8(a). Chief Examiner
- Question 9 Chief Examiner

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For Examiner's use only	
Question Number	Marks
1	
2	
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Total Marks	
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Examiner Number

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