



General Certificate of Secondary Education
2014

Double Award Science: Physics

Unit P2

Foundation Tier

[GSD61]

ML

THURSDAY 12 JUNE 2014, MORNING

Centre Number

71

Candidate Number

TIME

1 hour 15 minutes, plus your additional time allowance.

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 **all nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 90.

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

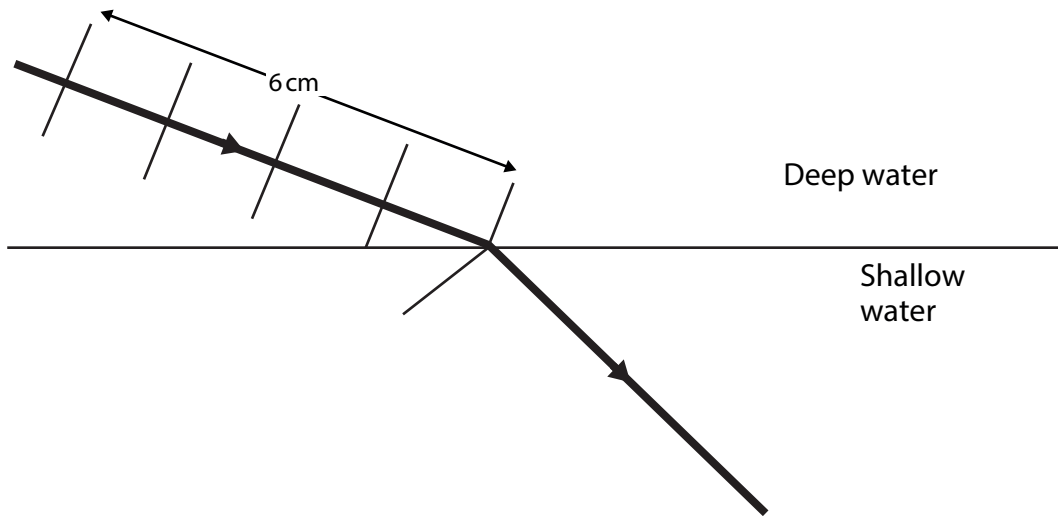
Quality of written communication will be assessed in Question **4(c)(ii)**.

For Examiner's
use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	

Total
Marks

- 1 The following diagram (not to scale) shows water waves travelling through deep water.



- (a) (i) Use the diagram to find the wavelength of the waves in deep water. Remember the diagram is not to scale.

Wavelength = _____ cm [1]

- (ii) 10 waves are produced every 5 seconds. What is the frequency of the waves? Remember to include the correct unit.

Frequency = _____ [2]

- (iii) Use your answers to parts (a)(i) and (a)(ii) to calculate the speed of waves in deep water in cm/s. **Show your working out.**

Speed = _____ cm/s [3]

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Marks	Remark
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(b) The direction of the waves is shown in deep water and in shallow water.

(i) Draw two wavefronts in the shallow water. [3]

(ii) What, if anything, happens to the speed and frequency of the waves as they enter **shallow** water?

Speed _____

Frequency _____ [2]

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Marks	Remark

2 Ultrasound waves have frequencies which are too high to be detected by the human ear.

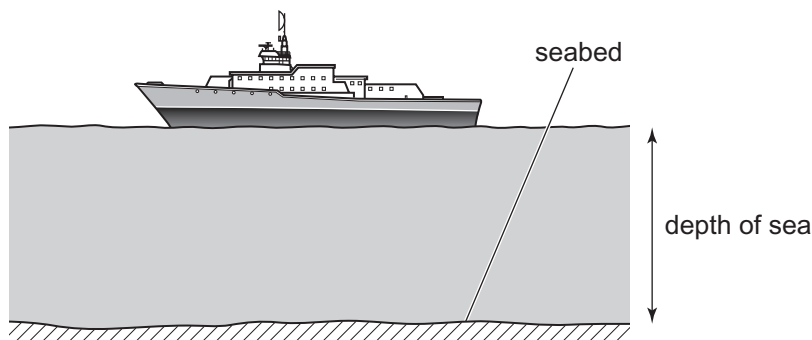
(a) What type of waves are sound and ultrasound waves?

_____ [1]

(b) Describe a medical application of ultrasound waves.

_____ [2]

Ultrasound waves are used to measure the depth of the sea.



The speed of ultrasound waves in water is 1500 m/s. The ship sends out a pulse of ultrasound and detects the reflection from the seabed 0.8 s after it is transmitted from the ship.

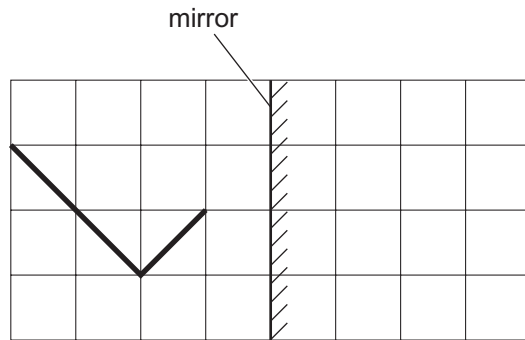
(c) Calculate the depth of the sea.
Show your working out.

Depth of the sea = _____ m [4]

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Marks	Remark
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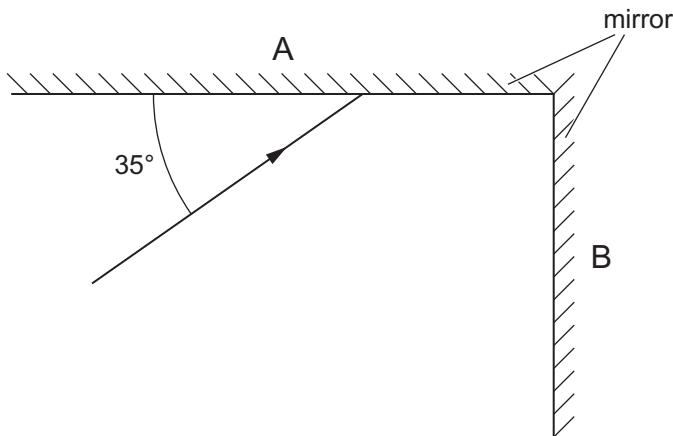
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(Questions continue overleaf)

3 A letter L is put in front of a mirror as shown below.



(a) Use the grid to draw the image of the letter L in the mirror. [2]

Two mirrors are arranged at 90° as shown below. A ray of light is incident on mirror A.



(b) (i) Draw a normal where the incident ray strikes mirror A. Label it N. [1]

(ii) What is the angle of incidence at mirror A?

Angle of incidence = _____ [1]

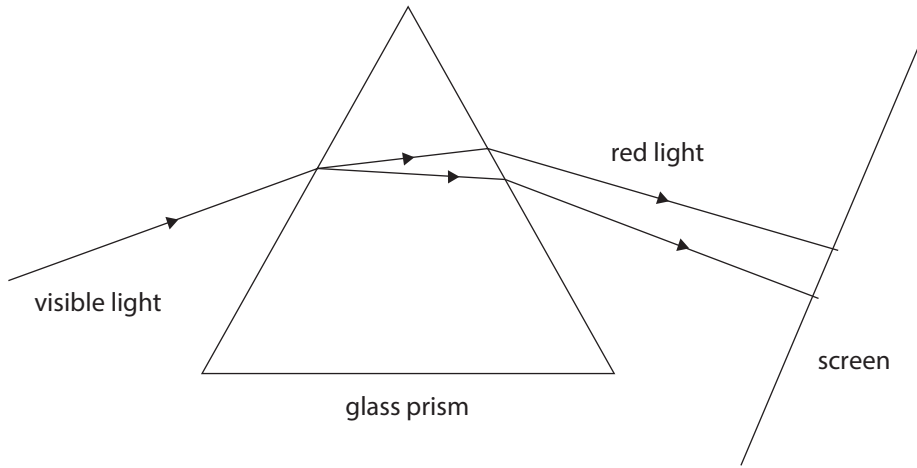
(iii) Continue the ray showing reflection at mirror B. [2]

(iv) Calculate the angle of reflection at mirror B.

Angle of reflection = _____ [2]

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Marks	Remark
○	○

(c) Visible light enters a glass prism.



The visible light is split into different colours.

(i) Name this process.

_____ [1]

(ii) Starting with red, list the colours, in order, that you would observe on the screen.

Red _____
_____ [1]

(iii) Visible light is a member of the electromagnetic spectrum. Name a member with a wavelength shorter and a member with a wavelength longer than visible light.

1. Shorter wavelength than visible light _____
2. Longer wavelength than visible light _____ [2]

Examiner Only	
Marks	Remark

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4 Some solids are electrical conductors while others are electrical insulators.

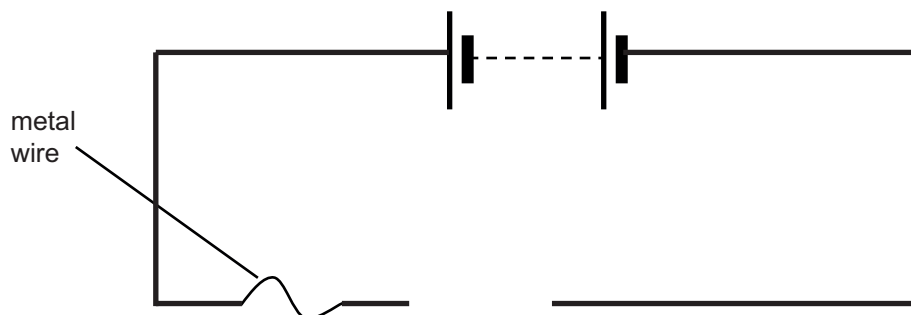
(a) Explain the difference between electrical conductors and electrical insulators.

_____ [1]

(b) A charge of 15C passes through a resistor in a time of 50s.
How much current flows through the resistor?
Show your working out.

Current = _____ A [3]

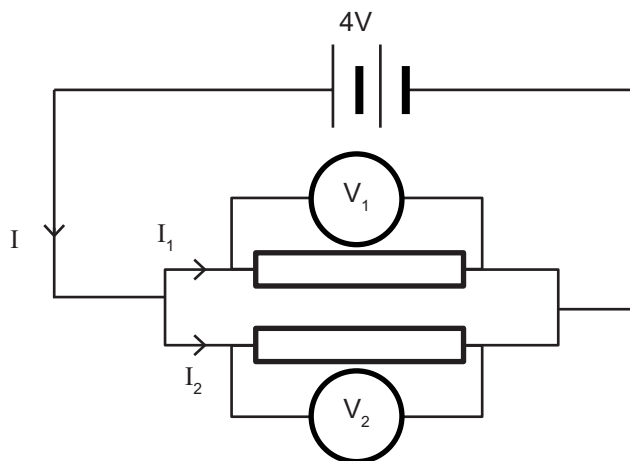
(c) Jenny sets up a circuit to measure the resistance of a metal wire.



(i) Complete the diagram of the circuit Jenny would set up to find the resistance of the metal wire. [3]

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Marks	Remark
○	○

5 A 4 V battery is connected to two equal resistors in parallel.



(a) (i) What is the reading on voltmeter V_1 ?

Voltmeter $V_1 = \text{_____ V}$ [1]

(ii) What is the reading on voltmeter V_2 ?

Voltmeter $V_2 = \text{_____ V}$ [1]

The battery supplies a total current I which divides into currents I_1 and I_2 as shown above.

Current I_1 is 0.4A.

(iii) What is current I_2 ?

Current $I_2 = \text{_____ A}$ [1]

(iv) What is current I ?

Current $I = \text{_____ A}$ [1]

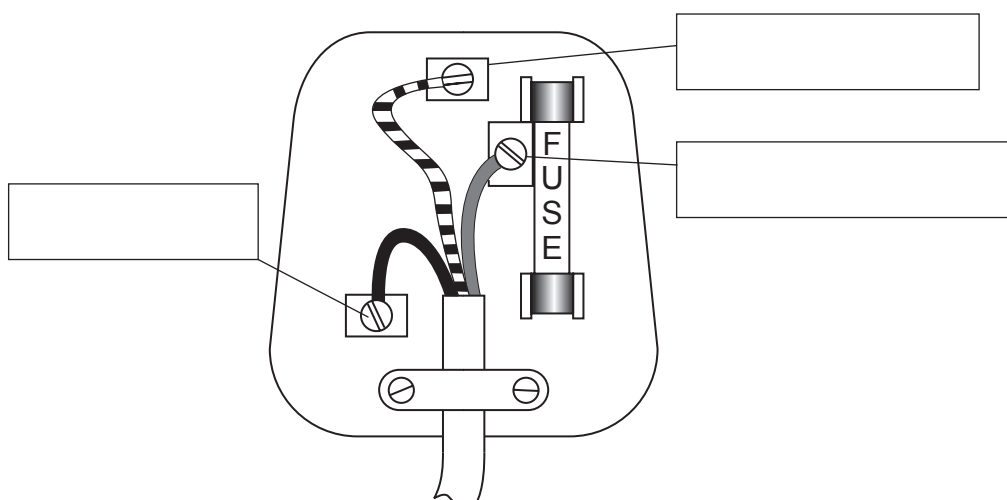
(v) Each resistor has a resistance of 10Ω . Calculate their combined resistance.

Show your working out.

Combined resistance = _____ Ω [2]

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Marks	Remark
○	○

- (b) (i) The diagram shows an electrical three pin plug. In the boxes label the pins live, neutral or earth.



[3]

- (ii) State the colour of the live wire.

Colour: _____ [1]

- (iii) Wires are connected to the three pins. Which wire protects the user from electric shock?

_____ wire [1]

- (iv) The plug is connected to a kettle and a current of 6.0A flows through the live wire. What current flows in the earth wire?

Current = _____ A [1]

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Marks	Remark

6 (i) What does "direct current" mean?

_____ [1]

(ii) Name a source of direct current.

_____ [1]

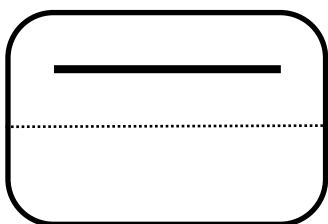
(iii) What does "alternating current" mean?

_____ [2]

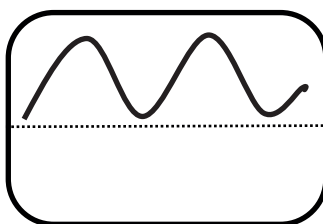
(iv) Name a source of alternating current.

_____ [1]

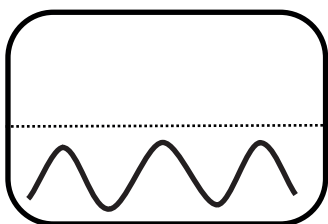
Four traces, A, B, C and D, are shown. The dotted line represents zero voltage.



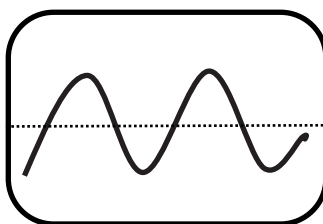
A



B



C



D

(v) 1. Which trace (or traces) represent a.c.?


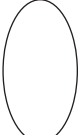
Trace(s): _____

2. Which trace (or traces) represent d.c.?

Trace(s): _____ [3]

(vi) What instrument would you use to display the above traces?

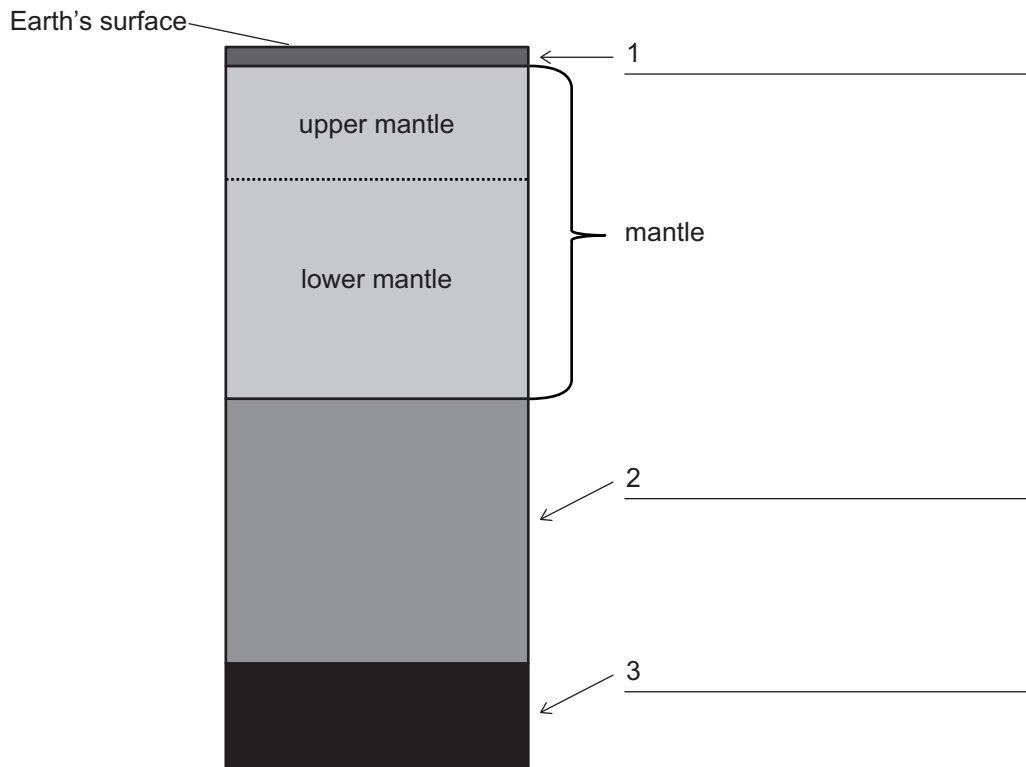
_____ [1]

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Marks	Remark
	

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- 7 The questions below are concerned with the structure of the Earth. The diagram represents a cross section (not to scale) through the Earth.



(a) The mantle has been labelled for you. Label the layers 1, 2 and 3. [3]

(b) Name two major elements found below the mantle.

1. _____

2. _____ [2]

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Marks	Remark
○	○

The lithosphere is the layer of the Earth which is divided into plates, called tectonic plates.

(c) (i) What does “lithosphere” mean?

_____ [2]

(ii) What allows the tectonic plates to move?

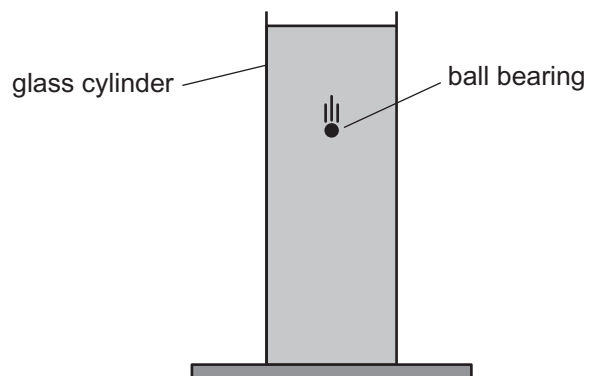
_____ [1]

(iii) Name two large-scale processes which occur because of the movement of the plates that make up the lithosphere.

_____ and _____ [2]

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- 8 A ball bearing is released at the surface of a liquid contained in a tall glass cylinder.



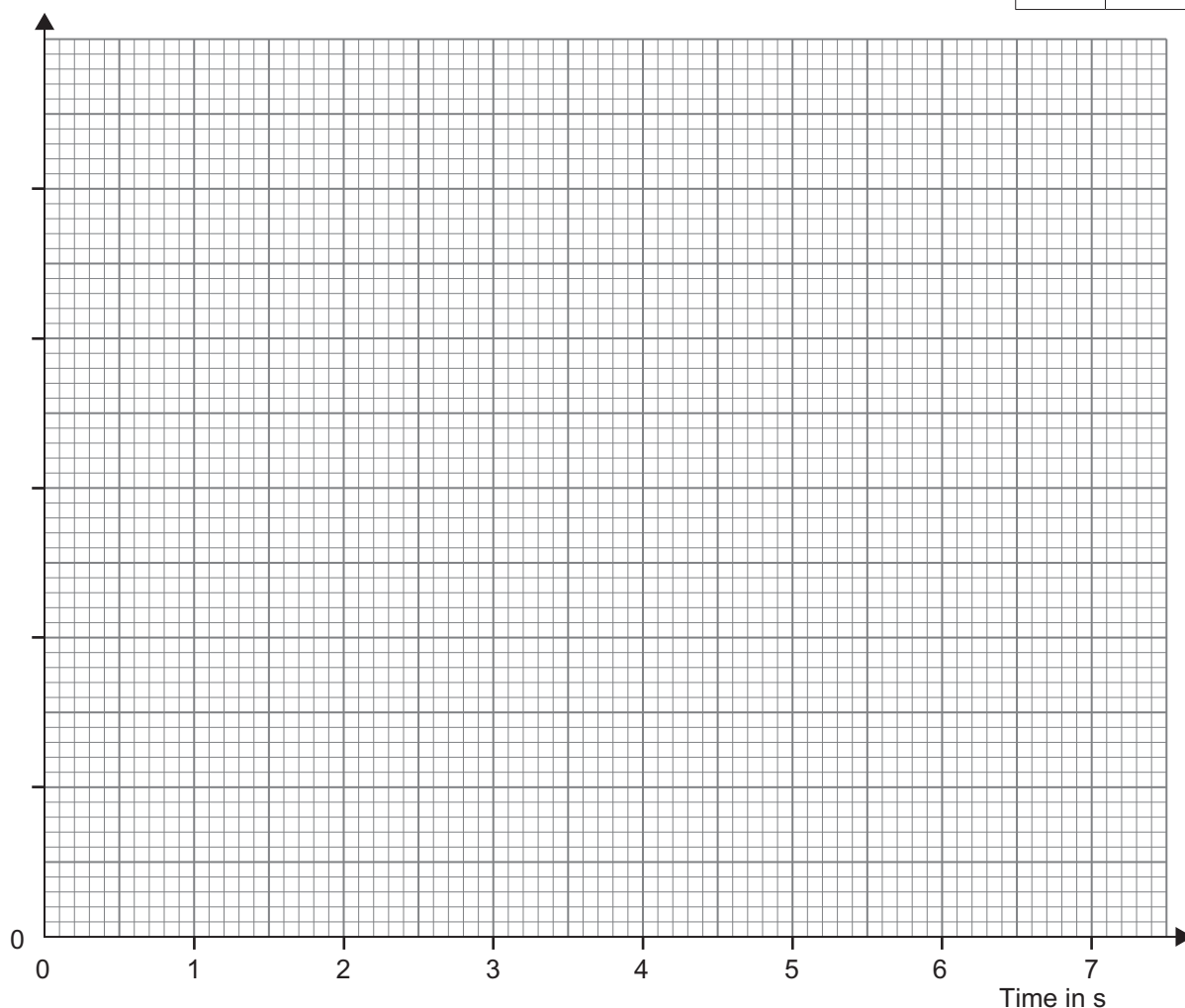
Its velocity is measured every second as it falls through the liquid and the results are recorded in the table.

Time in s	0	1	2	3	4	5	6	7
Velocity in cm/s	0	0.2	0.4	0.6	0.8	1.0	1.0	1.0

- (a) On the graph below choose and label a suitable scale on the vertical axis.

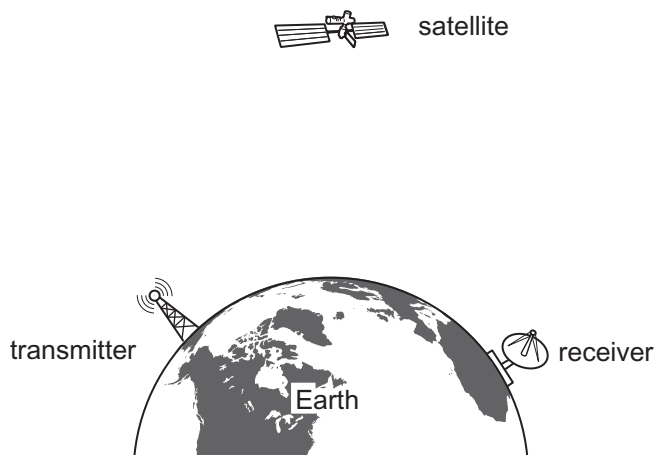
Plot points of velocity against time.

[4]



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Marks	Remark
○	○

- 9 A satellite, situated in space, may be used to pass a microwave signal from one part of the Earth to the other as shown in the diagram.



- (a) What two properties of microwaves allow the signal to travel from the transmitter to the satellite?

_____ [2]

- (b) Artificial satellites are used for communications. Give two other uses of artificial satellites.

1. _____
2. _____ [2]

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Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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