



General Certificate of Secondary Education
2018

Centre Number

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Candidate Number

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Double Award Science: Physics

Unit P2

Foundation Tier

MV18

[GSD61]

FRIDAY 15 JUNE, MORNING

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.

You must answer the questions in the spaces provided.

Do not write on blank pages.

Complete in black ink only.

Answer **all nine** questions.

Information for Candidates

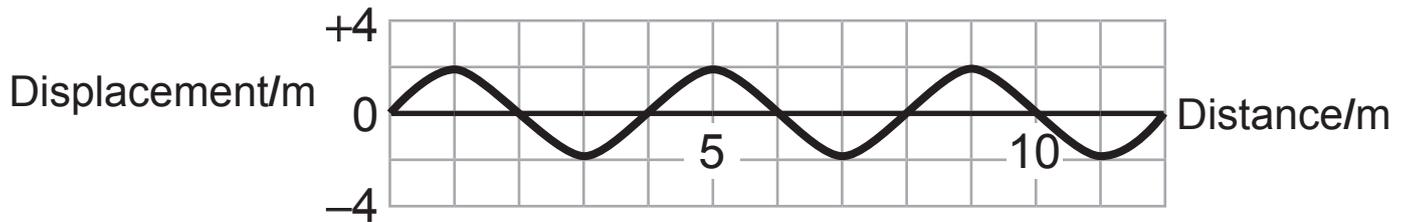
The total mark for this paper is 90.

Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in

Question **8(a)**.

1 The graph of a sea wave is shown below.



(a) What do waves transfer as they move? [1 mark]

(b) Use the above diagram to state the amplitude and wavelength of the sea wave. [1 mark for each]

Amplitude = _____ m

Wavelength = _____ m

(c) In an experiment 50 waves pass a point in 20 seconds.

- (i) Calculate the frequency of the waves.
Remember to include the unit. [3 marks]
You are advised to show your working out.

Frequency = _____

- (ii) The wavelength of the waves is 2.0 cm.
Use your answer to (c)(i) to calculate the speed of
the waves. [3 marks]
You are advised to show your working out.

Speed = _____ cm/s

2 This question is about waves.

Some members of the electromagnetic spectrum are missing from the following list.

gamma rays	X-rays	ultra violet rays		infrared rays		
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(a) Complete the list above by inserting the missing radiations. [3 marks]

(b) (i) What type of wave are all members of the electromagnetic spectrum? [1 mark]

(ii) State another property possessed **only** by electromagnetic waves. [1 mark]

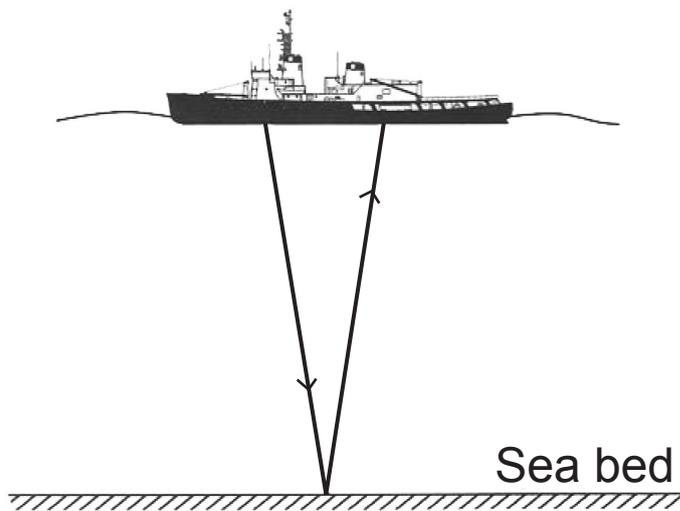
(iii) Which radiation in the list has the shortest wavelength? [1 mark]

(c) State a

(i) use of X-rays [1 mark]

(ii) danger of X-rays [1 mark]

Sonar waves are used to find the depth of the sea. The sonar waves are reflected from the sea bed. A pulse is sent out from the ship and takes 5 seconds to return to the ship.



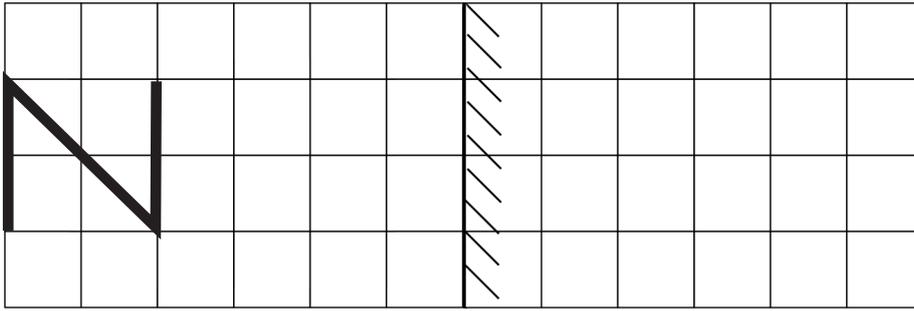
(d) If the speed of sonar waves is 1500 m/s in water, calculate the depth of the sea. [4 marks]
You are advised to show your working out.

Depth of sea = _____ m

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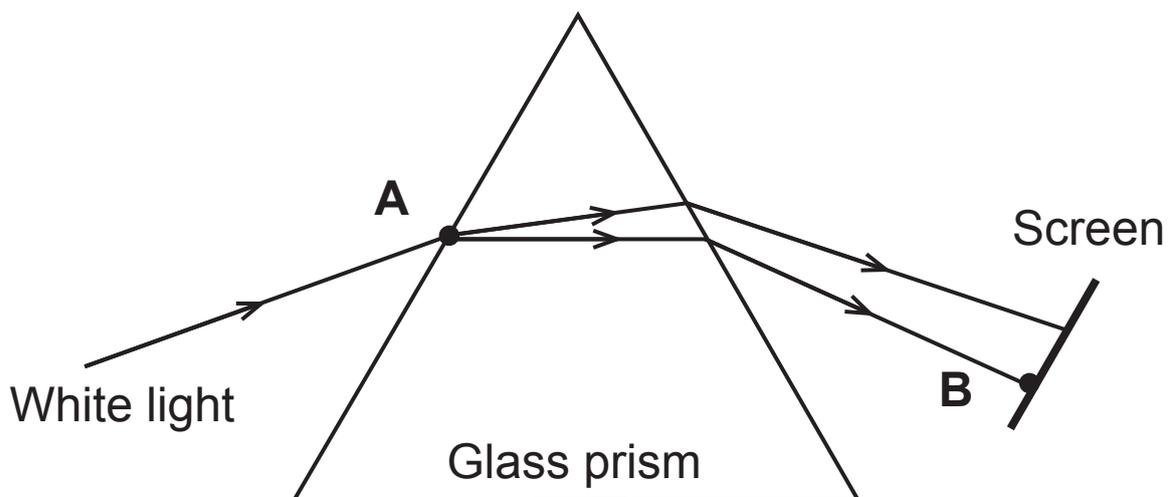
(Questions continue overleaf)

- 3 The letter N is placed in front of a plane mirror as shown below.



- (a) Draw the reflection of the letter in the mirror. [3 marks]

- (b) The following diagram shows a beam of white light passing through a glass prism.



(i) What happens to the speed of light as it enters the glass at point **A**? [1 mark]

(ii) The white light spreads out into different colours inside the prism.
Name this process. [1 mark]

(iii) State the term used to describe the full list of colours displayed on the screen. [1 mark]

(iv) Which colour appears on the screen at point **B**? [1 mark]

4 A girl combs her hair with a plastic comb.



(a) (i) State the name of the force which causes the comb to become charged. [1 mark]

(ii) Name the particle which moves and describe how the comb has become **positively** charged. [1 mark for each]

Particle _____

Description _____

(b) The girl notices that after she combed her hair some strands remained separated.

Explain fully why the strands of hair remained separated.
[2 marks]

Before a racing car is refuelled, a conducting metal strip is connected between the car and the ground. This is called earthing.

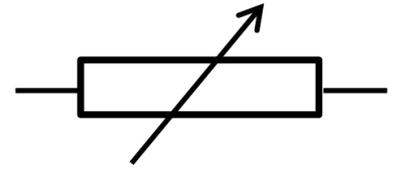
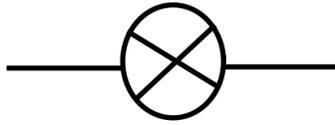
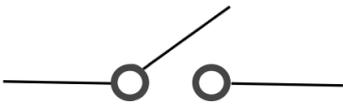


(c) Explain fully what might happen if the racing car is not earthed while refuelling. [2 marks]

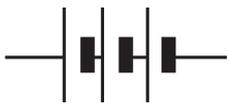
- (d) A charge of 750 C flows through a resistor for 5 minutes.
Calculate the current which flows during this time.
[4 marks]
You are advised to show your working out.

Current = _____ A

5 (a) Identify the electrical symbols below. [3 marks]



A single cell produces 1.5 V. The cells below are all identical and are combined in different ways.



A

B

C

D

(b) Answer **A**, **B**, **C**, or **D** for each of the following.
[1 mark for each]

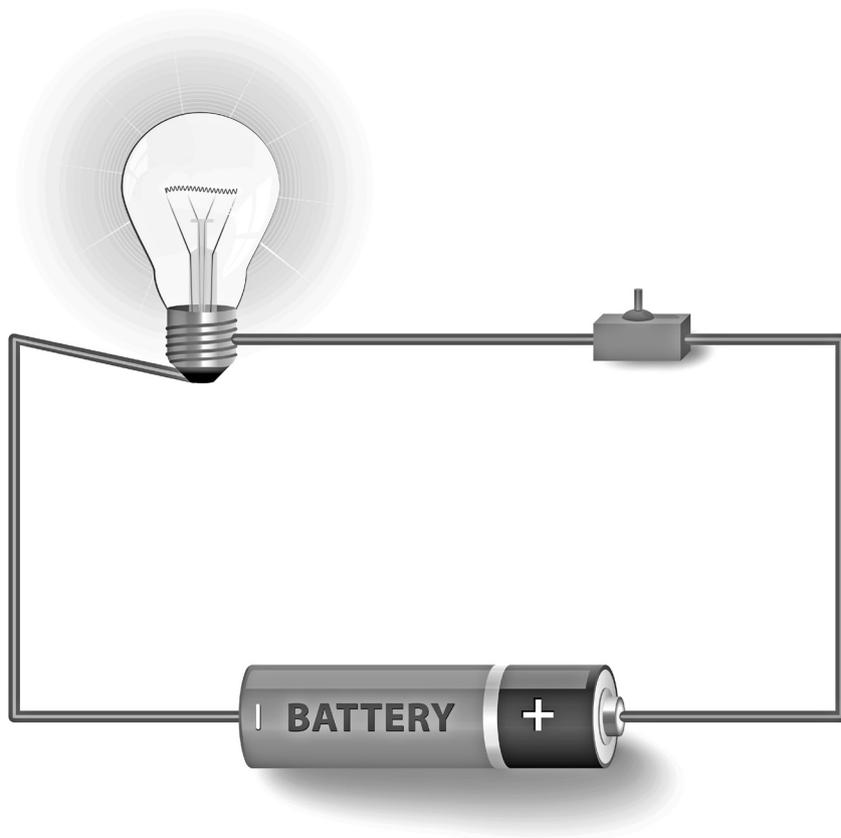
Which arrangement produces 0 volts? _____

Which arrangement produces 1.5 volts? _____

Which arrangement produces 3.0 volts? _____

Which arrangement produces 4.5 volts? _____

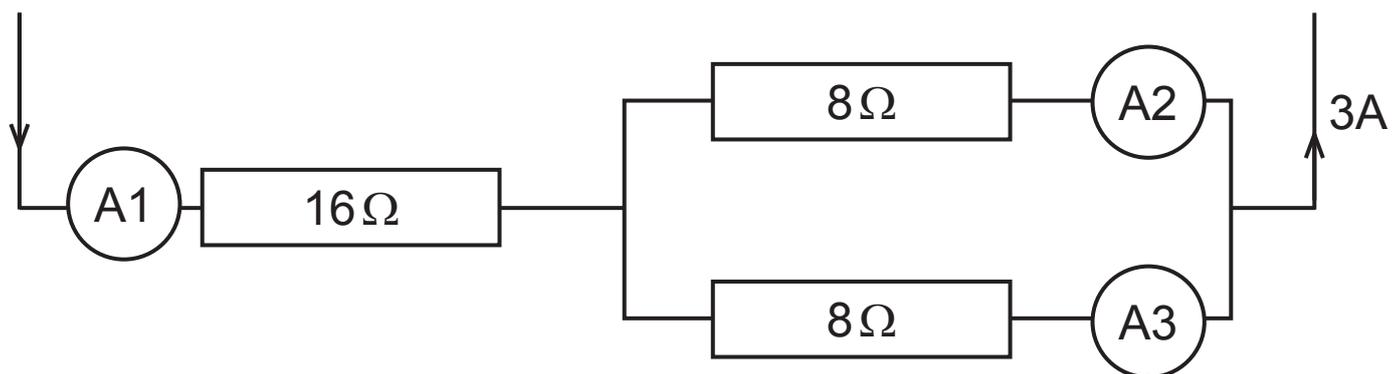
A battery of unknown voltage sends a current of 0.5A through a bulb of resistance 6Ω .



(c) Calculate the unknown battery voltage. [3 marks]
You are advised to show your working out.

Voltage = _____ V

6 The diagram shows part of an electrical circuit.



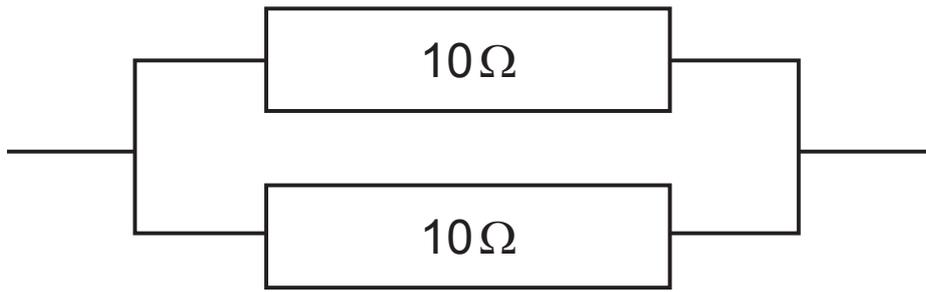
(a) Give the readings on the ammeters A1, A2, and A3.
[1 mark for each]

Reading on A1 = _____ A

Reading on A2 = _____ A

Reading on A3 = _____ A

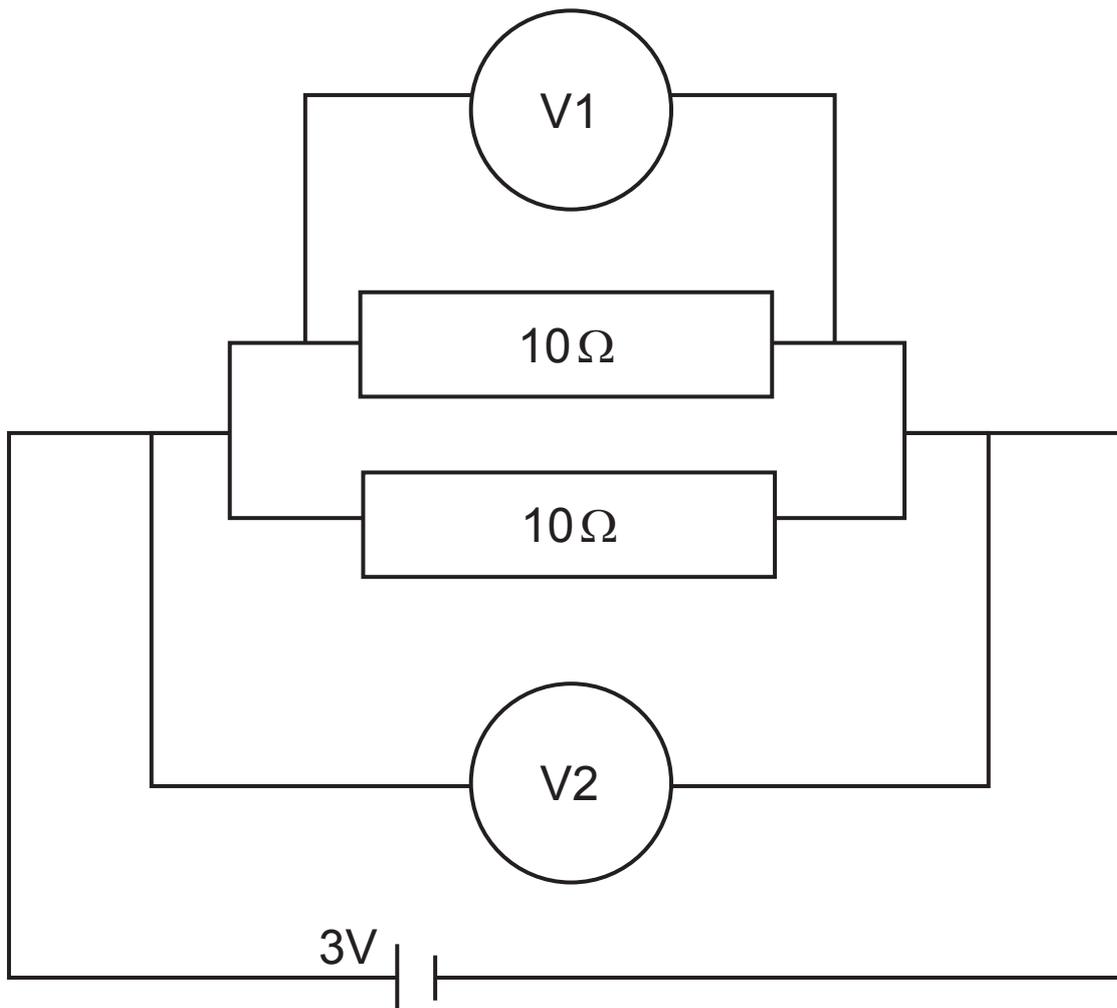
Two resistors of equal resistance are connected in parallel.



- (b)** What single resistor would have the same resistance as the two resistors in parallel? [2 marks]
You are advised to show your working out.

Resistance = _____ Ω

The resistors are now connected into a circuit across a 3V battery.

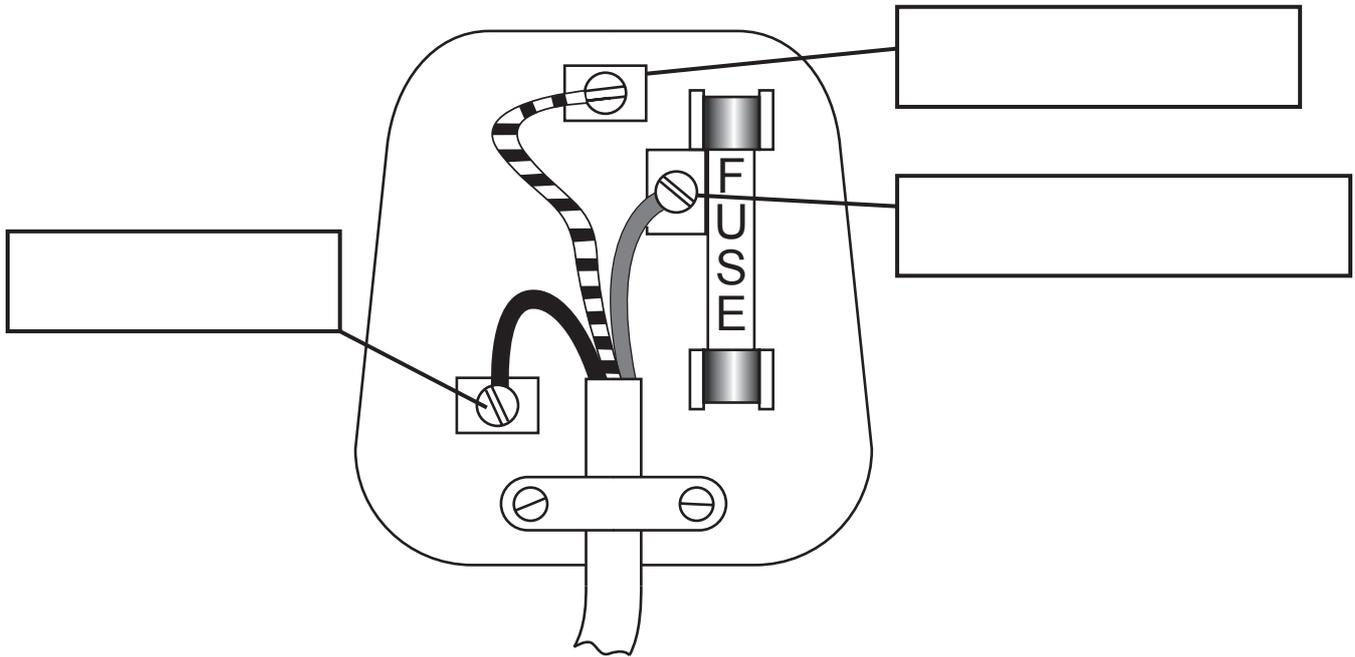


(c) What do voltmeters V1 and V2 read?
[1 mark for each]

Reading on V1 = _____ V

Reading on V2 = _____ V

- (d) (i) The diagram shows an electrical three pin plug.
Name the three terminals in the boxes.
[1 mark for each]



When the plug is attached to an appliance, wires are connected to each of the terminals.

- (ii) Name the wire which protects the user from electric shock. [1 mark]

_____ wire

- (iii) State the colour of the neutral wire. [1 mark]

- (iv) The plug is connected to an electric lamp and a current of 3.0A flows through the live wire. What current flows in the earth wire? [1 mark]

Current = _____ A

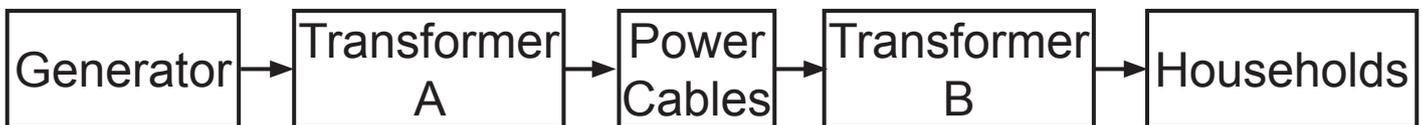
7 Generators are used to produce electricity.

(a) (i) Give the names of two major components found inside a simple a.c. generator. [2 marks]

_____ and _____

(ii) A generator produces alternating current. What do you understand by 'alternating current'? [2 marks]

The block diagram below represents the generation and transmission of electricity.



(b) (i) What change is made by Transformer A to the alternating voltage from the generator? [1 mark]

(ii) Give a reason why this change is made. [1 mark]

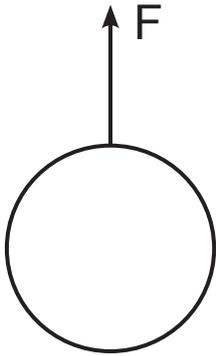
(c) (i) What change is made by Transformer B to the alternating voltage from the power cables?
[1 mark]

(ii) Give a reason why this change is made. [1 mark]

(b) Give the names of two bodies, other than planets, which orbit the Sun. [2 marks]

_____ and _____

- 9 When an object falls through the air a frictional drag force, F , acts on the object.



The size of the drag force, F , depends on the speed, v , of the falling object.

It is suggested that the drag force is proportional to the square of the velocity.

This relationship may be written:

$$F = kv^2 \quad \text{Equation 9.1}$$

where k is a constant.

Results are obtained and these are shown in the table below.

F/N	0.5	2.0	4.5	8.0	12.5
$v/\text{m/s}$	1	2	3	4	5
$v^2/\text{m}^2/\text{s}^2$		4			

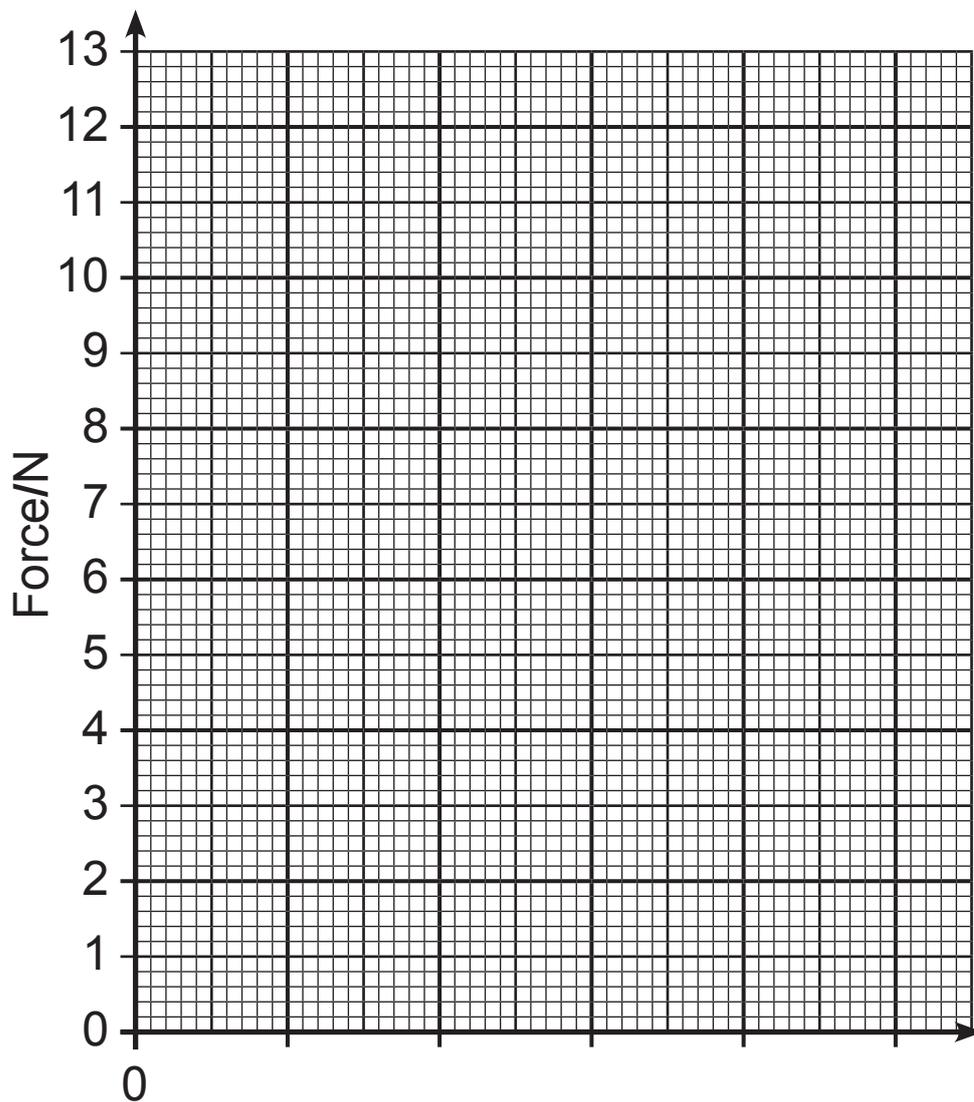
- (i) Complete the table by entering the values of v^2 .
One value has been entered for you. [2 marks]

You are asked to plot a graph of F against v^2 .

(ii) Choose a suitable scale for the horizontal axis and label it. [2 marks]

(iii) Plot a graph of F against v^2 . [2 marks]

(iv) Draw the best fit line. [1 mark]



(v) Is the drag force directly proportional to v^2 ?

Tick (✓) the correct box.

Yes

No

Give **two** reasons for your answer.

[1 mark for each reason]

1. _____

2. _____

(vi) Use your graph to find the velocity of the falling body when the drag force acting on it is 10 N. Give your answer correct to one decimal place.

[3 marks]

You are advised to show your working out.

Velocity = _____ m/s

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3	
4	
5	
6	
7	
8	
9	
Total Marks	

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