AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE PHYSICS

F

Foundation Tier Paper 2

Friday 15 June 2018 Morning Time allowed: 1 hour 45 minutes

Materials

For this paper you must have:
- a ruler
- a scientific calculator
- the Physics Equation Sheet (enclosed).

Instructions
- Use black ink or black ball-point pen.
- Fill in the box at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

Information
- The maximum mark for this paper is 100.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
TOTAL	

Do not write outside the box

0 1 . 1 The Sun is a star.

Which galaxy is the Sun in?

Tick **one** box.

the Earth revolves around the sun = same galaxy

Earth? – What galaxy is the Earth in?

[1 mark]

- Cartwheel ☐
- Milky Way ☑
- Starburst ☐
- Tadpole ☐

0 1 . 2 Light takes 500 seconds to travel from the Sun to the Earth.

time

s

Light travels at 300 000 kilometres per second.

speed

km/s

Calculate the distance between the Sun and the Earth.

Use the equation:

distance = speed × time

[2 marks]

distance = 300 000 × 500

= 150 000 000 km

Distance = 150,000,000 kilometres

Do not write outside the box

Table 1 gives information about some of the planets in our solar system.

The planets are in order of increasing distance from the Sun.

Table 1

Planet	Time to orbit the Sun in years
Mercury	0.2
Venus	0.6
Earth	1.0
Mars	
Jupiter	12.0

8 planets total

My Very Easy Method Just ... Speeds Up Naming

0 1 . 3 There are some planets in our solar system missing from **Table 1**.

How many planets are missing?

[1 mark]

8 - 5 = 3

Saturn
Uranus
Neptune

0 1 . 4 Estimate how many years it takes Mars to orbit the Sun.

[1 mark]

1.0 → 12.0
Trend in table → planets further from sun take longer to orbit → hence fit Mars into this trend (between 1.0 and 12.0)

5.0 years

0 1 . 5 Calculate how many times Venus will orbit the Sun in 9 years.

[2 marks]

V = 0.6 years

years → $\frac{9}{0.6} = 15$

years taken to orbit

In 9 years Venus will orbit the Sun 15 times.

7

Turn over for the next question

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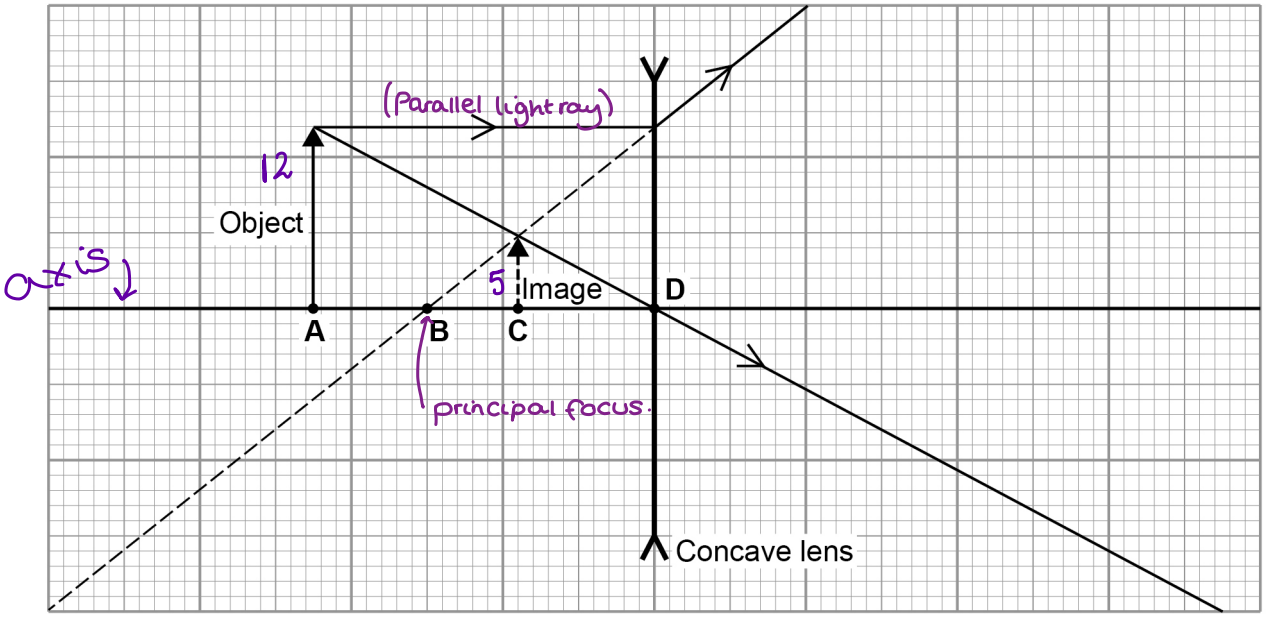
0 2 **Figure 1** shows how a concave lens forms an image of an object.

Concave Lens

Figure 1



0 2 . 1 Which point on **Figure 1** marks the position of the principal focus of the lens?

Tick **one** box.

Point on the axis at which parallel rays of light converge.

[1 mark]

A ☐ B ☑ C ☐ D ☐

0 2 . 2 Which **two** words describe the image?

Tick **two** boxes.

[2 marks]

larger arrow?

Enlarged ☐ ✗ ↑ ↑ The image arrow is smaller so it is diminished, not enlarged

Inverted ↑↓? ☐ ✗ Image and object are the same way up (both arrows are upright ↑↑), so the image is not inverted.

Real ☐ ✗ No, it is virtual (appears to come from behind the lens).

Upright ☑ Both arrows are upright (the same orientation)

Virtual ☑ appears to come from behind the lens

Do not write outside the box

0 2 . 3 Calculate the magnification produced by the lens.

Use the equation:

$$\text{magnification} = \frac{\text{image height}}{\text{object height}}$$

How many little squares tall are the object and image arrows? - count them!

[4 marks]

$$\text{magnification} = \frac{5}{12} = 0.41\dot{6}$$

$$= 0.4$$

Magnification = 0.4

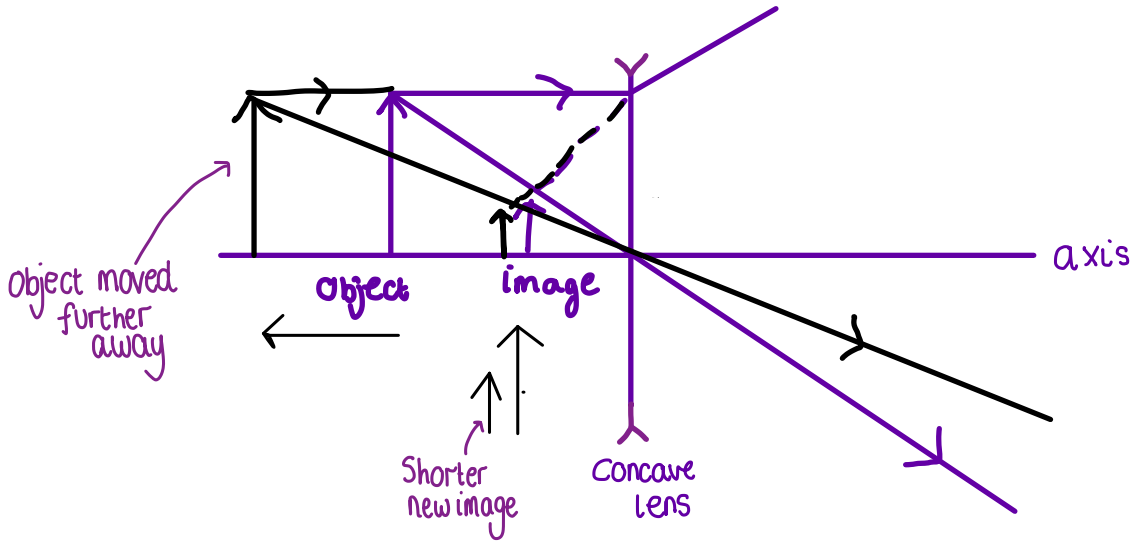
0 2 . 4 Complete the sentence.

Choose an answer from the box.

[1 mark]

decrease	**increase**	**not change**

As the object is moved further away from the lens, the size of the image will decrease.

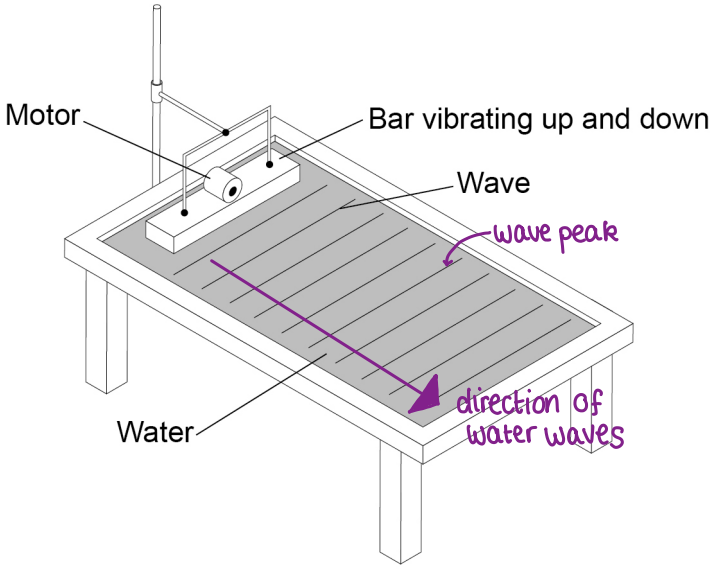


8

Do not write outside the box

0 3 **Figure 2** shows a ripple tank that a student used to investigate water waves.

Figure 2



0 3 . 1 The student adjusted the speed of the motor so that the bar hit the water more times each second.

What happened to the frequency of the waves produced?

Tick **one** box. **[1 mark]**

Number of waves produced each second.

$Hz = s^{-1} = \frac{1}{s}$

- Decreased ☐
- Did not change ☐
- Increased ☑

0 3 . 2 Describe how the frequency of the water waves in the ripple tank can be measured. **[2 marks]**

count peaks

Count the number of waves to pass a fixed point in a given time (1), then divide by this time (measured in seconds) (1).

Do not write outside the box

0 3 . 3 The student measured the frequency of the water waves as 5 hertz.

Calculate the period of the water waves.

Hz = s^{-1} = $\frac{1}{s}$

Use the equation:

$$\text{period} = \frac{1}{\text{frequency}}$$

Unit for period:

$1 \div \frac{1}{s}$

$= 1 \times s$

$= s$

$\frac{1}{s}$

Choose the unit.

metres	**metres / second**	**seconds**

[3 marks]

Using the above formula:

$\text{period} = \frac{1}{5} = 0.2$

Period = 0.2 Unit seconds

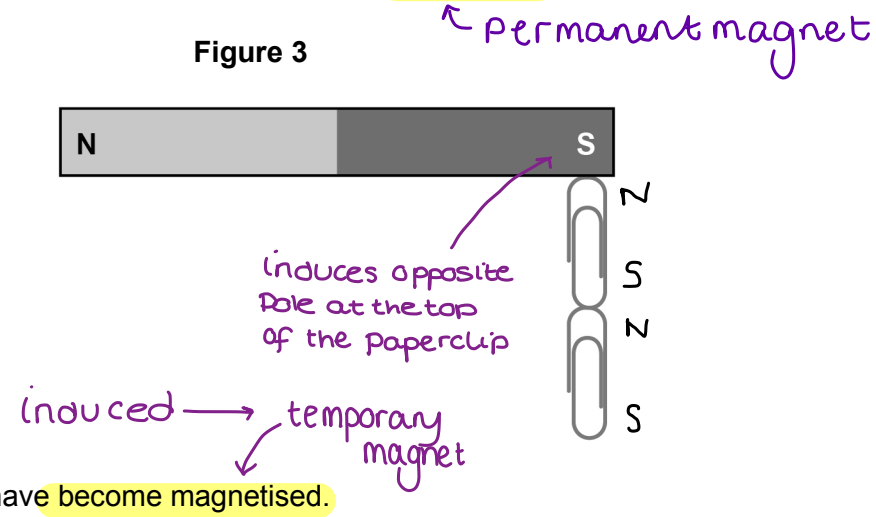
6

Turn over for the next question

Do not write outside the box

0 4 **Figure 3** shows two paper clips hanging from a bar magnet.

Figure 3



The paper clips have become magnetised.

– Opposite poles attract

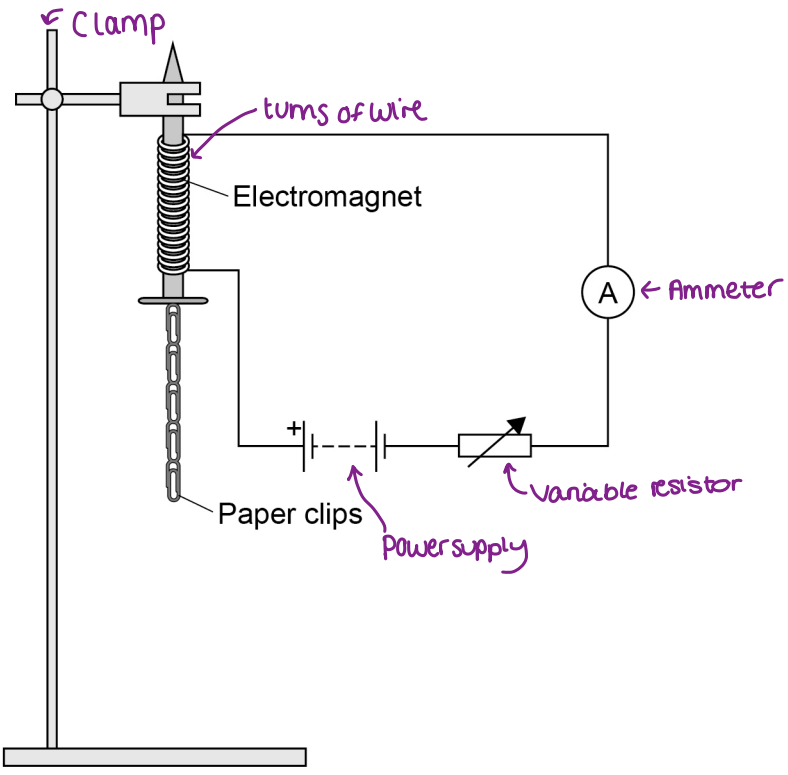
0 4 . 1 Label the north and south poles of both paper clips.

[1 mark]

A student investigated how the number of turns of wire on an electromagnet affects the strength of the electromagnet.

Figure 4 shows the equipment used by the student. Throughout the investigation the student kept the current through the wire constant.

Figure 4



Do not write outside the box

0 4 . 2 The student measured the strength of the electromagnet by counting the number of paper clips the electromagnet could hold.

Explain why it was important that the paper clips were all the same size. (=mass)

[2 marks]

So the paperclips have the same mass. (1)

This allows for results (for each number of turns) to be compared fairly (1)

Table 2 shows the student's results.

Table 2

IV - what we change

DV - what we measure

Number of turns of wire on the electromagnet	Number of paper clips held
10	3
20	6
30	9
40	12

+10

0 4 . 3 Describe the pattern shown in **Table 2**.

trend - how does the DV change with the IV?

[2 marks]

As the number of turns increases so does the number of paper clips held, (1) in a linear pattern (1)

- Directly proportional (2)

Question 4 continues on the next page

Do not write outside the box

0 4 . 4 The student then used 50 turns of wire on the electromagnet.

The electromagnet picked up 18 paper clips. This was more paper clips than the student had expected.

Which **one** is the most likely cause of this result?

Tick **one** box.

[1 mark]

X The paper clips used with 50 turns were larger than the others. ☐

Larger papercups have a greater mass - electromagnet can't hold as many

X There were less than 50 turns of wire on the electromagnet. ☐

Refer to table - less turns = weaker magnet = less paperclips held

Some of the paper clips were already magnetised. ☑

The magnet is able to pick up more magnetised paperclips.

0 4 . 5 The student repeated the measurement for 50 turns of wire three more times.

This gave her the following set of results.

Use these 3 similar results

discard 18 [16 14 15]

Explain what the student should now do with the **four** results for 50 turns of wire.

[3 marks]

Discount the result of 18 (1)

as the three new results are similar (1)

(and not close to 18)

The student should use the mean of these values, which is 15. (1)

↑ average

Do not write outside the box

0 4 . 6 The student wrote the hypothesis:

'Increasing the current through the wire will make the electromagnet stronger.'

Describe how the student should change the investigation to test this hypothesis.

↑ comment on each variable (IV, DV, CV) **[3 marks]**

CV → Keep the number of turns of wire constant (1)

IV → Change the current flowing (using the variable resistor) (1)

DV → Count how many paperclips the electromagnet will hold. – same as before (1)

12

Turn over for the next question

Do not write outside the box

0 5 Some objects are transparent and some objects are opaque.

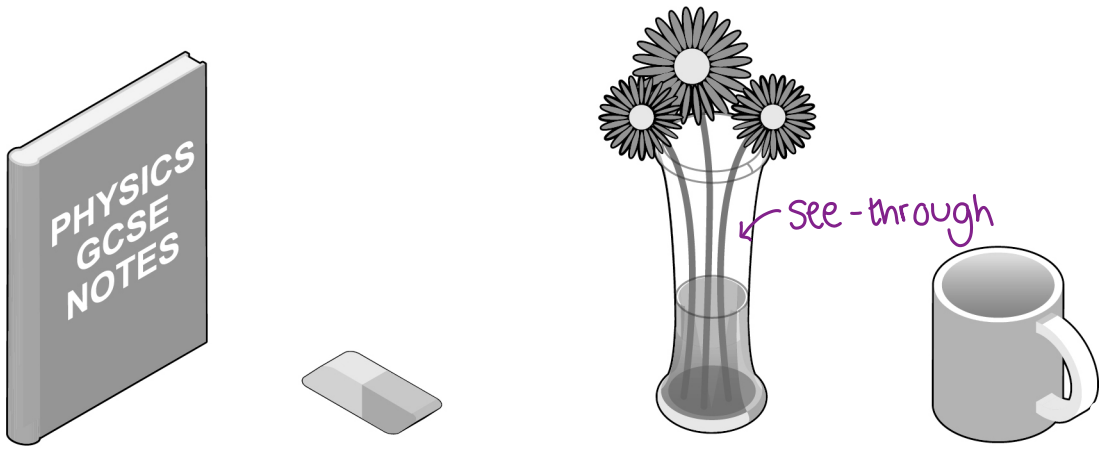
See-through

0 5 . 1 Which **one** of the objects in **Figure 5** is transparent?

Tick **one** box.

[1 mark]

Figure 5



Book	Pencil rubber	Glass vase	Ceramic mug
☐	☐	☑	☐

0 5 . 2 Complete the sentence.

Choose an answer from the box.

[1 mark]

absorb	reflect	transmit

An opaque object does not transmit light.

We can only see the surface of opaque objects because light is either reflected or absorbed by the object. Hence they do not transmit light.

Do not write outside the box

A student wears a white T-shirt and a red baseball cap to a party.

0 5 . 3 Why does the T-shirt look white in white light?

[1 mark]

light it reflects

It reflects all wavelengths of visible light (equally).

0 5 . 4 Explain how the colour of the baseball cap appears to change when the room lights at the party change from white to blue.

[2 marks]

red

black – no red light wavelengths in blue light

White light contains wavelengths of red light

Changes from red to black (1)

because the cap absorbs all of the blue light (1)

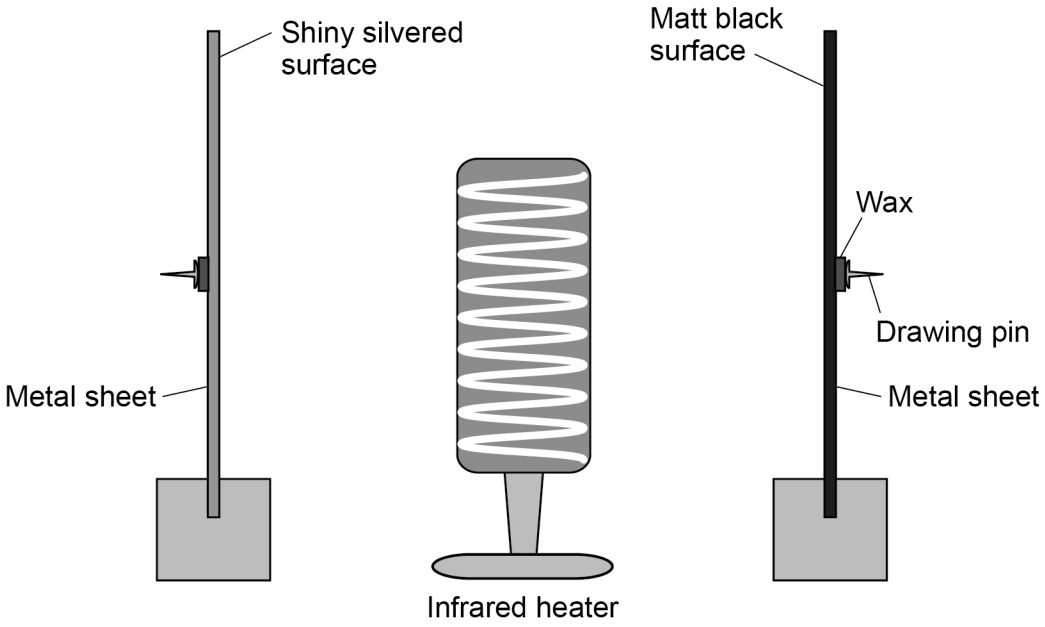
Question 5 continues on the next page

Do not write outside the box

A student investigated how the type of surface affects the amount of infrared radiation the surface absorbs.

Figure 6 shows the equipment that the student used.

Figure 6



The metal sheets absorb infrared radiation. The wax melts and the drawing pins fall off the surfaces.

0 5 . 5 In the investigation there are several variables.

Draw **one** line from each variable to the correct description of that variable.

[2 marks]

Variable	Description
Control	Distance from the metal sheets to the infrared heater.
Dependent	The surface colour of the metal sheets.
Independent	Time taken for the drawing pins to fall off.

Same

measure

Change

Changing the distance would affect the results, but in this instance, it is not the variable that we want to be responsible for this change.

We are trying to see how the surface type affects absorption

This is a measure of how quickly (well) the surface absorbs radiation.

Do not write outside the box

0 5 . 6 What is the main hazard in this investigation? **[1 mark]**

danger - IR exposure - The heater will get very hot - can cause burns etc.

the infrared heater

0 5 . 7 The drawing pin attached to the matt black metal sheet fell off first.

the wax melted more quickly

What can be concluded from this result? **[1 mark]**

wax melts when the surface is hot enough - so the pin falls

The matt black surface is a better absorber of the infrared radiation.

heated up more quickly, so the pin fell sooner

9

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ANSWER IN THE SPACES PROVIDED

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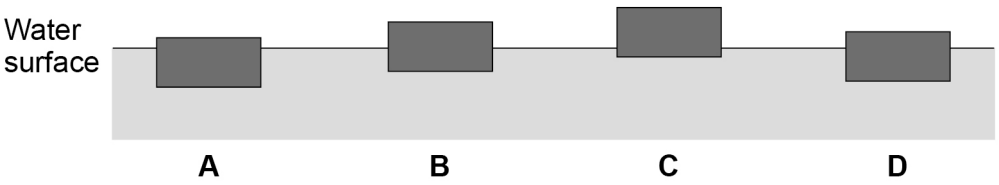
0 6 **Figure 7** shows four blocks of different materials floating on water.

The four blocks are the same volume.

Figure 7



0 6 . 1 Which of the blocks has the smallest weight?

$\downarrow \rho = \frac{m}{V} \downarrow$

$\rho \propto m$

Tick **one** box.

[1 mark]

A ☐ **B** ☐ **C** ☑ **D** ☐

Denser blocks sit lower in the water

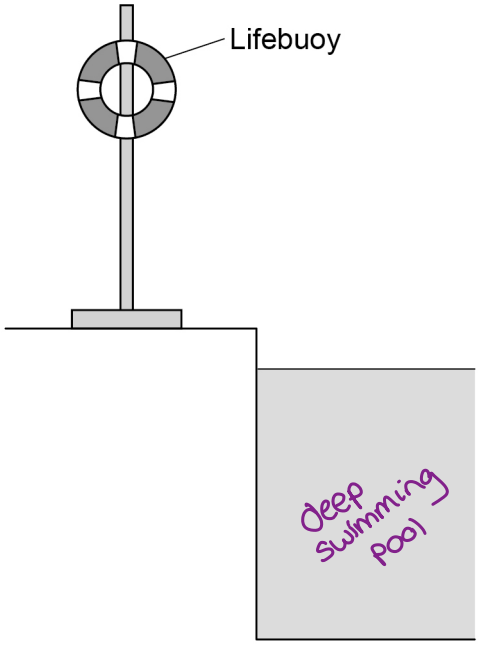
Density is proportional to mass, so the block with the smallest mass will sit highest in the water → hence C

Sits mostly above the water surface.

Do not write outside the box

Figure 8 shows a lifebuoy next to a deep swimming pool.

Figure 8



0 6 . 2 The lifebuoy has a mass of 2.5 kg.

gravitational field strength = 9.8 N/kg

Calculate the weight of the lifebuoy.

Use the equation:

weight = mass × gravitational field strength

[2 marks]

mass × GFS (1)

Weight = 2.5 kg × 9.8 N/kg (1)

$\frac{N}{kg} \times kg = N$

= 24.5 N

Weight = 24.5 N

Do not write outside the box

0 6 . 3 When thrown into the water the lifebuoy floats. The two forces acting on the lifebuoy are the weight of the lifebuoy downwards and upthrust upwards.

How big is the upthrust on the lifebuoy compared to the weight of the lifebuoy?

Tick **one** box.

upthrust
↕
weight

[1 mark]

The upthrust is greater than the weight. ☐

The upthrust is less than the weight. ☐

The upthrust is the same as the weight. ☑

Floats = there has to be no resultant (net) force acting on the object

The only two vertical forces acting are upthrust (up) and weight (down).

These must be equal for the object to be in equilibrium (floating in this instance).

0 6 . 4 Write down the equation which links acceleration, mass and resultant force.

[1 mark]

FAM

Force = mass × acceleration

F = ma

m FAM

0 6 . 5 A rope is used to pull the lifebuoy to the side of the swimming pool.

A resultant force of 4.0 N acts on the lifebuoy.

The mass of the lifebuoy is 2.5 kg.

Calculate the acceleration of the lifebuoy.

[3 marks]

F = ma ← from the previous part of the question

÷2.5 ↓

4.0 = 2.5 × a (1)

a = 4.0 / 2.5 (1) = 1.6 (1)

Acceleration = 1.6 m/s^2

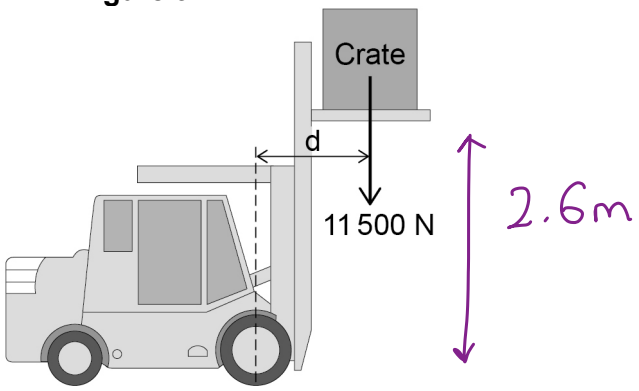
8

Turn over ►

Do not write outside the box

0 7 **Figure 9** shows a fork-lift truck lifting a heavy crate.

Figure 9



0 7 . 1 The crate weighs 11 500 N and is lifted vertically 2.60 m.

Calculate the work done to lift the crate.

Use the equation:

work done = force × distance

[2 marks]

Work done = force × distance

Work done = 11500 N × 2.60 m (1)

= 29 900 Nm (1)

1 Nm = 1 J

Work done = 29 900 J

Do not write outside the box

The weight of the crate causes a clockwise moment of 13 800 Nm about the centre of the front wheel of the fork-lift truck.

0 7 . 2 The weight of the fork-lift truck and driver cause an anticlockwise moment.

What is the minimum size of the anticlockwise moment needed so that the fork-lift truck does **not** topple over? ← no net moment = in equilibrium **[1 mark]**

13 800 Nm

Principle of moments → for an object to be in equilibrium acw moment = cw moment

0 7 . 3 Write down the equation which links distance, force and moment of a force. **[1 mark]**

MDF

Moment = force x distance

M = F x d

M = Fd ~ = M = dF

0 7 . 4 Calculate the distance '**d**' marked on **Figure 9**. **[3 marks]**

M = Fd

moment cw = 13800 Nm → 13800 = 11500 x d (1)

F = 11500 N → d = 13800 / 11500 (1)

d = ?

d = 1.20

Distance '**d**' = 1.20 (1) m

7

Turn over for the next question

Do not write outside the box

0 8 **Figure 10** shows the position of three types of wave in the electromagnetic spectrum.

EM spectrum song

RMIVUXG

Figure 10

Radio waves	A	B	C	Ultraviolet	X-rays	D

Microwaves IR Visible light gamma

0 8 . 1 Which position shows where visible light is in the spectrum?

Tick **one** box.

[1 mark]

A ☐ B ☐ C ☑ D ☐

0 8 . 2 Which **one** of the statements about electromagnetic waves is correct?

Tick **one** box.

↑λ ↓f ↓λ ↑f

Radio waves Gamma

[1 mark]

Radio waves have a higher frequency than X-rays. ☐

Radio waves have a longer wavelength than ultraviolet. ☑

X-rays have a longer wavelength than radio waves. ☐

X-rays travel faster through the air than ultraviolet. ☐

0 8 . 3 Give **one** possible danger of exposing your skin to ultraviolet radiation.

from the Sun

damage to skin

[1 mark]

risk of skin cancer (1)

(or) premature ageing of skin (1)

Do not write outside the box

0 8 . 4 Having an X-ray taken exposes a person to ionising radiation.

Table 3 gives the average radiation dose for an X-ray of the chest and an X-ray of the upper digestive system.

Table 3

Part of the body	Radiation dose in millisieverts (mSv)
Upper digestive system	5.0
Chest	0.1

The risk of an X-ray causing cancer is about 1 in 20 000 for each mSv of radiation received.

Compare the risk of developing cancer from having an X-ray of the upper digestive system with the risk from having an X-ray of the chest.

Use the data in **Table 3**.

[2 marks]

Risk Calculations

UDS: $\frac{1}{20000} \times 5 = \frac{1}{4000}$ (1)

$\times 50$

Chest = $\frac{1}{20000} \times 0.1 = \frac{1}{200\,000}$ (1)

The risk is higher (by a factor of 50) (1) for the UDS x-ray. (1)

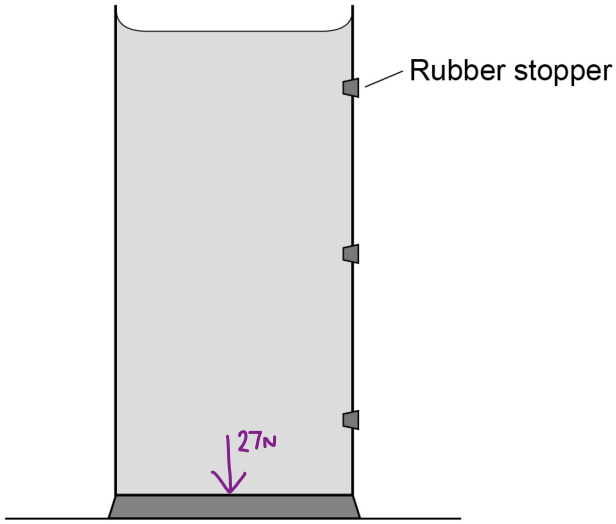
5

Do not write outside the box

0 9 **Figure 11** shows a container filled with water.

The three holes in the side of the container are sealed with rubber stoppers.

Figure 11



F

0 9 . 1 The water exerts a force of 27 N on the bottom of the container. a
The cross-sectional area of the bottom of the container is 0.009 m^2.

Calculate the pressure exerted by the water on the bottom of the container.

Use the equation:

$$p = \frac{F}{a}$$

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

exerted on the bottom of the container (by the water)

Pa

of the bottom of the container (where the force is being exerted)

Choose the unit.

[3 marks]

kg/m^3	N/m	Pa

Substituting into formula

$\text{pressure} = \frac{27\text{ N}}{0.009\text{ m}^2} = 3000$ (1) (1) $Nm^{-2} = Pa$

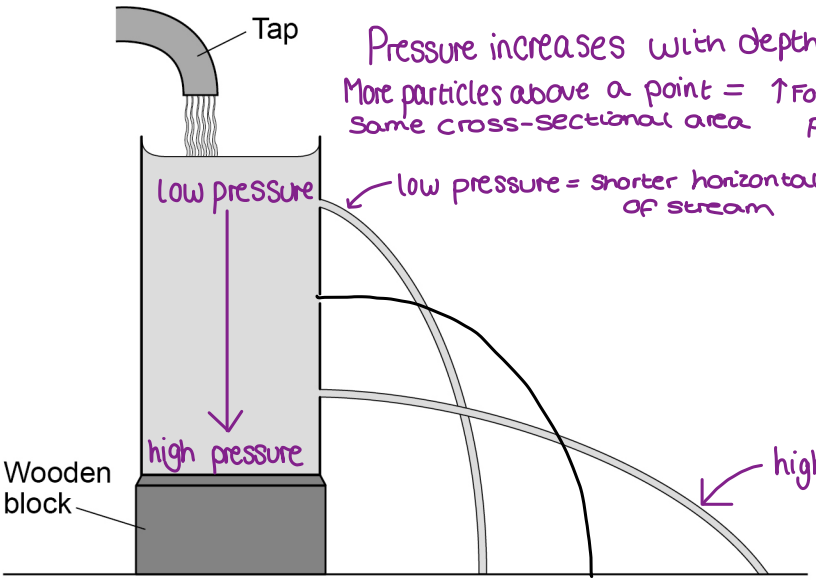
Pressure = 3000 Unit Pa (1)

Do not write outside the box

The container is put under running water from a tap and the three rubber stoppers removed.

Figure 12 shows the path taken by the water escaping from the top and bottom holes.

Figure 12



Pressure increases with depth in a fluid.
More particles above a point = ↑Force over the same cross-sectional area $p = \frac{F}{A}$ so a greater force = a greater pressure
low pressure = shorter horizontal distance of stream
highest pressure = furthest horizontal projection

0 9 . 2 Complete **Figure 12** to show the path taken by the water escaping from the centre hole.

[1 mark]

how does it change in Figure 12

0 9 . 3 What can be concluded from **Figure 12** about the pressure in a liquid?

[1 mark]

Pressure increases with depth

Question 9 continues on the next page

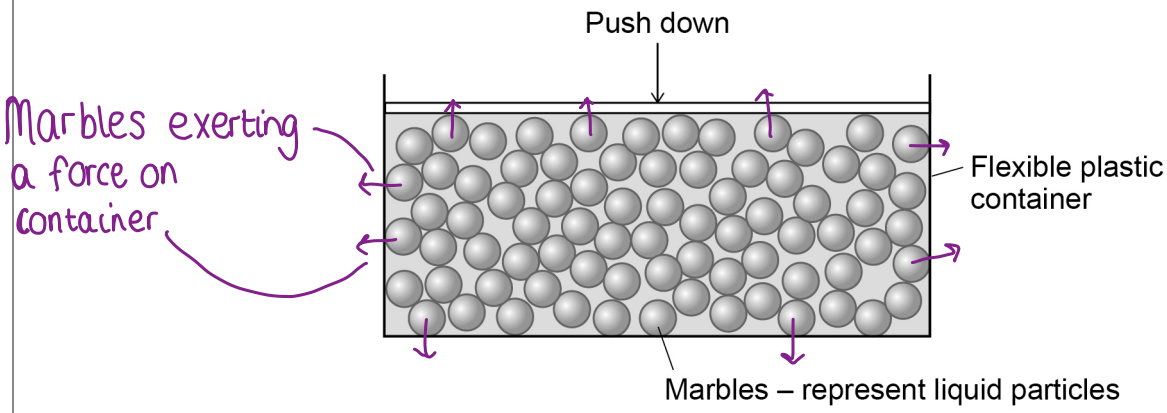
Do not write outside the box

0 9 . 4 **Figure 13** shows a simple model of a liquid.

When a force pushes down on the marbles, the marbles push the sides and bottom of the container outwards.

Represented by arrows on marbles

Figure 13



What can be concluded from this model about the pressure in a liquid?

[1 mark]

Pressure acts in all directions

Pressure causes a force on all surfaces

6

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ANSWER IN THE SPACES PROVIDED

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1 0 A child drops a ball.

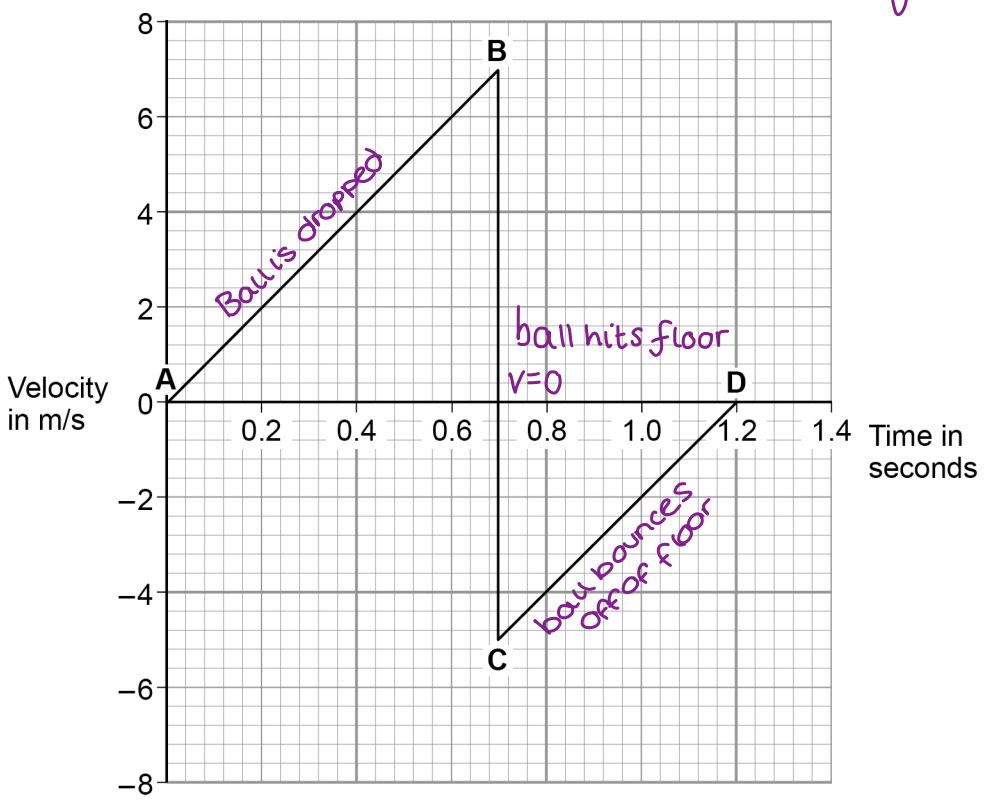
The ball hits the ground and bounces.

Figure 14 shows the velocity-time graph for the ball from when the ball is dropped until when the ball reaches the top of its first bounce.

Air resistance has been ignored.

A → B
Straight line with a constant gradient

Figure 14



1 0 . 1 Describe the motion of the ball between points **A** and **B** on **Figure 14**.

[2 marks]

gradient
m = acceleration $m = \frac{\Delta y}{\Delta x} = \frac{ms^{-1}}{s} = ms^{-2}$

uniform acceleration ← velocity is increasing at a constant rate
↑ constant – shown by straight line

What direction is the ball moving between points **C** and **D** on **Figure 14**?

[1 mark]

A→B
C→D
when ball hits floor

Upwards

The ball has a positive velocity when falling downwards (between A and B)

Do not write outside the box

1 0 . 3 The ball and the Earth form a system.

What is meant by 'a system'?

Tick **one** box.

[1 mark]

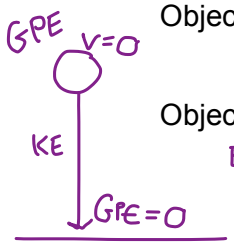
The objects in a system interact.
A group of objects that interact. ☑

Objects with big differences in mass. ☐

They do have a large difference in mass, but this doesn't determine whether or not the two are a system.

Objects with gravitational potential energy. ☐

Energy transfers do occur in systems, but again, this isn't the determining feature of a system.



1 0 . 4 When the ball hits the ground, energy is transferred from the ball to the Earth.

Explain how the data in **Figure 14** shows this energy transfer.

[4 marks]

Velocity just after bounce is less than velocity just before. (height at the top of the bounce is less than height dropped from). (1)

The ball has lost kinetic energy. (1) It will have a reduced maximum GPE after the bounce. (1)

The total energy of the ball and Earth is constant (1)
↑ energy is conserved

8

Do not write outside the box

1 1 A student carried out an investigation to determine the spring constant of a spring.

Table 4 gives the data obtained by the student.

Table 4

Force in N	Extension in cm
0	0.0
2	3.5
4	8.0
6	12.5
8	16.0
10	20.0

force applied to spring (2N weights)

from rest position

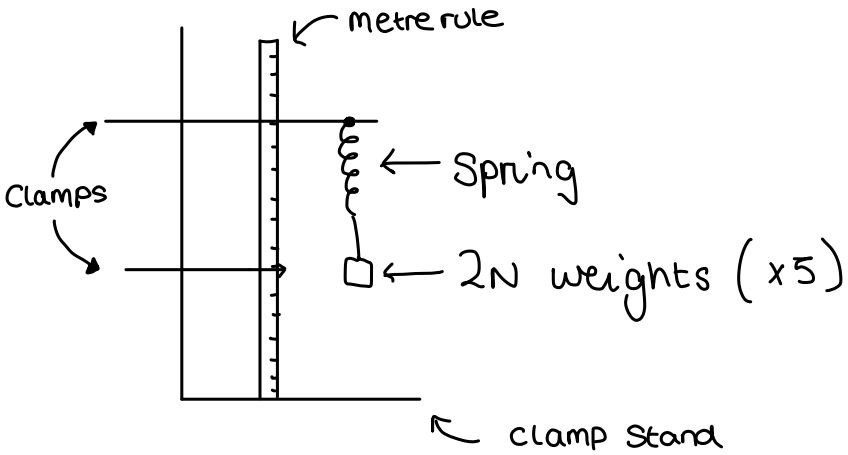
1 1 . 1 Describe a method the student could have used to obtain the data given in **Table 4**.

Your answer should include any cause of inaccuracy in the data.

Your answer may include a labelled diagram.

[6 marks]

logically arranged and detailed method required to obtain all marks here.



Set up the apparatus in the diagram above (spring hanging from clamp on a clamp stand with a ruler clamped beside it).

- Record the position of the bottom of the spring on the ruler ← rest / equilibrium position
- Hang the first 2N weight from the spring
- Measure the extension of the spring (new length − rest length) (from the rest position)
- Add 2N weights, finding the extension each time.

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don't all need to be mentioned
-could be included within answer

Possible sources of inaccuracy:
- Holding the ruler as opposed to clamping it
- Not holding / clamping the ruler vertically
- Misjudging the position of the bottom of the spring
- Parallax error when reading measurements off of the ruler.

repeat measurements

1 1 . 2 The student measured the extension for five different forces rather than just measuring the extension for one force.

Suggest why.

[1 mark]

To identify any anomalous results
(to reduce the effect of random error – you could calculate an average from all of the reliable results).

Question 11 continues on the next page

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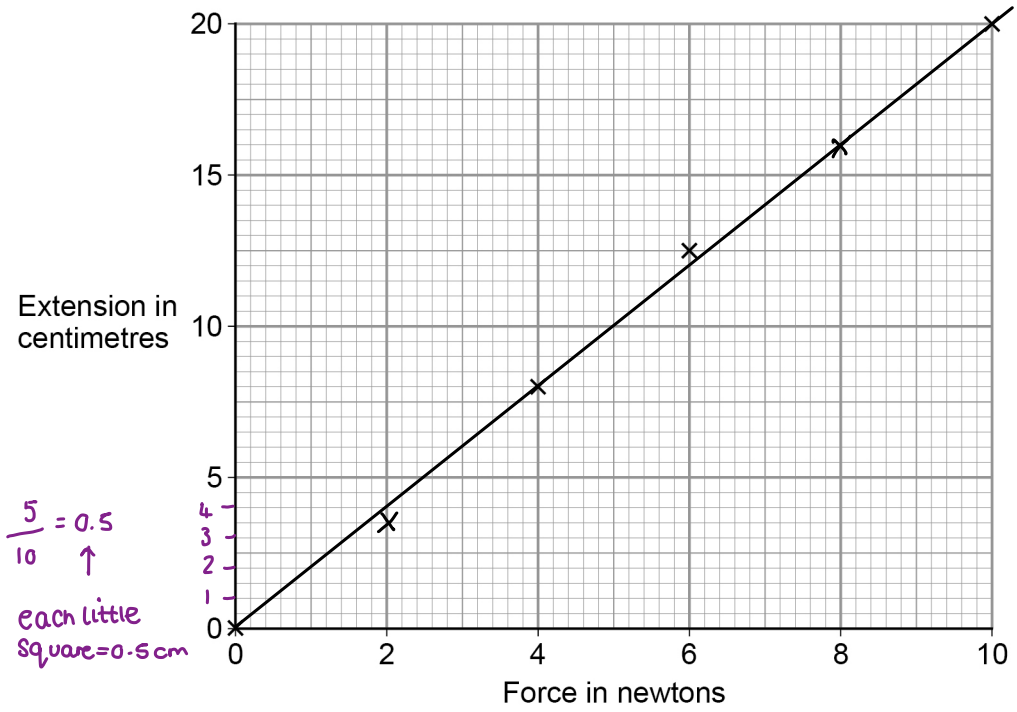
Figure 15 shows some of the data obtained by the student.

Figure 15



1 1 . 3 Complete **Figure 15** by plotting the missing data from **Table 4.**

Draw the line of best fit.

Table 4 is repeated here to help you answer this question.

[2 marks]

graph axis = x y

Table 4

Force in N	Extension in cm
0	0.0
2	3.5
4	8.0
6	12.5
8	16.0
10	20.0

Plot • (2, 3.5)

Plot • (8, 16.0)

ΔL F k

1 1 . 4 Write down the equation that links extension, force and spring constant.

[1 mark]

F ∝ L k

F = L k

Force = Spring constant × extension

F = k ΔL

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1 1 . 5 Calculate the spring constant of the spring that the student used.

Give your answer in newtons per metre. Nm^{-1}

[4 marks]

$F = k\,\Delta L$ ← e

F / ΔL $\quad \frac{\Delta y}{\Delta x} = \frac{F}{\Delta L} = k$

$10 = k \times 20cm$

$\times 10^{-3}$ ↑ $0.20m$ (1)

$10N = 0.20m \times k$ (1)

$k = \frac{10N}{0.20m}$ (1) N/m

$k = 50$ (1)

Spring constant = 50 N/m

looking for a straight line graph which goes through the origin

1 1 . 6 Hooke's Law states that:
'The extension of an elastic object is directly proportional to the force applied, provided the limit of proportionality is not exceeded.'

ΔL / F $\quad F \propto \Delta L$

The student concluded that over the range of force used, the spring obeyed Hooke's Law.

Explain how the data supports the student's conclusion.

[2 marks]

the line is straight (1)

and passes through the origin (1)

16

Turn over for the next question

Do not write outside the box

1 2 P-waves and S-waves are two types of seismic wave caused by earthquakes.

P - longitudinal ↑ transverse ∿∿

1 2 . 1 Which **one** of the statements about P-waves and S-waves is correct?

'p' has a long stem

Tick **one** box.

[1 mark]

P-waves and S-waves are transverse. ☐

P-waves and S-waves are longitudinal. ☐

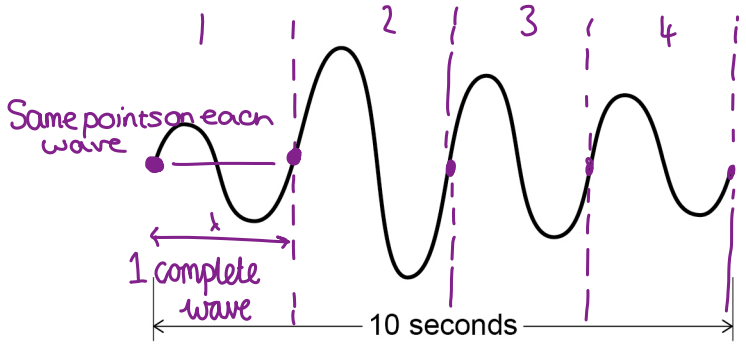
P-waves are transverse and S-waves are longitudinal. ☐

P-waves are longitudinal and S-waves are transverse. ☑

Seismometers on the Earth's surface record the vibrations caused by seismic waves.

Figure 16 shows the vibration recorded by a seismometer for one P-wave.

Figure 16



Number of waves to pass a fixed point each second

1 2 . 2 Calculate the frequency of the P-wave shown in **Figure 16**.

[1 mark]

4 waves = 10 s

÷10 ↓ 4/10 = 1 s ↓ ÷10 = 0.4

Frequency = 0.4 s^{-1} Hz

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1 2 . 3 Write down the equation which links frequency, wavelength and wave speed.

[1 mark]

$v = f\lambda$ Velocity = wavelength × frequency

Units (check) = $ms^{-1} = (Hz) \times m = ms^{-1}$ ($s^{-1} \times m = ms^{-1}$)

1 2 . 4 The P-wave shown in **Figure 16** is travelling at 7200 m/s.

Calculate the wavelength of the P-wave.

[3 marks]

$v = f\lambda$ ← from previous part of qu

$7200\ ms^{-1} = 0.4\ Hz \times \lambda$ (1) ÷0.4

$\lambda = \frac{7200\ ms^{-1}}{0.4\ s^{-1}} = m$ (1) ÷0.4 $\lambda = 18000$

Wavelength = 18000 (1) m

1 2 . 5 Explain why the study of seismic waves provides evidence for the structure of the Earth's core.

[2 marks]

Seismic waves are produced by Earthquakes/explosions and detected by seismometers around the Earth – data from these is analysed

Liquid (outer core)

Because S-waves cannot travel through a liquid (1) and S-waves do not travel through the Earth's outer core (1).

8

END OF QUESTIONS

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