

Paper Reference(s) **1PH0 / 2F**

Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Physics

Paper 2

Foundation Tier

Friday 14 June 2019 – Morning

Time: 1 hour 45 minutes plus your additional time allowance

INSTRUCTIONS TO CANDIDATES

Write your centre number, candidate number, surname, other names and your signature in the boxes below. Check that you have the correct question paper.

Centre No.					
Candidate No.					
Surname					
Other names					
Signature					
Paper Reference	1	P	H	0	/ 2 F

- Use **BLACK** ink or ball-point pen.
- Answer **ALL** questions.
- Answer the questions in the spaces provided – there may be more space than you need.
- Calculators may be used.
- Any diagrams may **NOT** be accurately drawn, unless otherwise indicated.
- You must show all your working out with your answer clearly identified at the end of your solution.

MATERIALS REQUIRED FOR EXAMINATION

Calculator, ruler

ITEMS INCLUDED WITH QUESTION PAPERS

Equations Booklet

INFORMATION FOR CANDIDATES

- The total mark for this paper is 100.
- The marks for **EACH** question are shown in brackets – use this as a guide as to how much time to spend on each question.
- In questions marked with an **ASTERISK (*)**, marks will be awarded for your ability to structure your answer logically showing how the points that you make are related or follow on from each other where appropriate.
- An Equations Booklet is provided.

(Instructions continue on next page)

(Turn over)

ADVICE TO CANDIDATES

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☐. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☐.

- 1 (a) Figure 1 gives the names of three atomic particles and some descriptions of the charge on the particles and their position in the atom.**

(Question continues on next page)

Draw one straight line from each atomic particle to its correct description. (3 marks)

particle	description
	<div>negative charge</div> <div>inside the nucleus</div>
<div>proton</div>	<div>no charge</div> <div>inside the nucleus</div>
<div>electron</div>	<div>positive charge</div> <div>inside the nucleus</div>
	<div>negative charge</div> <div>outside the nucleus</div>
<div>neutron</div>	<div>no charge</div> <div>outside the nucleus</div>

Figure 1

(Question continues on next page)

(Turn over)

(b) Figure 2 shows the junction of three wires, F, G and H, in a circuit.

The current in wire F is 6.0 A .

The current in wire G is 3.5 A .

Calculate the current in wire H. (1 mark)

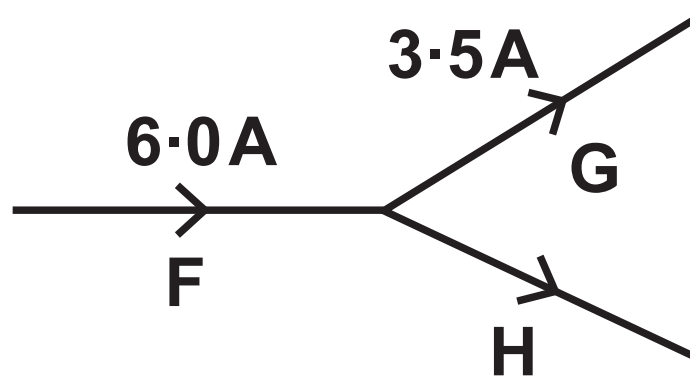


Figure 2

current in wire H = _____ A

(Question continues on next page)

(Turn over)

- (c) A wire in a circuit carries a current of 0.9 A.
Calculate the quantity of charge that flows through the wire in 50 s. (3 marks)

State the unit of charge with your answer.

Use the equation

$$\text{charge} = \text{current} \times \text{time}$$

quantity of charge = _____ unit _____

(TOTAL FOR QUESTION 1 = 7 MARKS)

(Questions continue on next page)

(Turn over)

- 2 (a) Figure 3 shows a diver swimming in a lake.

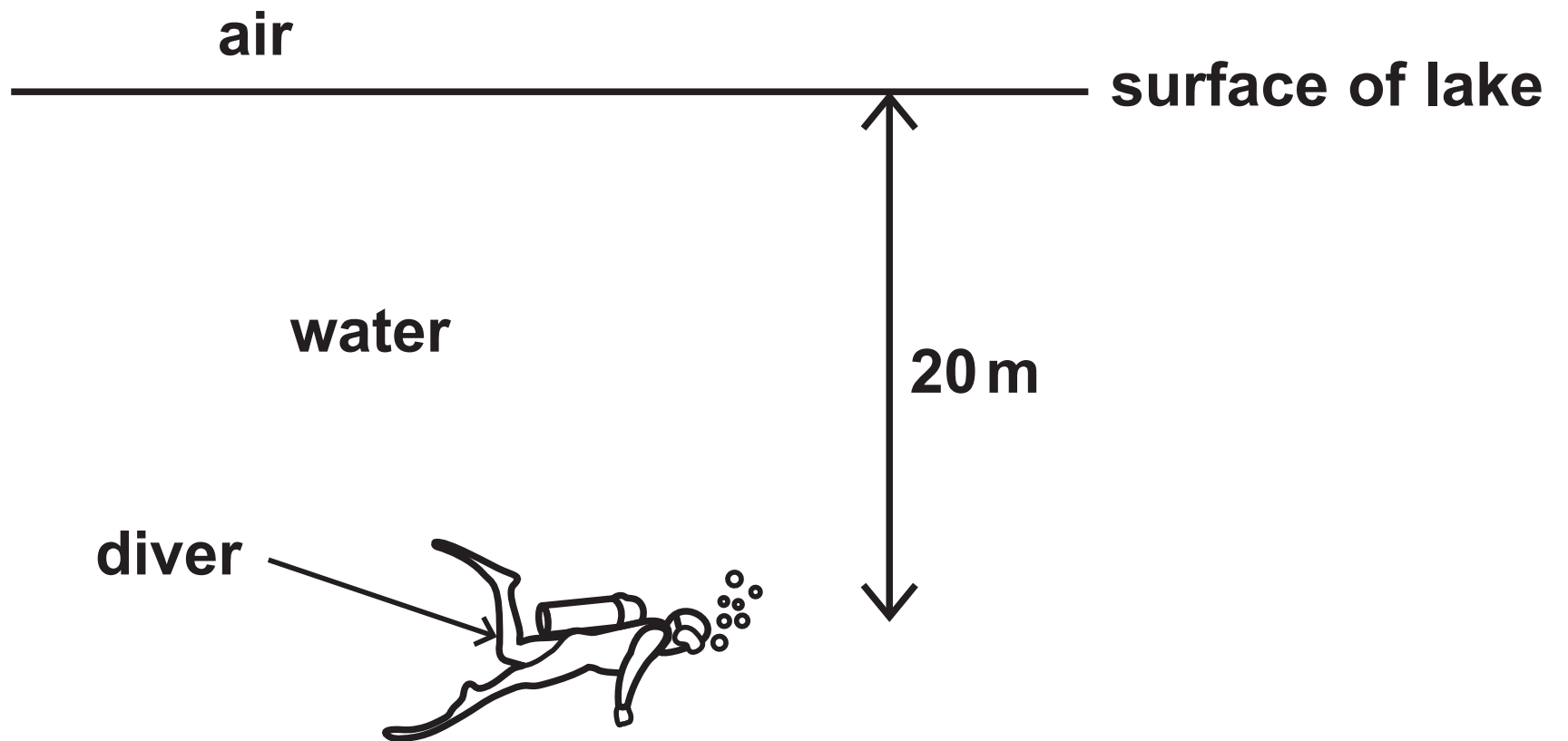


Figure 3

The pressure on the diver is due to both the water above him and the Earth's atmosphere.

The pressure of air on the surface of the water is one atmosphere.

10 m of water is equivalent to one atmosphere.

How many atmospheres of pressure will be on the diver at a depth 20 m? (1 mark)

☐ A 1

☐ B 2

☐ C 3

☐ D 4

(Question continues on next page)

(Turn over)

(b) A balloon is filled with helium when it is on the ground.

The balloon is released and it rises through the atmosphere.

Explain what happens to the size of the balloon as it rises through the atmosphere. (3 marks)

(Question continues on next page)

(Turn over)

- (c) Figure 4 shows a container of length 6.0 m and width 2.0 m resting on a floor. The weight of the container is 15 000 N.

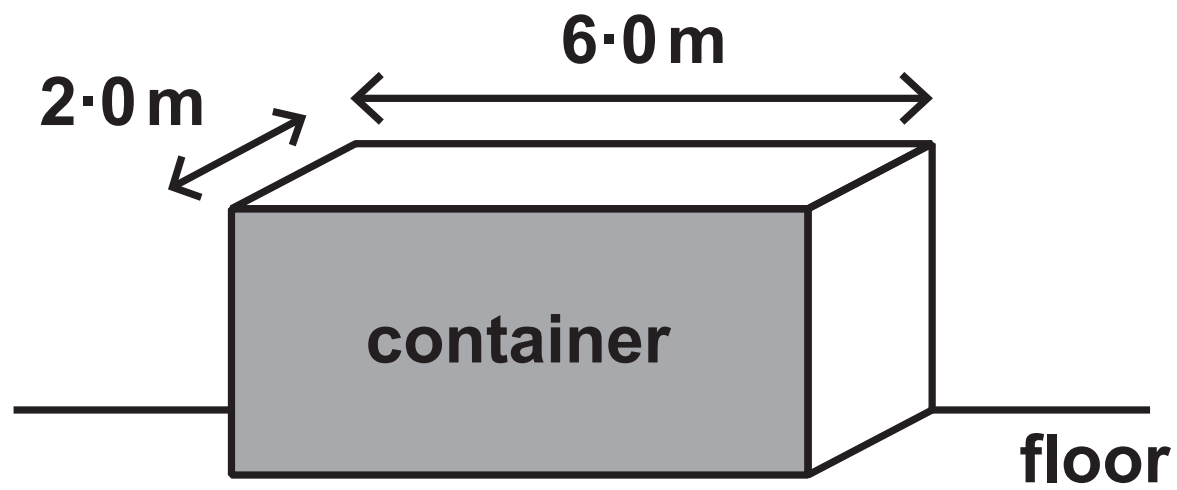


Figure 4

(Question continues on next page)

Calculate the pressure that the container exerts on the floor. (3 marks)

Use the equation

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

pressure of the container on the floor = _____ Pa

(TOTAL FOR QUESTION 2 = 7 MARKS)

(Questions continue on next page)

3 (a) Which of these is a magnetic material? (1 mark)

☐ **A aluminium**

☐ **B carbon**

☐ **C cobalt**

☐ **D copper**

(Question continues on next page)

(b) A student has

- a power pack**
- a long piece of wire**
- a stiff card**
- iron filings**

Describe how the student could use this equipment to show the shape of the magnetic field produced by a current in the wire.

**You may draw a diagram to help with your answer.
(4 marks)**

(Question continues on next page)

- (c) Figure 5 shows two magnetic poles facing each other.

The magnetic field between the poles is uniform.

On Figure 5, draw the magnetic field lines between the two poles and show the direction of this magnetic field. (3 marks)

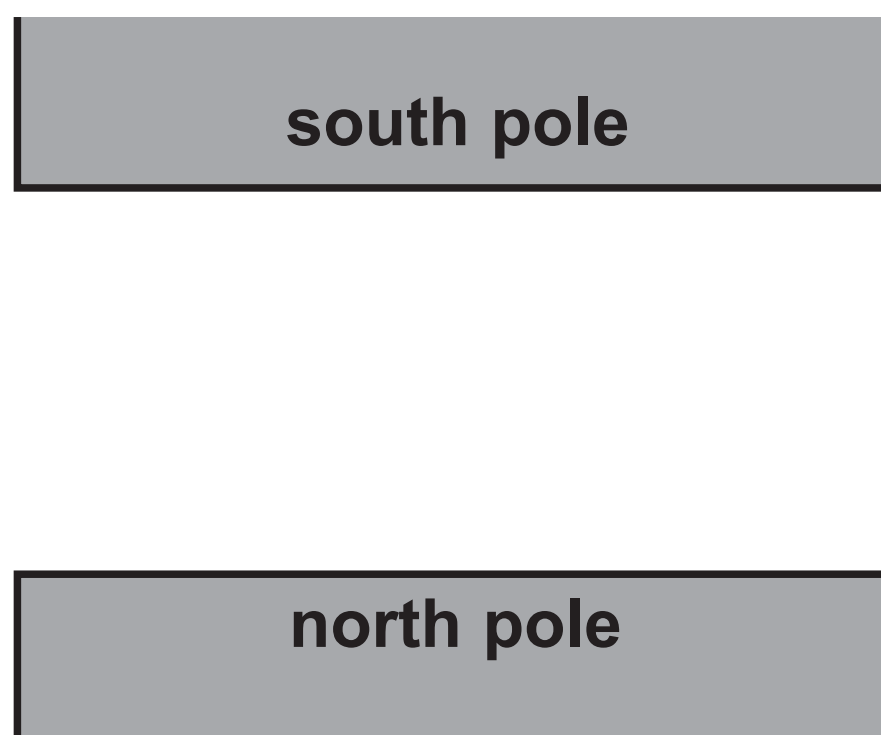


Figure 5

(TOTAL FOR QUESTION 3 = 8 MARKS)

(Questions continue on next page)

(Turn over)

4 (a) The particles of a gas exert a pressure on the walls of a container.

Which row of the table is correct when the pressure of the gas changes? (1 mark)

	pressure of gas	number of particles colliding with the walls of the container each second
<input type="checkbox"/> A	increases	stays the same
<input type="checkbox"/> B	increases	increases
<input type="checkbox"/> C	decreases	stays the same
<input type="checkbox"/> D	decreases	increases

(b) A digital thermometer gives a temperature reading of 23 °C.

Calculate the value of this temperature in kelvin.
(1 mark)

- (c) A student changes the volume of gas in a container and notes the pressure for different values of the volume.

The results are shown in Figure 6 and plotted on the graph in Figure 7.

volume in ml	pressure in kPa
10	260
12	200
20	140
25	150
30	100
40	75
50	65

Figure 6

(Question continues on next page)

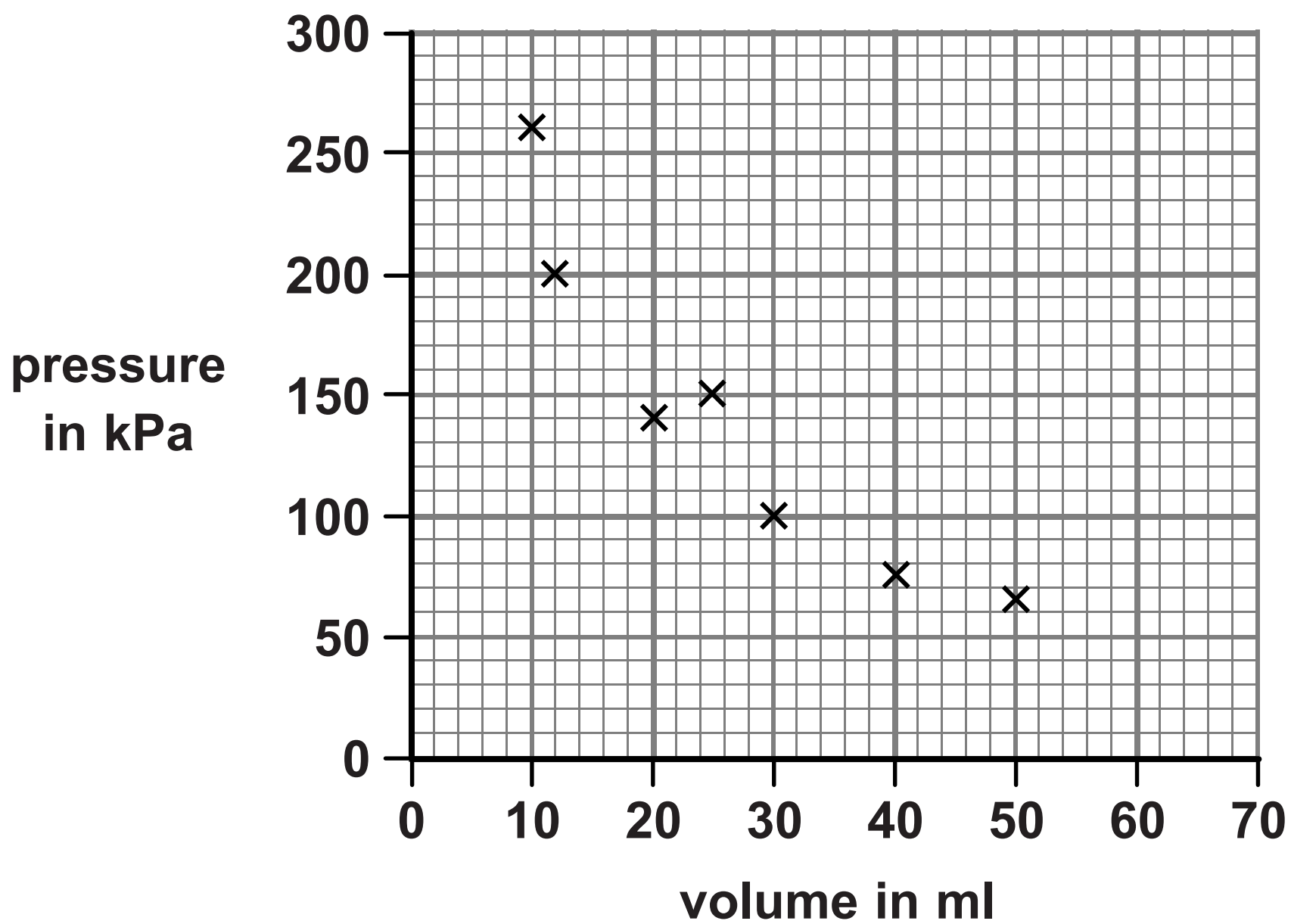


Figure 7

- (i) Identify the anomalous result plotted on Figure 7 by drawing a circle on Figure 7 around the anomalous point. (1 mark)**
- (ii) Draw the curve of best fit on Figure 7. (1 mark)**

(Question continues on next page)

- (iii) Describe how the graph in Figure 7 would change if the student repeated the experiment with the same mass of gas, at a higher constant temperature. (2 marks)**

(Question continues on next page)

- (d) Figure 8 shows a small container of carbon dioxide at high pressure.

The pressure, P_1 , in the container is 8.00 MPa.

The volume, V_1 , of the container is 14.5 cm³.



Figure 8

The container is pierced and all of the carbon dioxide goes into a large balloon.

The volume of gas, V_2 , in the large balloon is 1160 cm³.

(Question continues on next page)

**Calculate the pressure, P_2 , in the large balloon.
(3 marks)**

Use the equation

$$P_1V_1 = P_2V_2$$

pressure in the large balloon = _____ MPa

(TOTAL FOR QUESTION 4 = 9 MARKS)

(Questions continue on next page)

- 5 (a) Figure 9 shows a 10 N weight hanging from a spring.

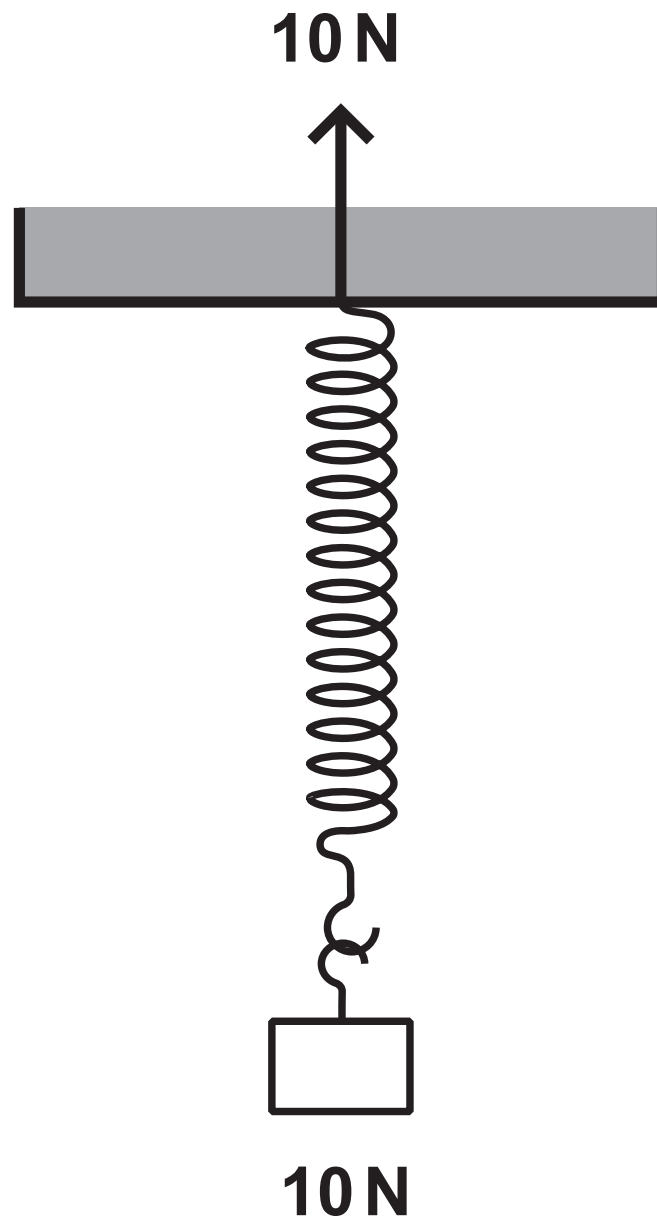


Figure 9

One of the forces acting to stretch the spring is shown in Figure 9.

Complete Figure 9 by adding an arrow to show the other force acting to stretch the spring. (2 marks)

(Question continues on next page)

(Turn over)

(b) A weight of 4.0 N is used to extend a spring.

The extension of the spring is 0.06 m.

**(i) Calculate the spring constant, k , of the spring.
(3 marks)**

Use the equation

$$F = k \times x$$

spring constant = _____ N/m

(Question continues on next page)

(Turn over)

- (ii) State what measurements should be made to determine the extension of the spring produced by the 4.0 N weight. (2 marks)

(Question continues on next page)

(c) Another spring has a spring constant of 250 N/m.

Calculate the work done in stretching the spring by 0.30 m.

State the unit. (3 marks)

Use the equation

$$E = \frac{1}{2} \times k \times x^2$$

work done in
stretching the spring = _____ unit _____

(TOTAL FOR QUESTION 5 = 10 MARKS)

(Questions continue on next page)

(Turn over)

6 (a) Solid, liquid and gas are states of matter.

Which process describes the change from a solid to a liquid? (1 mark)

- ☐ **A melting**
- ☐ **B freezing**
- ☐ **C evaporation**
- ☐ **D condensation**

(Question continues on next page)

(b) A student determines the density of a liquid.

The student puts an empty measuring cylinder on a balance (Figure 10a).

The student then adds liquid to the measuring cylinder (Figure 10b).

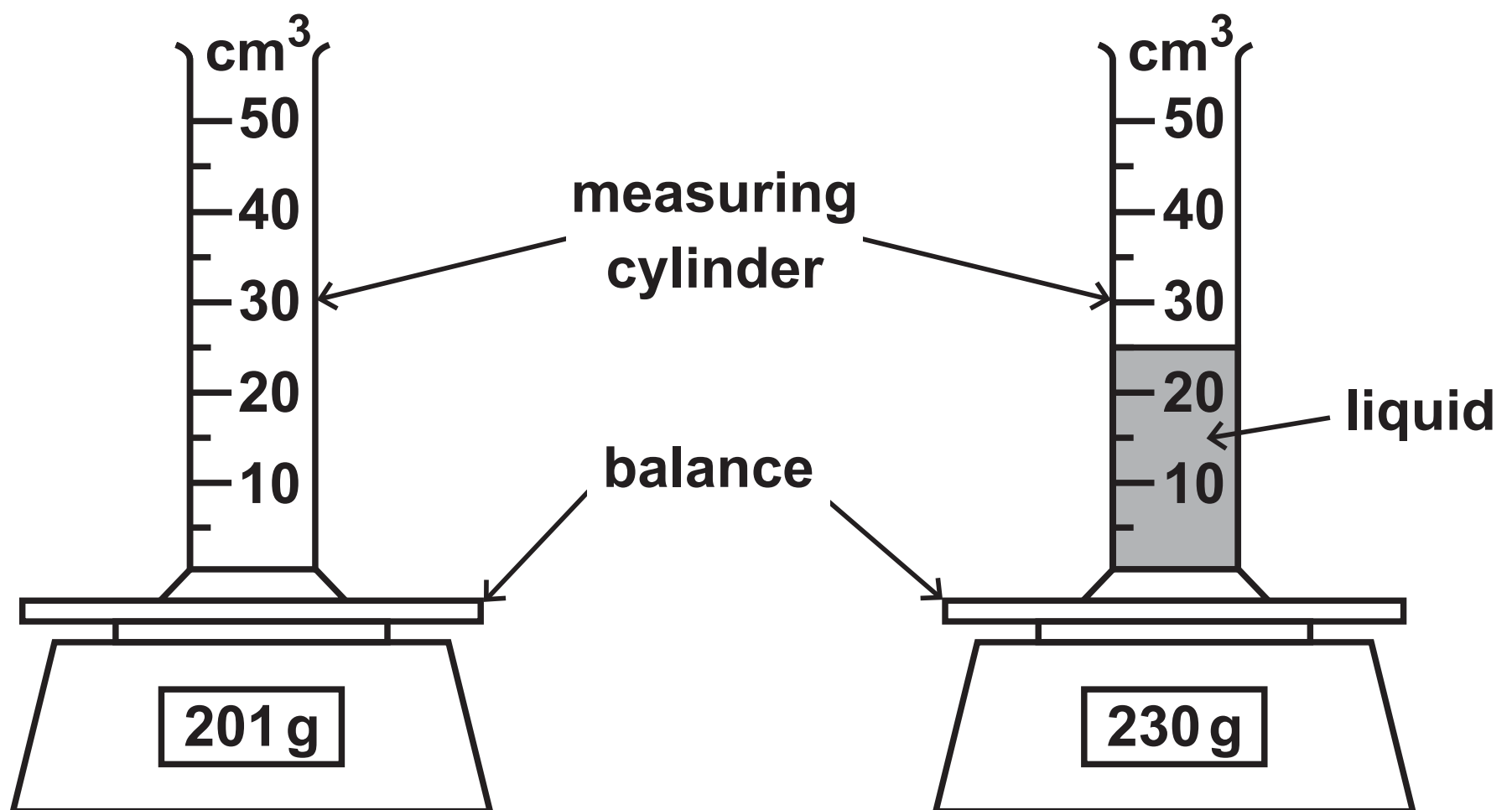


Figure 10a

Figure 10b

Calculate the mass of liquid added and the volume of liquid added.

Use the information in Figures 10a and 10b.

(i) mass of liquid added = _____ g
(1 mark)

(ii) volume of liquid added = _____ cm^3
(1 mark)

(iii) Which equation should the student use to calculate the density of the liquid? (1 mark)

☐ A density = mass + volume

☐ B density = mass – volume

☐ C density = mass × volume

☐ D density = $\frac{\text{mass}}{\text{volume}}$

(iv) State TWO improvements the student could make to this investigation. (2 marks)

1 _____

2 _____

(Question continues on next page)

(Turn over)

(c) (i) Figure 11 shows an electric kettle.

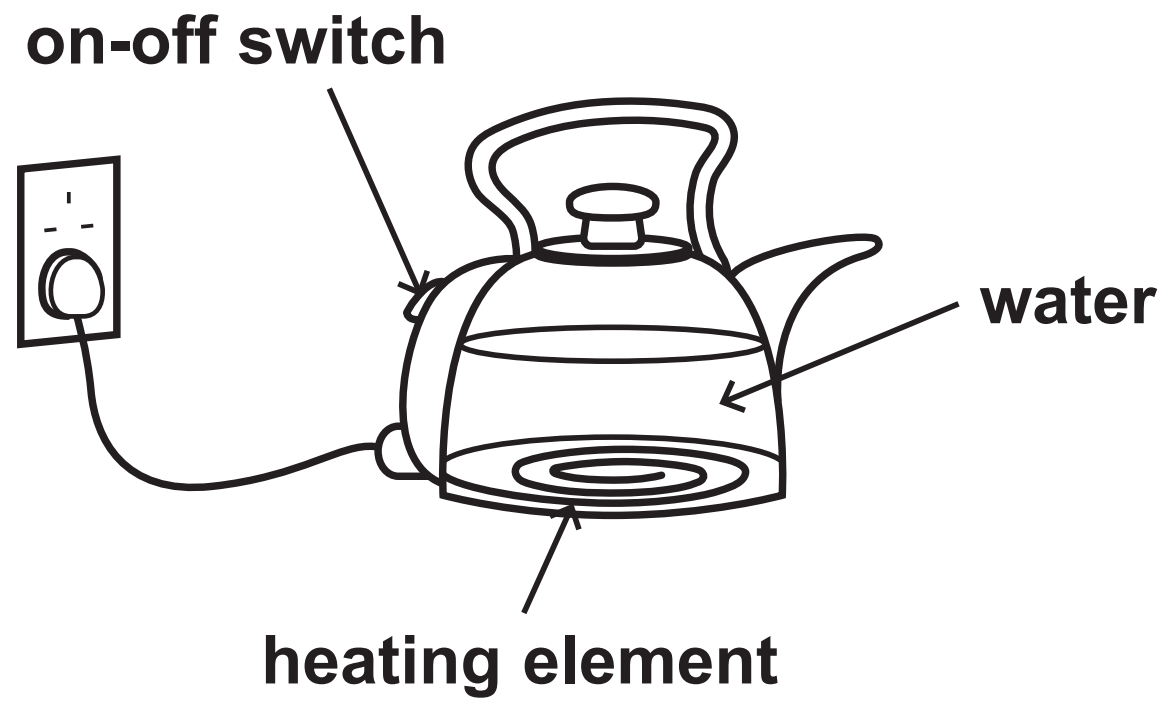


Figure 11

(Question continues on next page)

The kettle contains 1.5 kg of water.

The kettle is switched on.

Calculate the energy needed to raise the temperature of the water by 50 °C. (2 marks)

Specific heat capacity of water = 4200 J/kg °C

Use the equation

$$\Delta Q = m \times c \times \Delta \theta$$

energy needed = _____ J

(Question continues on next page)

(Turn over)

- (ii) The amount of energy, E , needed to bring the water to boiling point is 670 000 J.

The kettle has a power of 3500 W.

Calculate the time, t , it takes to bring the water to boiling point. (3 marks)

Use the equation

$$P = \frac{E}{t}$$

time to bring the water to boiling point = _____ s

(TOTAL FOR QUESTION 6 = 11 MARKS)

(Questions continue on next page)

(Turn over)

7 (a) A student uses a cloth to give a plastic rod a positive charge.

(i) Explain how the rod becomes positively charged. (3 marks)

(Question continues on next page)

(Turn over)

- (ii) Figure 12 shows four light balls, Q, R, S and T. Each ball is suspended on a nylon string. Balls Q, R and T are coated with a conducting material. Ball S is an insulator.

Q and S have no charge, R is positively charged and T is negatively charged.

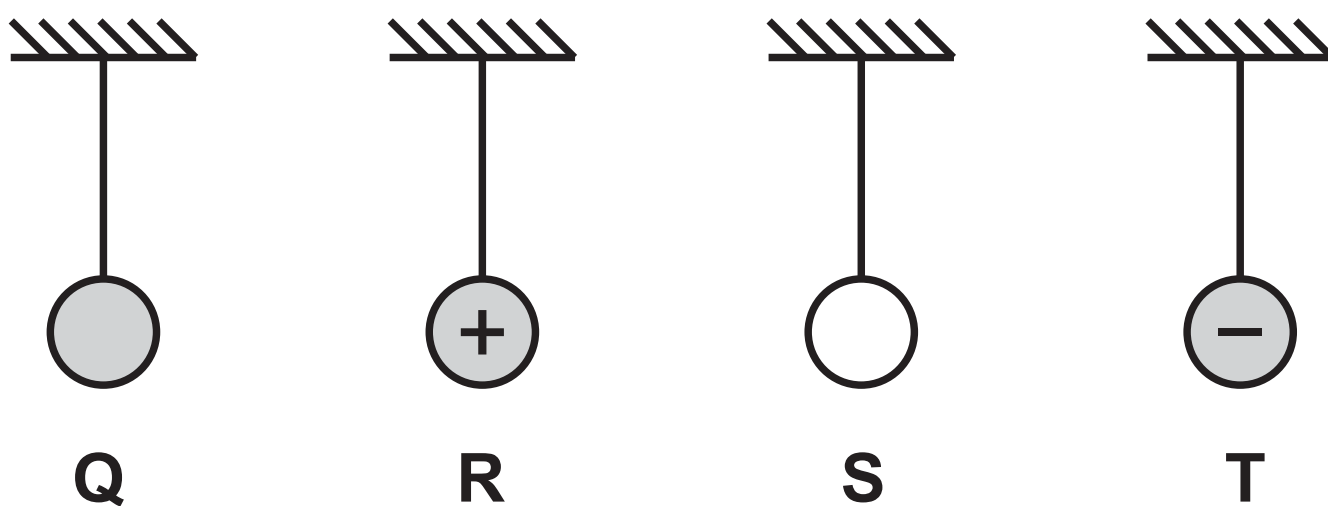


Figure 12

The student brings the positively charged rod near to each ball in turn.

Which ball is repelled by the positively charged rod? (1 mark)

☐ A Q

☐ B R

☐ C S

☐ D T

- (b) Figure 13 shows part of a cloud, above the ground. The base of the cloud is negatively charged.



Figure 13

Explain how lightning is produced between the cloud and the Earth.

Your answer should refer to induced charges.

You may add to the diagram in Figure 13 to help your answer. (3 marks)

(Continue your answer on next page)

(Turn over)

(Question continues on next page)

***(c) Figure 14 shows fuel being transferred to an aeroplane.**



Figure 14

Explain why transferring fuel can be dangerous and how the use of metal wires makes the process much safer. (6 marks)

(Continue your answer on next page)

(Turn over)

(Questions continue on next page)

8 (a) Which of these is the equation for work done?
(1 mark)

- ☐ A work done = force \div distance moved in direction of force
- ☐ B work done = force \times distance moved in direction of force
- ☐ C work done = force \div distance moved at right angles to direction of force
- ☐ D work done = force \times distance moved at right angles to direction of force

(Question continues on next page)

(b) A ball has a mass of 0.046 kg.

- (i) Calculate the change in gravitational potential energy when the ball is lifted through a vertical height of 2.05 m. (2 marks)**

Use the equation

$$\Delta GPE = m \times g \times \Delta h$$

change in gravitational potential energy = _____ J

(Question continues on next page)

(ii) The ball is released.

Calculate the kinetic energy of the ball when the speed of the ball is 3.5 m/s. (3 marks)

kinetic energy of the ball = _____ J

(Question continues on next page)

(iii) The ball bounces several times.

Figure 15 shows how the height of the ball above the floor changes with time.

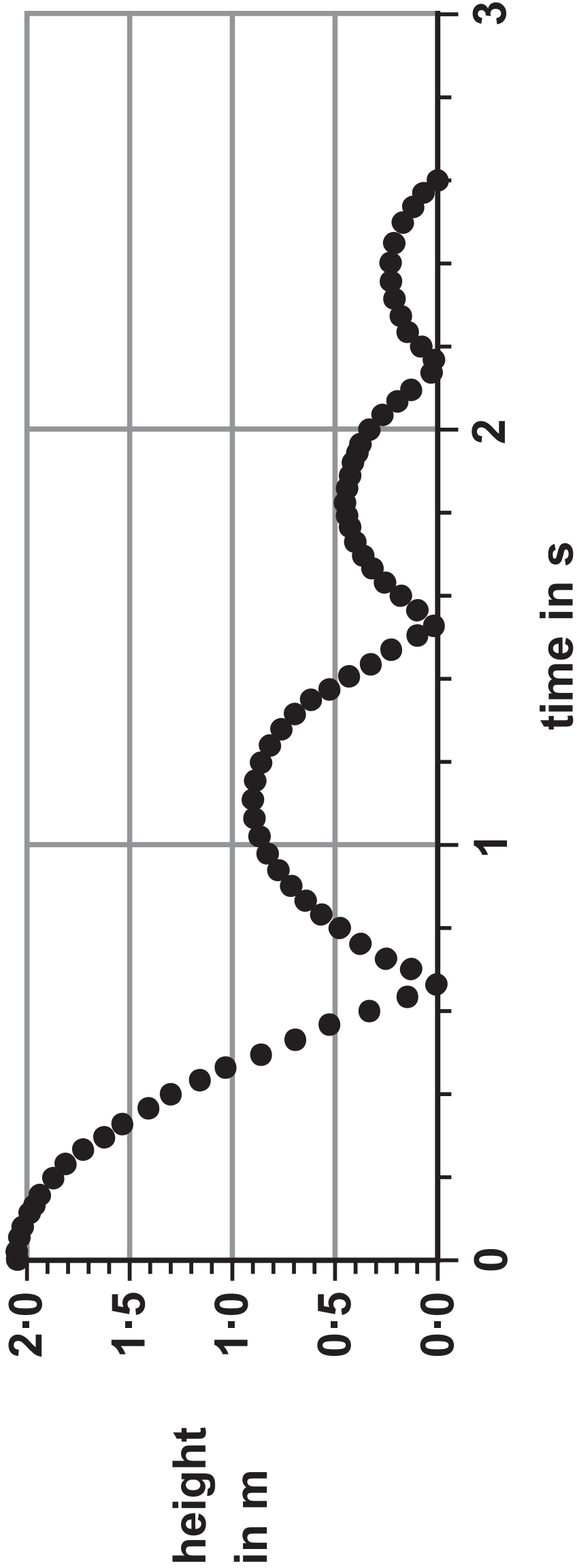


Figure 15

Use Figure 15 to estimate the maximum height that the ball reaches after the first bounce. (1 mark)

height after first bounce = _____ m

(Question continues on next page)

(Turn over)

(iv) Explain why the ball does not bounce back to its starting height of 2.05 m. (2 marks)

(Question continues on next page)

- (c) A student plots a graph showing the height at the start and the maximum height reached after each bounce.

Figure 16 shows the student's graph.

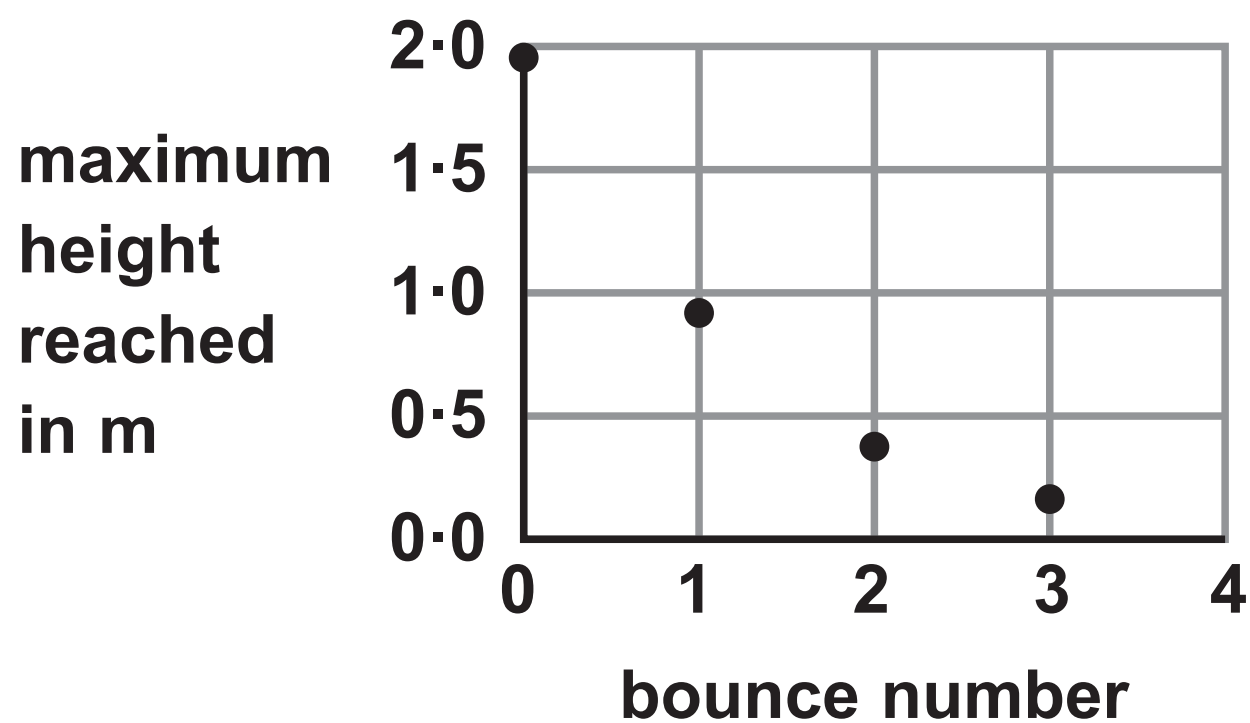


Figure 16

(Question continues on next page)

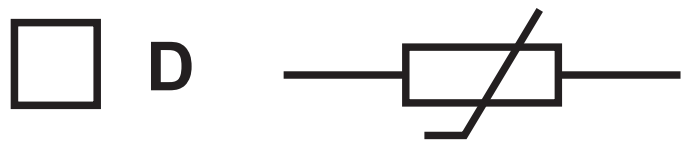
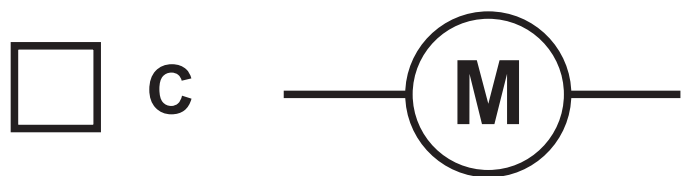
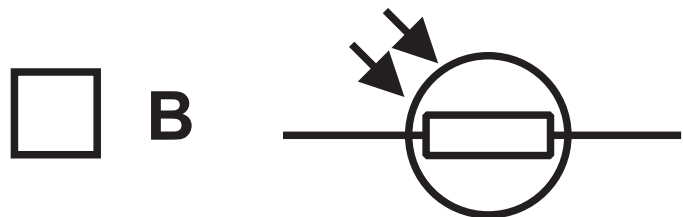
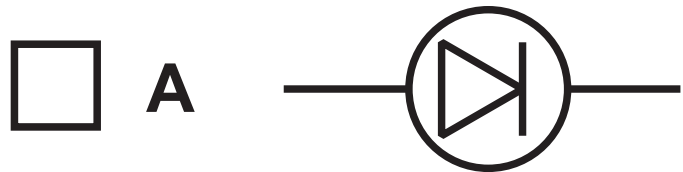
**Describe how the maximum height reached changes with the bounce number in Figure 16.
(2 marks)**

(TOTAL FOR QUESTION 8 = 11 MARKS)

(Questions continue on next page)

(Turn over)

- 9 (a) Which of these symbols is used to represent a thermistor in an electrical circuit? (1 mark)



(Question continues on next page)

- (b) A student investigates how the current in a lamp changes with the potential difference across the lamp.

The student uses the results to calculate the resistance of the lamp.

The results are shown in the table in Figure 17.

potential difference in V	current in A	resistance in Ω
1.0	0.09	11
2.0	0.14	14
3.0	0.18	17
4.0	0.22	18
5.0	0.26	
6.0	0.30	20

Figure 17

(Question continues on next page)

- (i) One value of resistance is missing from the table in Figure 17.

Calculate the value of resistance that is missing from the table. (3 marks)

missing resistance = _____ Ω

(Question continues on next page)

(ii) The student writes this conclusion:

‘The resistance of the lamp is directly proportional to the potential difference.’

Comment on the student’s conclusion.

Use information from Figure 17 in your answer. (3 marks)

(Question continues on next page)

- *(c) Figure 18 shows a battery connected to a filament lamp.**

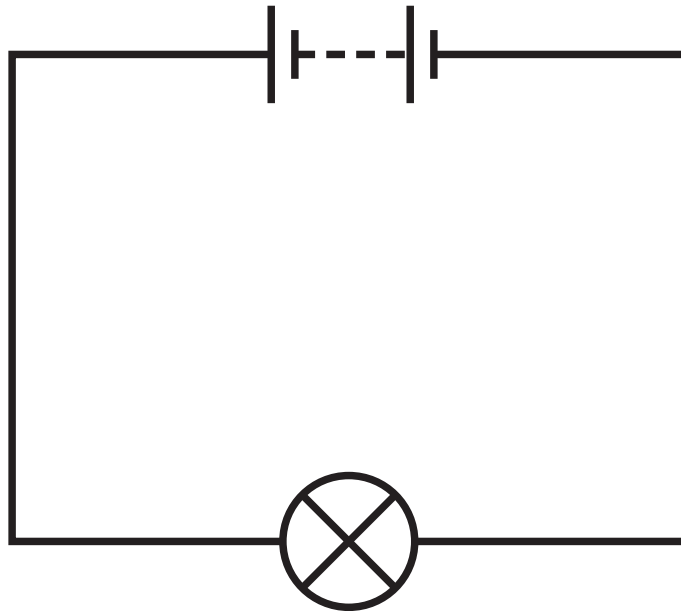


Figure 18

**Explain, in terms of the movement of charged particles, how energy is transferred from the battery, through the lamp, to the surroundings.
(6 marks)**

(Continue your answer on next page)

(Turn over)

[illegible][illegible]

(TOTAL FOR QUESTION 9 = 13 MARKS)

(Questions continue on next page)

- 10 (a) Figure 19 shows four forces, P, Q, R and S, acting on a rod.

The rod can rotate around an axle.

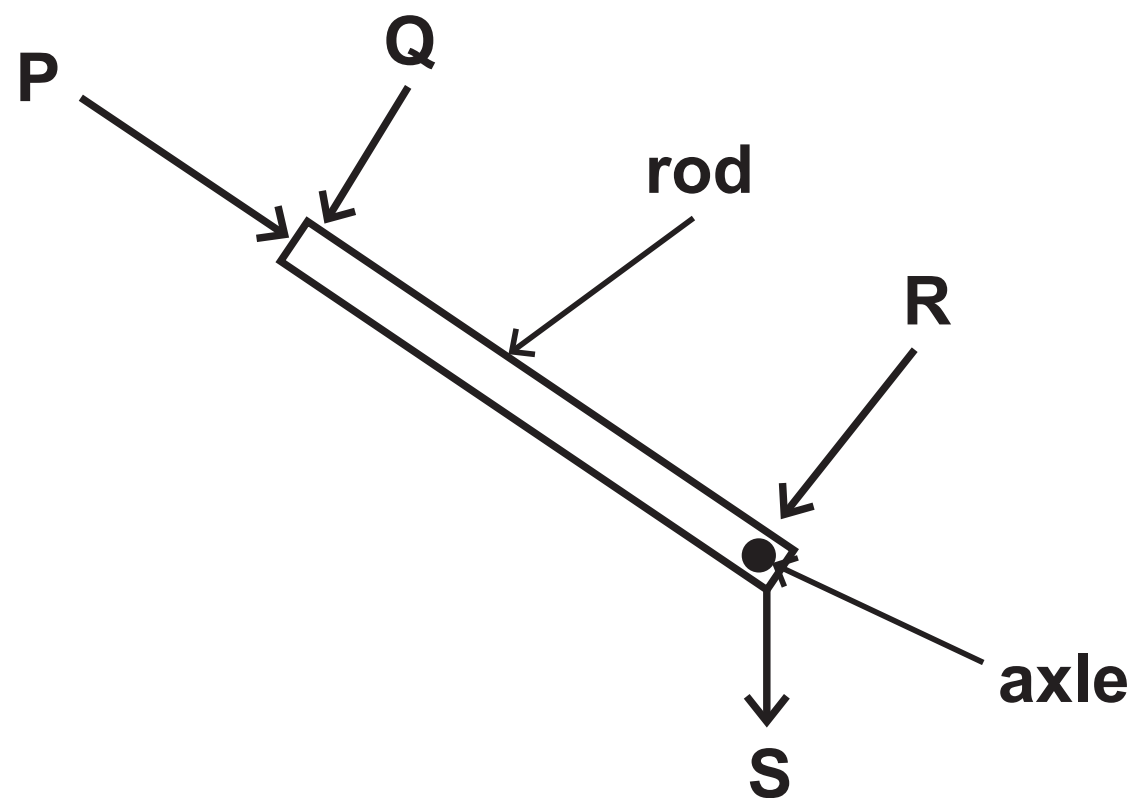


Figure 19

Which force will make the rod rotate about the axle? (1 mark)

☐ A P

☐ B Q

☐ C R

☐ D S

(Question continues on next page)

(Turn over)

(b) Figure 20 shows a person trying to lift a large rock using a metal bar.

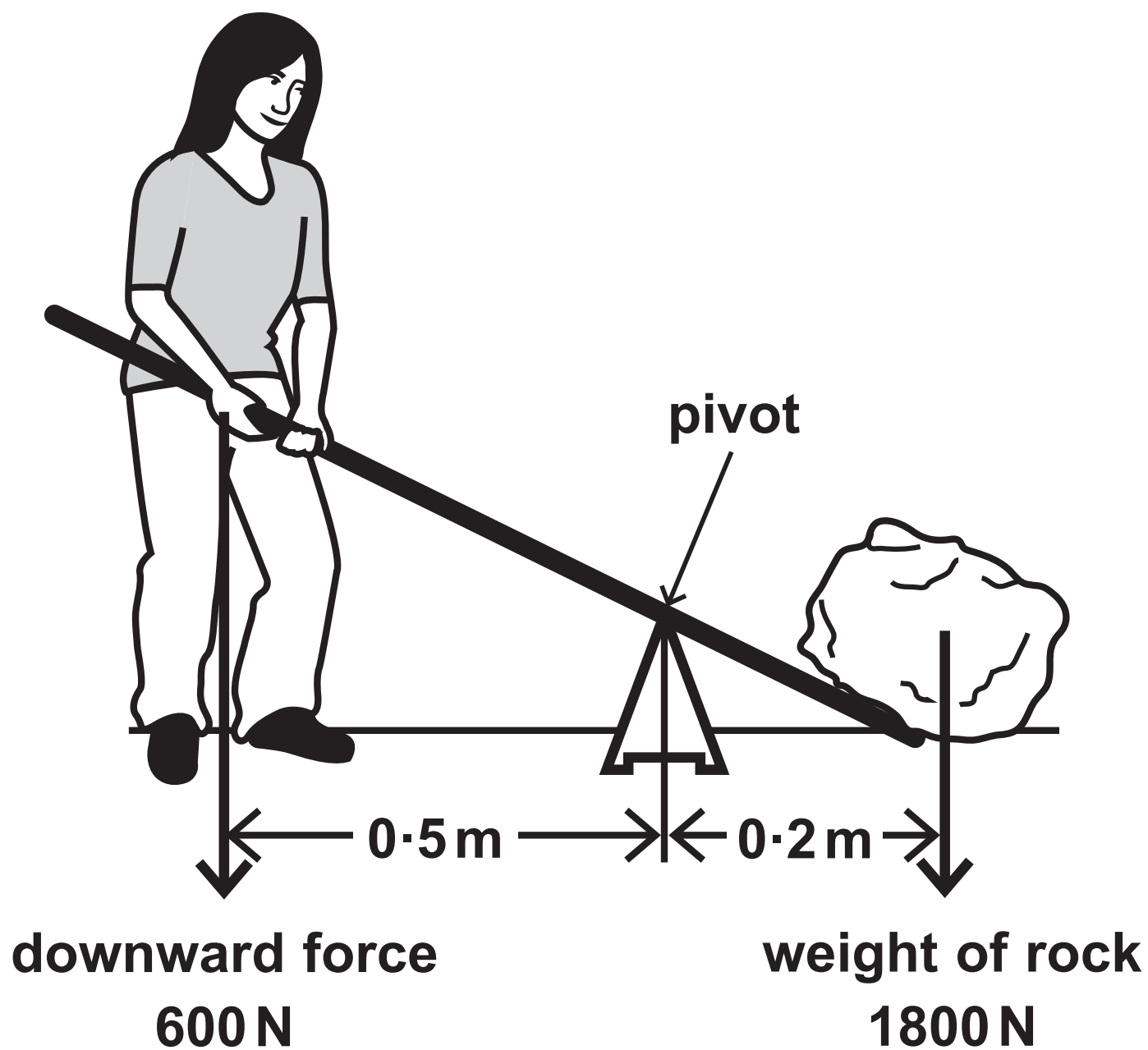


Figure 20

The rock weighs 1800 N.

The person can only produce a downwards force of 600 N.

The person cannot lift the rock.

(Question continues on next page)

(Turn over)

- (i) Explain, using calculations, why the person cannot lift the rock. (3 marks)

(Question continues on next page)

(Turn over)

- (ii) Explain ONE change to the arrangement that will make it possible for this person to lift the rock. (2 marks)

(Question continues on next page)

(c) Figure 21 shows a bicycle.

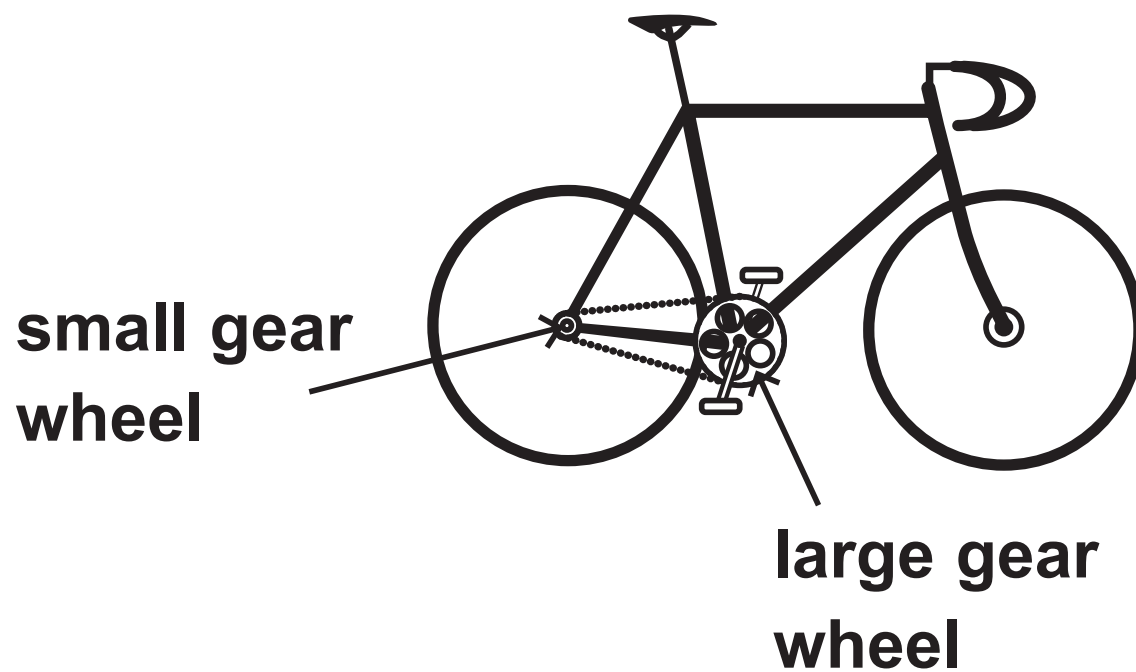


Figure 21

- (i) The rider uses the pedals to make the large gear wheel turn.**

**The large gear wheel moves the chain.
The chain turns the small gear wheel.**

The large gear wheel has 48 teeth.

The small gear wheel has 12 teeth.

The large gear wheel turns 2 times each second.

(Question continues on next page)

(Turn over)

Calculate the number of times that the small gear wheel turns each second. (2 marks)

_____ turns each second

(Question continues on next page)

- (ii) Oil is applied to the wheel of a bicycle at the point shown in Figure 22.

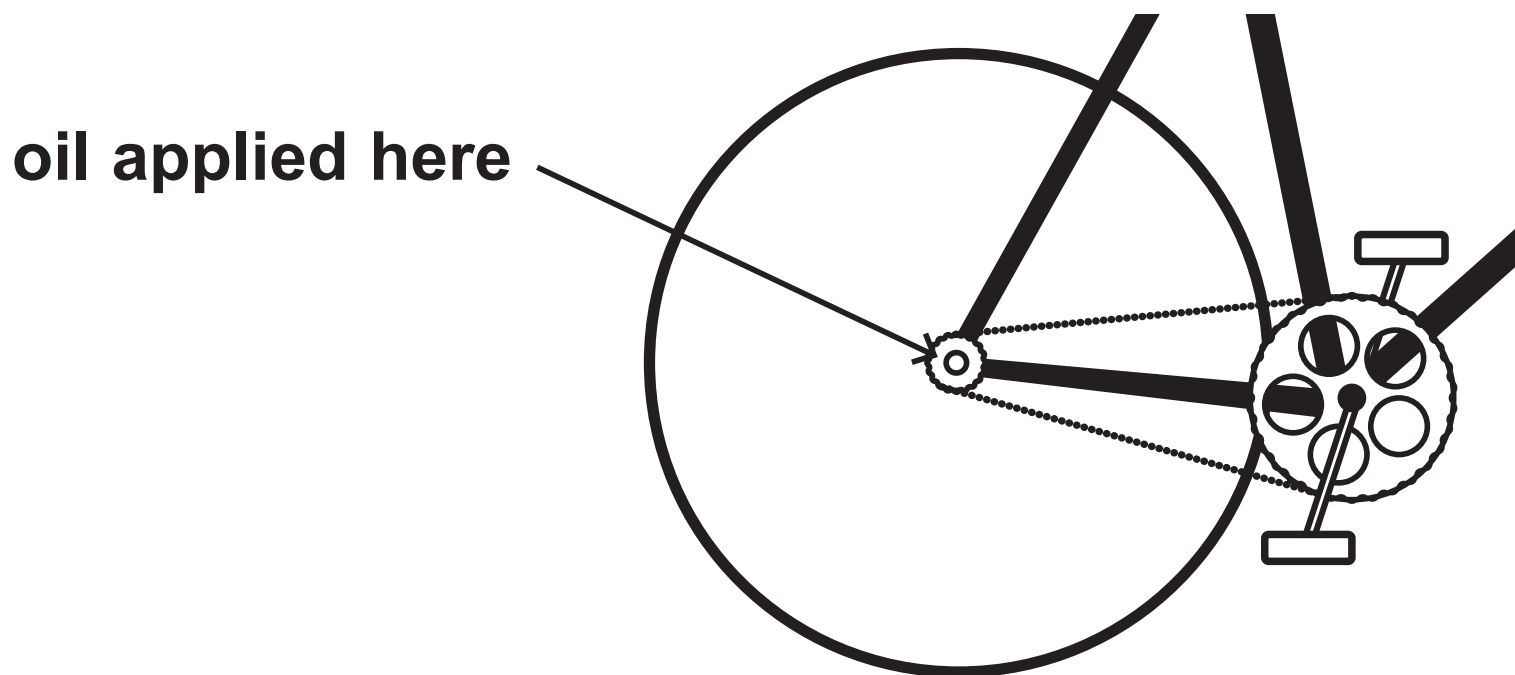


Figure 22

Explain how the oil improves the efficiency of the bicycle. (3 marks)

(Continue your answer on next page)

(Turn over)

(TOTAL FOR QUESTION 10 = 11 MARKS)

TOTAL FOR PAPER = 100 MARKS
END