Please check the examination details below before entering your candidate information

Candidate surname	Other names

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

Centre Number | Candidate Number

Friday 14 June 2019

Morning (Time: 1 hour 45 minutes) | Paper Reference **1PH0/2F**

Physics

Paper 2

Foundation Tier

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- 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**.

Information

- 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.
- A list of equations is included at the end of this exam paper.

Advice

- 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.

Turn over

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P 5 6 4 2 5 A 0 1 3 2

Pearson

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.

Draw one straight line from each atomic particle to its correct description.

(3)

particle	**description**
	negative charge inside the nucleus
proton	no charge inside the nucleus
electron	positive charge inside the nucleus
neutron	negative charge outside the nucleus
	no charge outside the nucleus

Figure 1

P 5 6 4 2 5 A 0 2 3 2

(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)

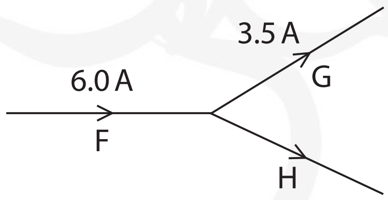

Figure 2

current in wire H = ... A

(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.

State the unit of charge with your answer.

Use the equation

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

(3)

quantity of charge = ... unit ....

(Total for Question 1 = 7 marks)

P 5 6 4 2 5 A 0 3 3 2

Turn over

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

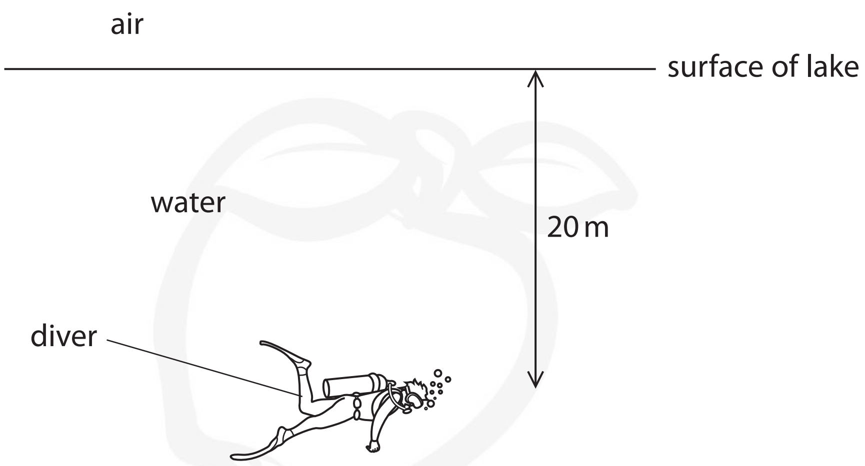

Figure 3

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)

☒ **A** 1

☒ **B** 2

☒ **C** 3

☒ **D** 4

(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)

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(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.

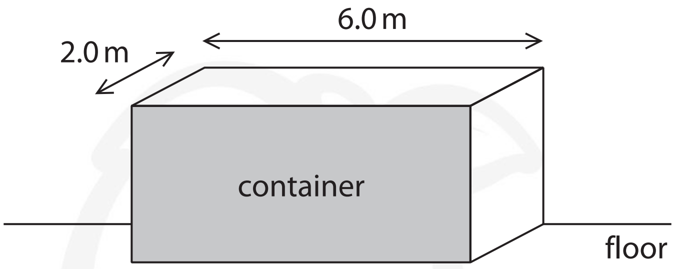

Figure 4

Calculate the pressure that the container exerts on the floor.

Use the equation

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

(3)

pressure of the container on the floor = ... Pa

(Total for Question 2 = 7 marks)

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

(1)

- ☒ **A** aluminium
- ☒ **B** carbon
- ☒ **C** cobalt
- ☒ **D** copper

(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)

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(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)

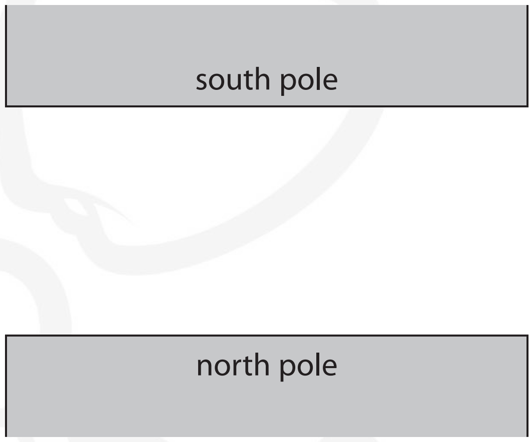

Figure 5

(Total for Question 3 = 8 marks)

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)

	pressure of gas	number of particles colliding with the walls of the container each second
☒ **A**	increases	stays the same
☒ **B**	increases	increases
☒ **C**	decreases	stays the same
☒ **D**	decreases	increases

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

Calculate the value of this temperature in kelvin.

(1)

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....

(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

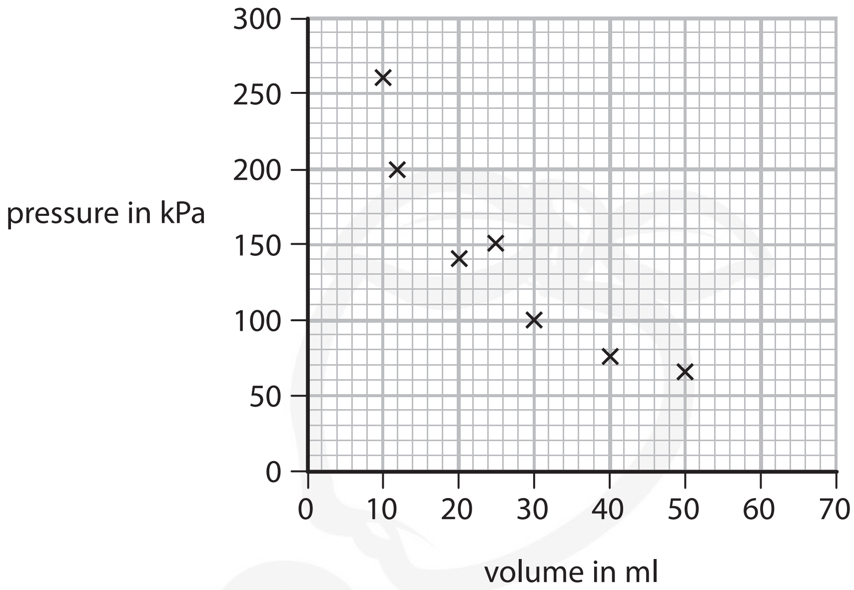

Figure 7

(i) Identify the anomalous result plotted on Figure 7 by drawing a circle on Figure 7 around the anomalous point.

(1)

(ii) Draw the curve of best fit on Figure 7.

(1)

(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)

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(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 cm^3.

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 cm^3.

Calculate the pressure, P_2, in the large balloon.

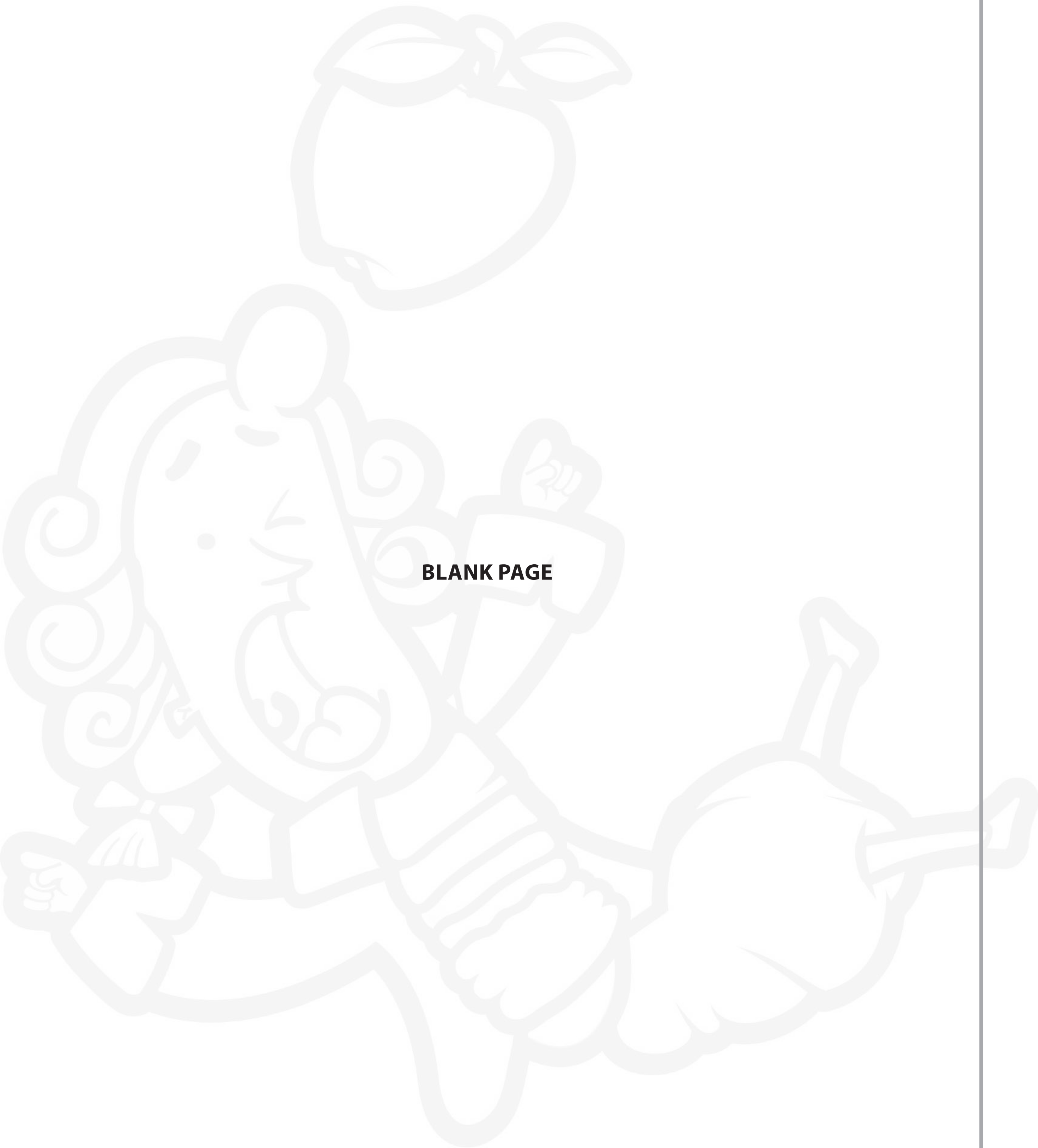
Use the equation

$$P_1V_1 = P_2V_2$$

(3)

pressure in the large balloon = ... MPa

(Total for Question 4 = 9 marks)



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

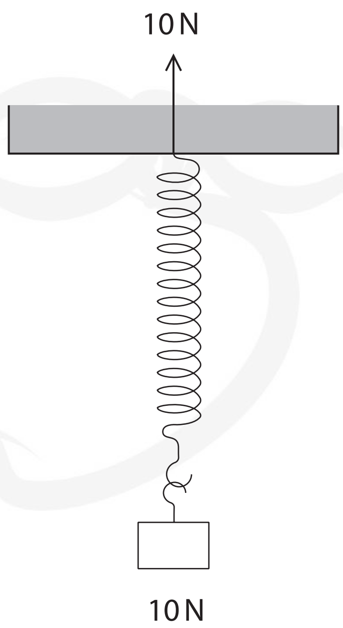

Figure 9

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)

(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.

Use the equation

$$F = k \times x$$

(3)

spring constant = ... N/m

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

(2)

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(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.

Use the equation

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

(3)

work done in stretching the spring = ... unit ....

(Total for Question 5 = 10 marks)

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

Which process describes the change from a solid to a liquid?

(1)

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

(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).

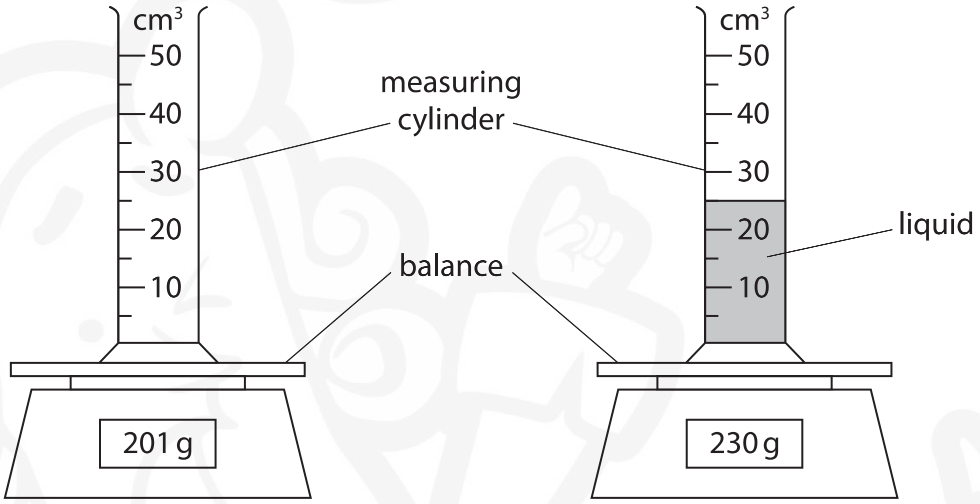

Figure 10a **Figure 10b**

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)

(ii) volume of liquid added = ... cm^3

(1)

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

(1)

- ☒ **A** density = mass + volume
- ☒ **B** density = mass − volume
- ☒ **C** density = mass × volume
- ☒ **D** density = $\frac{\text{mass}}{\text{volume}}$

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P 5 6 4 2 5 A 0 1 4 3 2

(iv) State **two** improvements the student could make to this investigation.

(2)

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2 ....

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

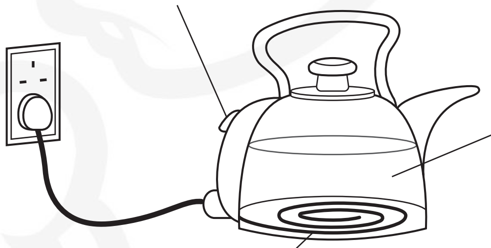

Figure 11

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.

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

Use the equation

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

(2)

energy needed = ... J

(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.

Use the equation

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

(3)

time to bring the water to boiling point = ... s

(Total for Question 6 = 11 marks)

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

(i) Explain how the rod becomes positively charged.

(3)

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(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.

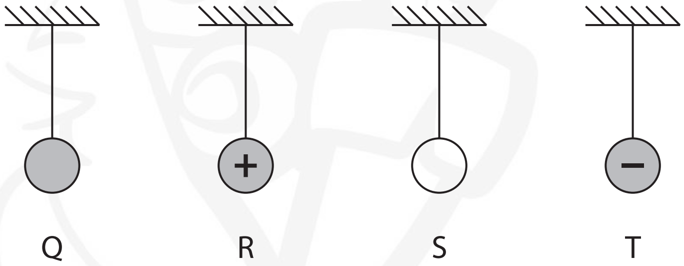

Figure 12

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

Which ball is repelled by the positively charged rod?

(1)

☒ **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)

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

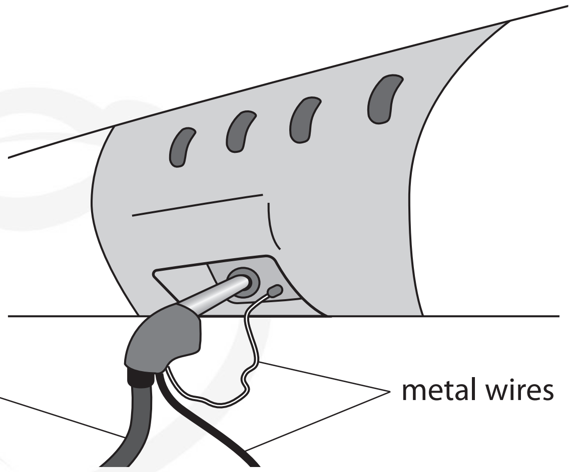

Figure 14

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

(6)

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(Total for Question 7 = 13 marks)

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

(1)

☒ **A** work done = force ÷ distance moved in direction of force

☒ **B** work done = force × distance moved in direction of force

☒ **C** work done = force ÷ distance moved at right angles to direction of force

☒ **D** work done = force × distance moved at right angles to direction of force

(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.

Use the equation

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

(2)

change in gravitational potential energy = ... J

(ii) The ball is released.

Calculate the kinetic energy of the ball when the speed of the ball is 3.5 m/s.

(3)

kinetic energy of the ball = ... J

(iii) The ball bounces several times.

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

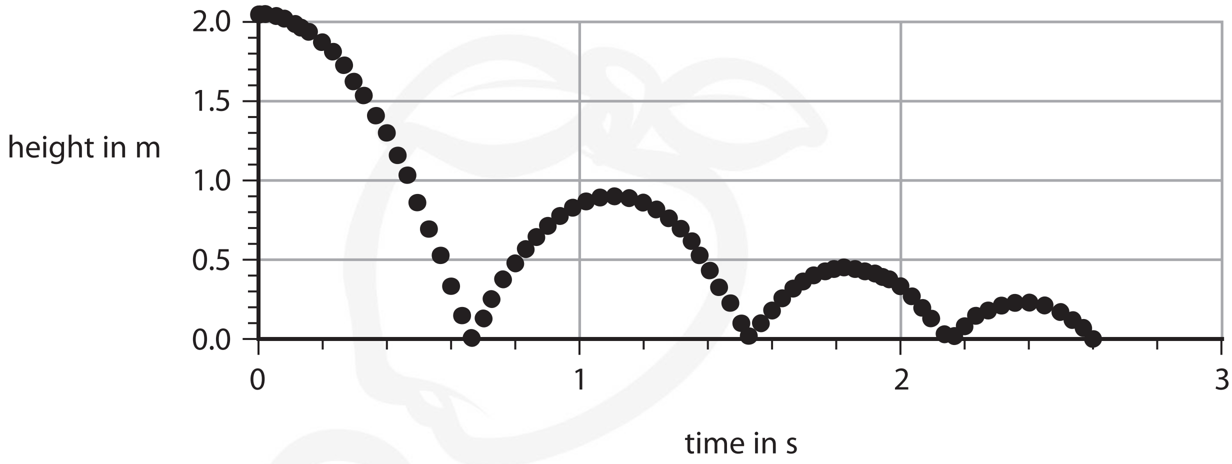

Figure 15

Use Figure 15 to estimate the maximum height that the ball reaches after the first bounce.

(1)

height after first bounce = ... m

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

(2)

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P 5 6 4 2 5 A 0 2 1 3 2

(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.

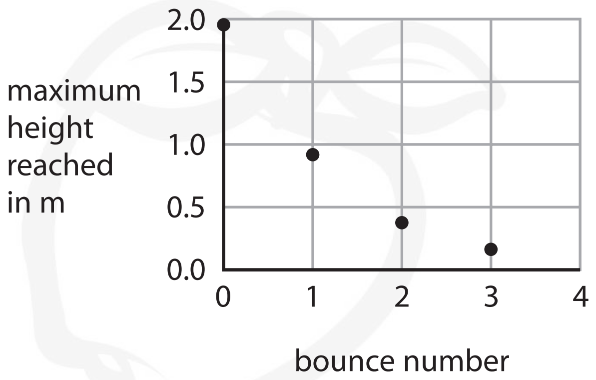

Figure 16

Describe how the maximum height reached changes with the bounce number in Figure 16.

(2)

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(Total for Question 8 = 11 marks)

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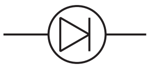
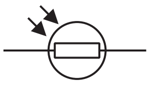
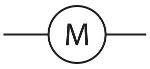
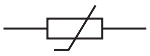
9 (a) Which of these symbols is used to represent a thermistor in an electrical circuit?

(1)

☒ **A** 

☒ **B** 

☒ **C** 

☒ **D** 

(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

(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)

missing resistance = ... Ω

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(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)

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

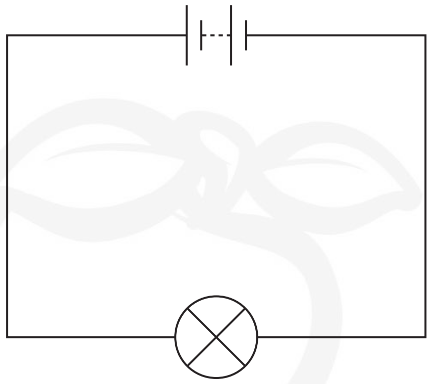

Figure 18

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

(6)

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(Total for Question 9 = 13 marks)

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

The rod can rotate around an axle.

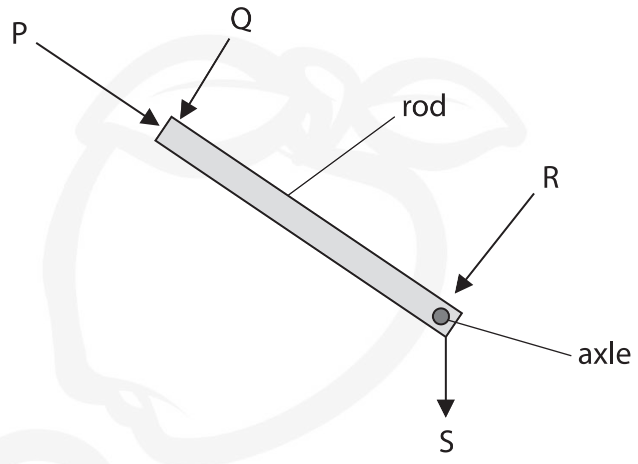

Figure 19

Which force will make the rod rotate about the axle?

(1)

☒ **A** P

☒ **B** Q

☒ **C** R

☒ **D** S

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

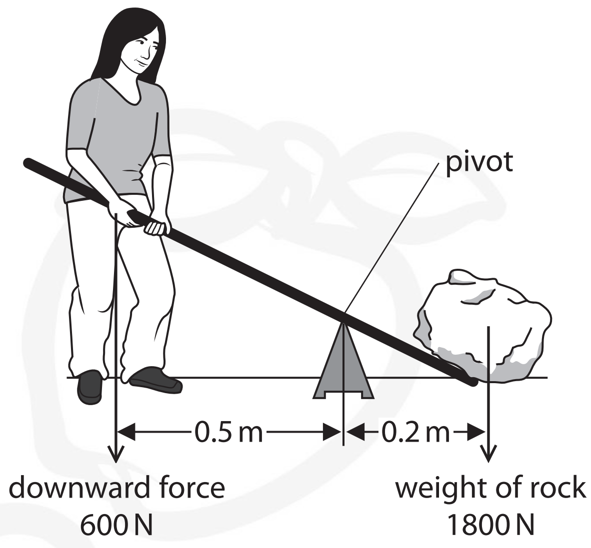

Figure 20

The rock weighs 1800 N.

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

The person cannot lift the rock.

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

(3)

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(ii) Explain **one** change to the arrangement that will make it possible for this person to lift the rock.

(2)

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(c) Figure 21 shows a bicycle.

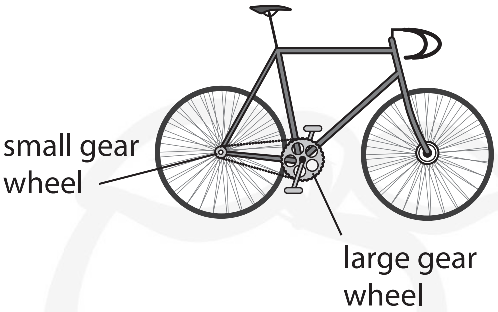

Figure 21

(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.

Calculate the number of times that the small gear wheel turns each second.

(2)

.... turns each second

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

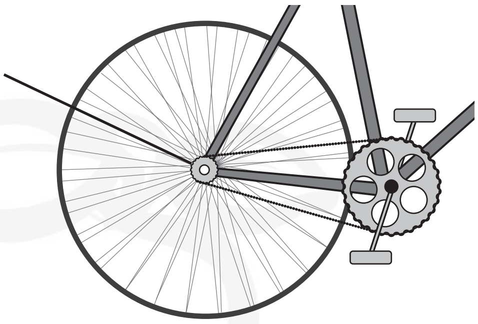

Figure 22

Explain how the oil improves the efficiency of the bicycle.

(3)

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(Total for Question 10 = 11 marks)

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Equations

(final velocity)^2 – (initial velocity)^2 = 2 × acceleration × distance $v^2 - u^2 = 2 \times a \times x$
energy transferred = current × potential difference × time $E = I \times V \times t$
potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil $V_p \times I_p = V_s \times I_s$
change in thermal energy = mass × specific heat capacity × change in temperature $\Delta Q = m \times c \times \Delta\theta$
thermal energy for a change of state = mass × specific latent heat $Q = m \times L$
to calculate pressure or volume for gases of fixed mass at constant temperature $P_1 V_1 = P_2 V_2$
energy transferred in stretching = 0.5 × spring constant × (extension)^2 $E = ½ \times k \times x^2$