Paper Reference(s) **1SC0/2PF**

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

Combined Science
Paper 6: Physics 2
Foundation Tier

Friday 14 June 2019 – Morning

Time: 1 hour 10 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	S	C	0	/	2	P	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 60.
- The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.

(Instructions continue on next page)

- 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.

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.

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

(Question continues on next page)

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

Figure 1

(Question continues on next page)

(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)

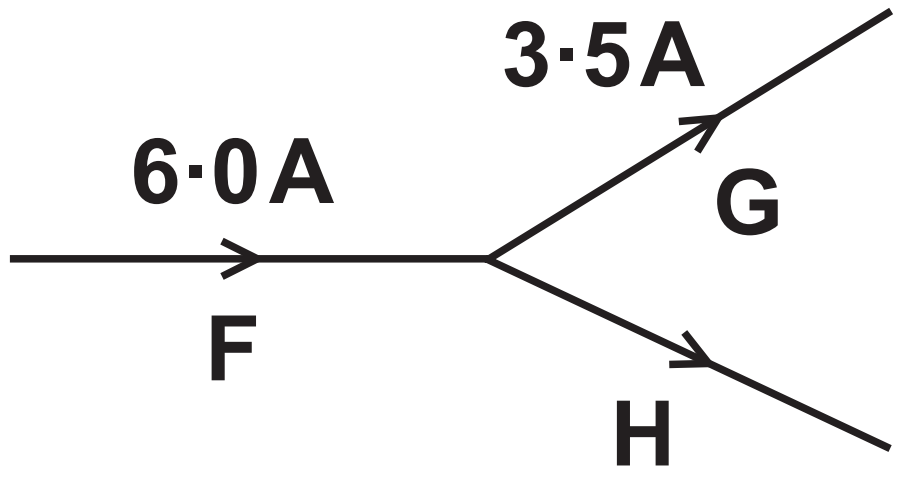


Figure 2

current in wire H = _____ A

(Question continues on next page)

(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. (3 marks)

Use the equation

charge = current × time

quantity of charge = _____ unit _____

(TOTAL FOR QUESTION 1 = 7 MARKS)

(Questions continue on next page)

2 (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.

(Question continues on next page)

10

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

(Continue your answer on next page)

(Question continues on next page)

(c) Figure 3 shows two magnetic poles facing each other.

The magnetic field between the poles is uniform.

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

(3 marks)

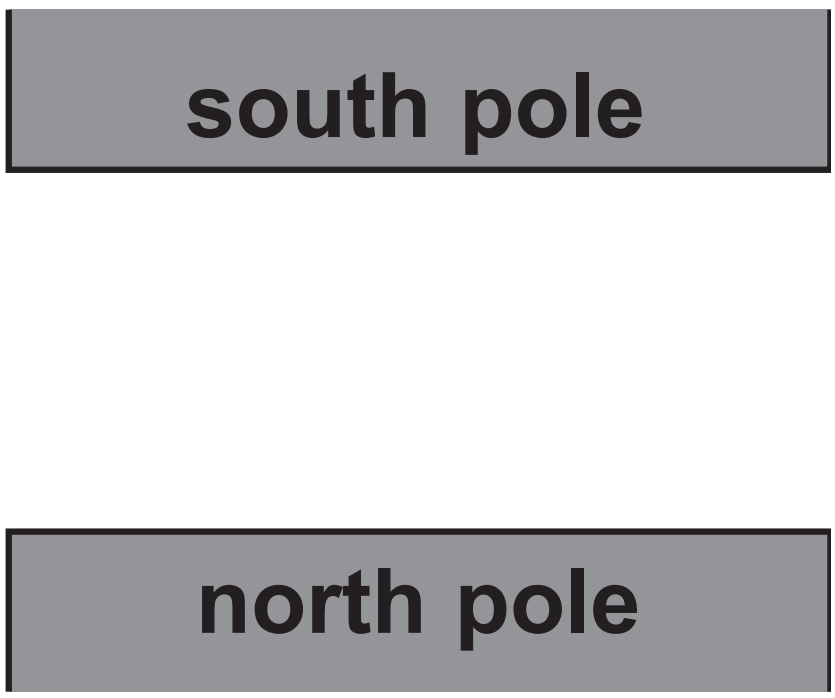


Figure 3

(TOTAL FOR QUESTION 2 = 8 MARKS)

(Questions continue on next page)

3 (a) Figure 4 shows a 10 N weight hanging from a spring.

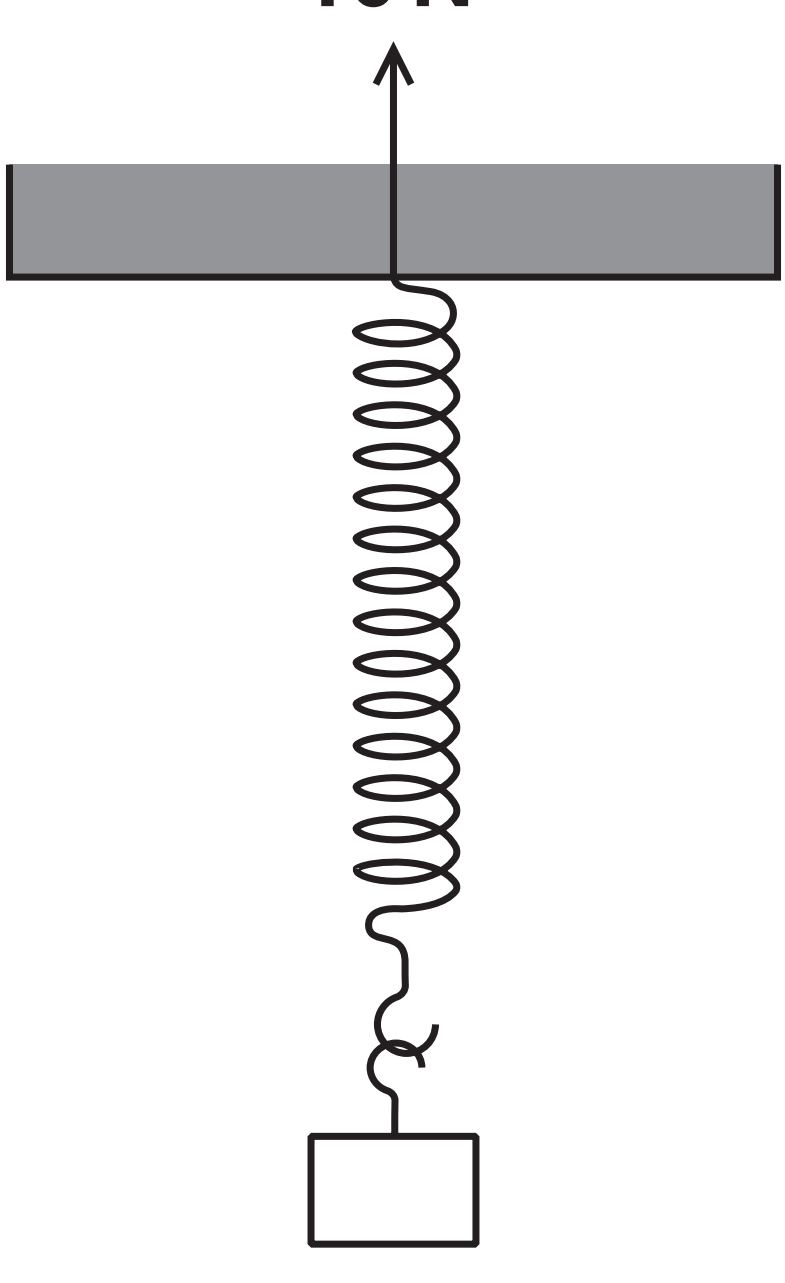


Figure 4

(Question continues on next page)

One of the forces acting to stretch the spring is shown in Figure 4.

Complete Figure 4 by adding an arrow to show the other force acting to stretch the spring. (2 marks)

(Question continues on next page)

(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)

(ii) State what measurements should be made to determine the extension of the spring produced by the 4·0 N weight. (2 marks)

(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)

(Question continues on next page)

Use the equation

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

work done in
stretching the spring = _____

unit _____

(TOTAL FOR QUESTION 3 = 10 MARKS)

(Questions continue on next page)

4 (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

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

The student puts an empty measuring cylinder on a balance (Figure 5a).
The student then adds liquid to the measuring cylinder (Figure 5b).

(Question continues on next page)

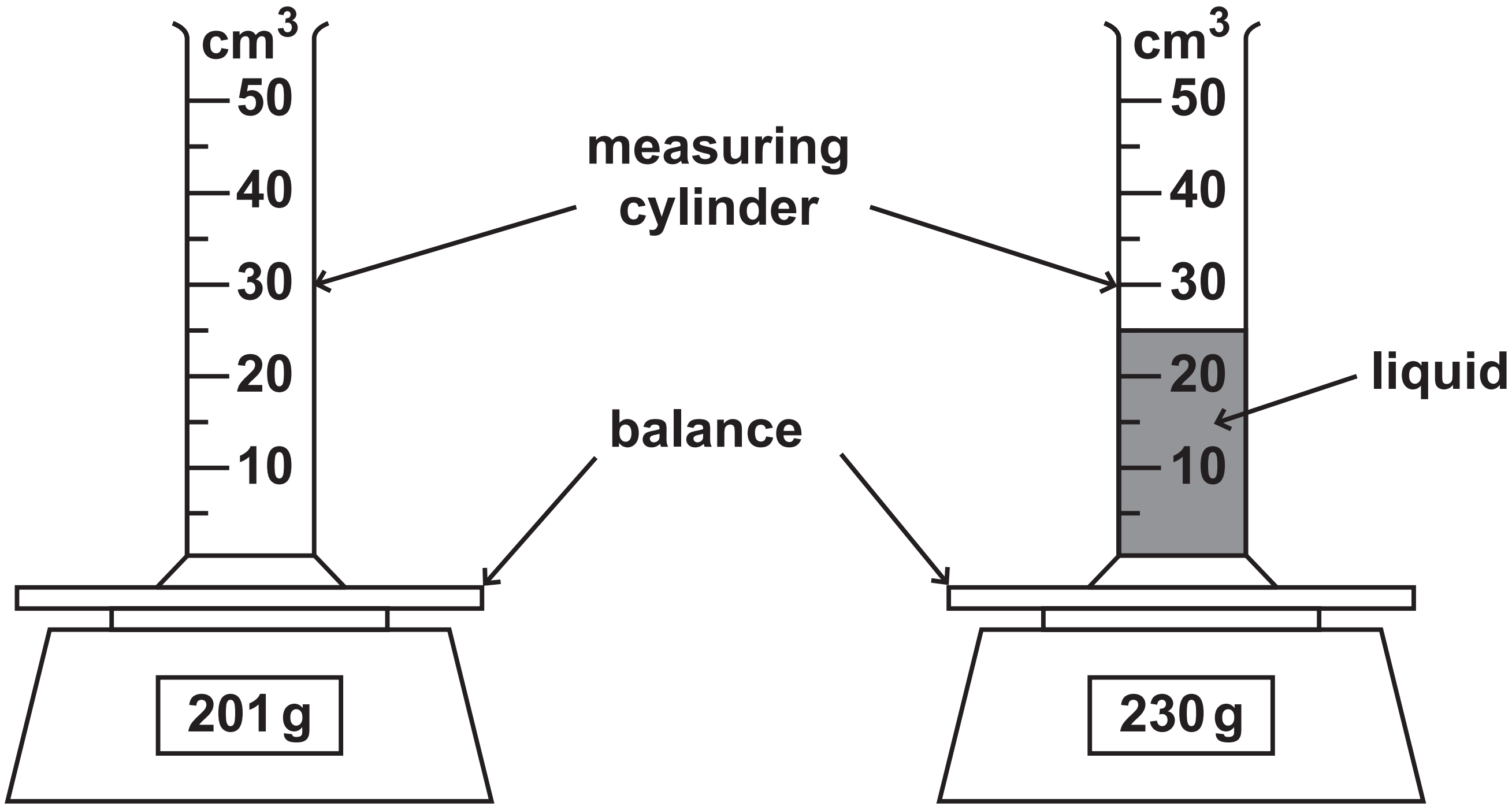


Figure 5a

Figure 5b

(Question continues on next page)

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

Use the information in Figures 5a and 5b.

(i) mass of liquid added =

_____ g (1 mark)

(ii) volume of liquid added =

_____ cm^3 (1 mark)

(Question continues on next page)

(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 $\text{density} = \frac{\text{mass}}{\text{volume}}$

(Question continues on next page)

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

1 _____

_____

2 _____

_____

_____

(Question continues on next page)

(c) (i) Figure 6 shows an electric kettle.

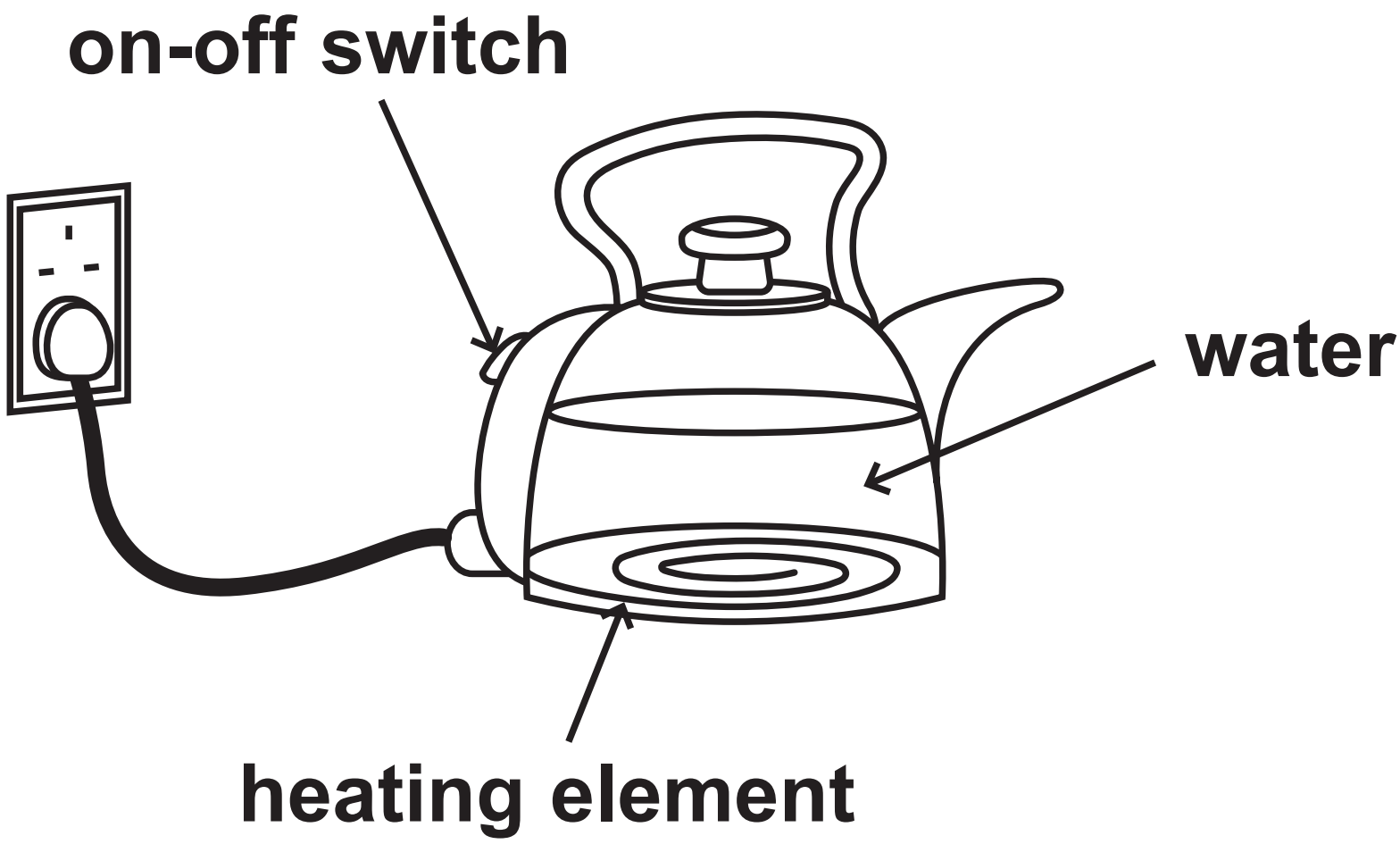


Figure 6

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

(Question continues on next page)

Use the equation

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

energy needed = _____ J

(Question continues on next page)

(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)

(Write your answer on next page)

Use the equation

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

time to bring the
water to boiling point = _____ s

(TOTAL FOR QUESTION 4 = 11 MARKS)

(Questions continue on next page)

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

☐ 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

(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

(iii) The ball bounces several times.

Figure 7 shows how the height of the ball above the floor changes with time.

(Question continues on next page)

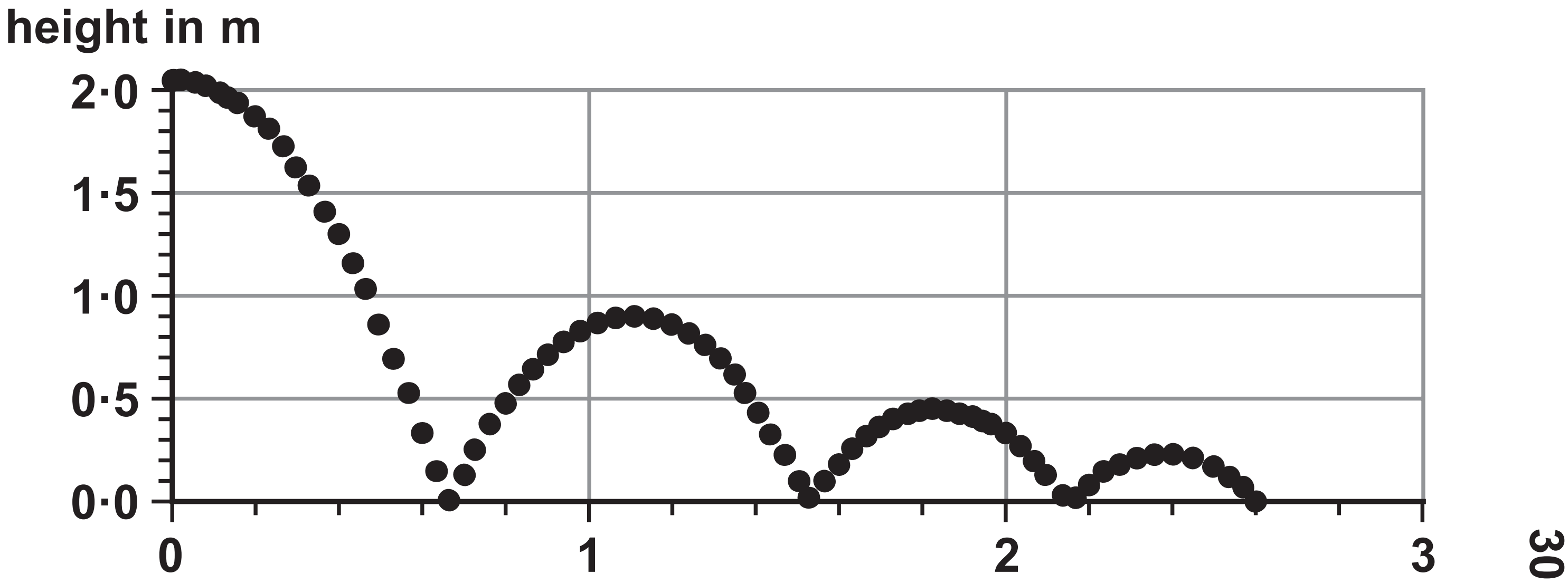


Figure 7

Use Figure 7 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)

(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 8 shows the student's graph.

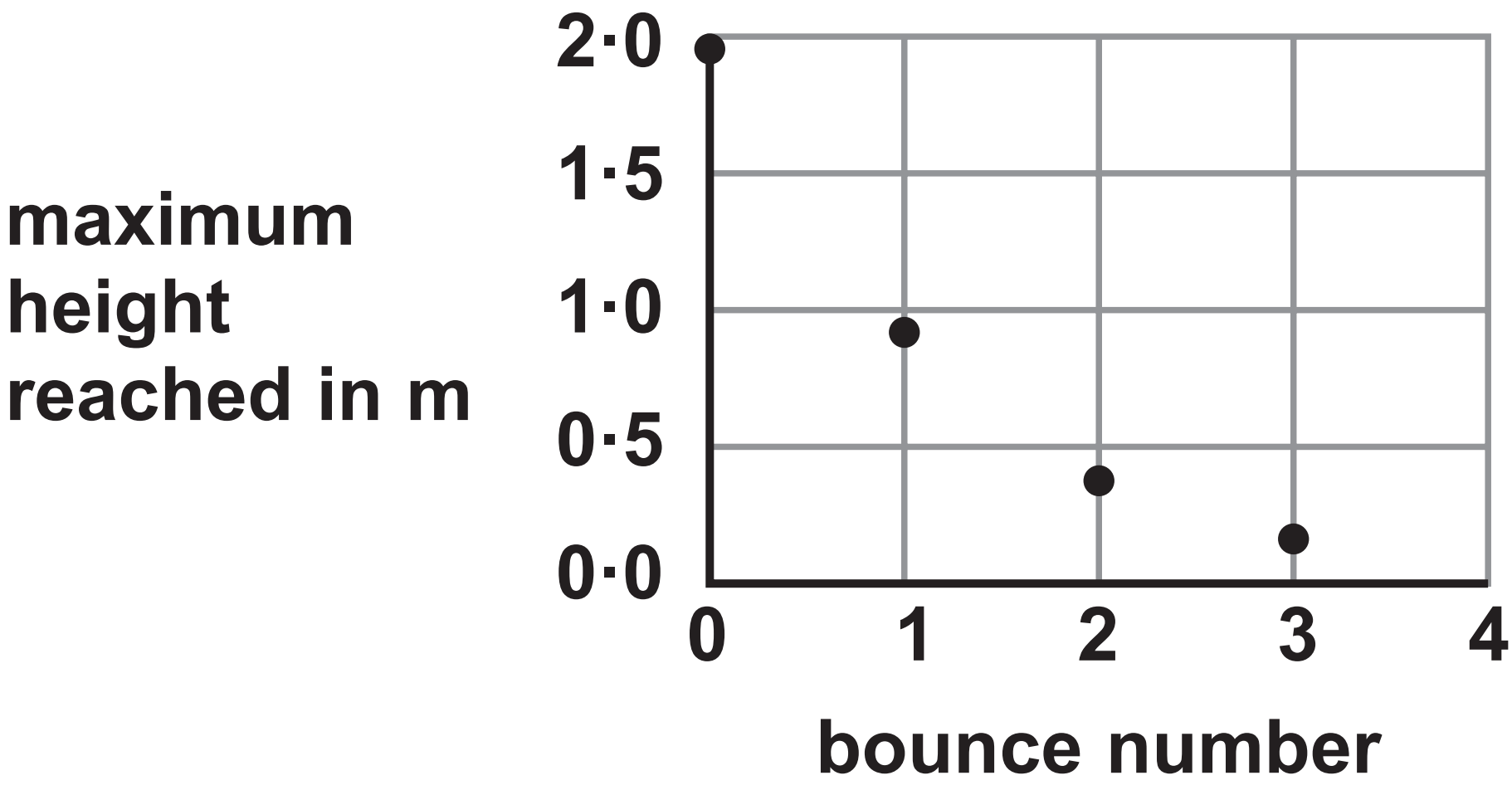


Figure 8

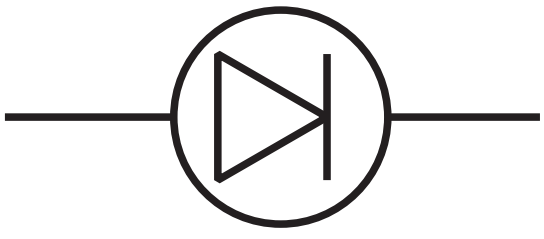
Describe how the maximum height reached changes with the bounce number in Figure 8. (2 marks)

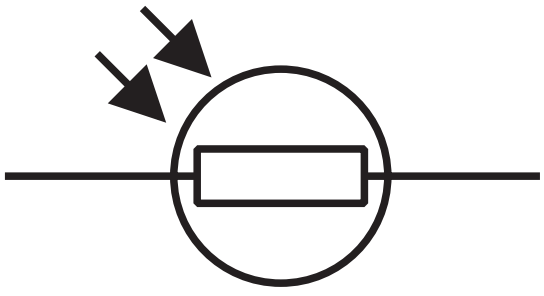
(Continue your answer on next page)

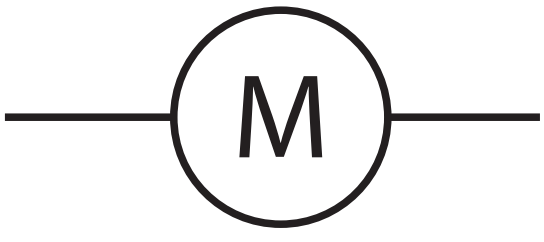
(TOTAL FOR QUESTION 5 = 11 MARKS)

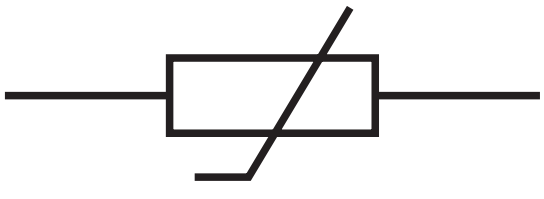
(Questions continue on next page)

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

☐ A 

☐ B 

☐ C 

☐ D 

(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 9.

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 9

(Question continues on next page)

(i) One value of resistance is missing from the table in Figure 9.

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 9 in your answer. (3 marks)

(Continue your answer on next page)

(Question continues on next page)

*(c) Figure 10 shows a battery connected to a filament lamp.

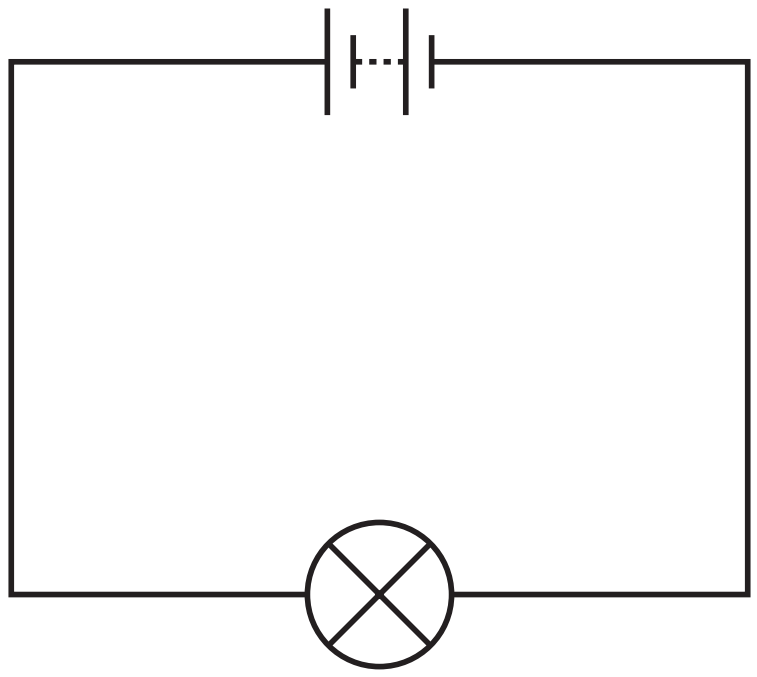


Figure 10

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)

(Continue your answer on next page)

(TOTAL FOR QUESTION 6 = 13 MARKS)

TOTAL FOR PAPER = 60 MARKS

END