

**Paper Reference(s) 4PH1/2P**

**Pearson Edexcel International GCSE (9–1)**

**Physics**

**Unit: 4PH1**

**Paper 2P**

**Friday 14 June 2019 – Morning**

**Time: 1 hour 15 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.**

<b>Centre No.</b>							
<b>Candidate No.</b>							
<b>Surname</b>							
<b>Other names</b>							
<b>Signature</b>							
<b>Paper Reference</b>	<b>4</b>	<b>P</b>	<b>H</b>	<b>1</b>	<b>/</b>	<b>2</b>	<b>P</b>

- 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.
- Show all the steps in any calculations and state the units.
- 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 .

## **MATERIALS REQUIRED FOR EXAMINATION**

**Calculator, ruler**

## **ITEMS INCLUDED WITH QUESTION PAPERS**

**Formulae booklet**

## **INFORMATION FOR CANDIDATES**

- The total mark for this paper is 70.
- 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)**

**(Turn over)**

## **ADVICE TO CANDIDATES**

- **Read each question carefully before you start to answer it.**
- **Write your answers neatly and in good English.**
- **Try to answer every question.**
- **Check your answers if you have time at the end.**

**Answer ALL questions.**

**1 (a) Which force is responsible for keeping satellites in orbit? (1 mark)**

**A electrostatic**

**B gravitational**

**C magnetic**

**D nuclear**

**(b) Which of these is the largest?  
(1 mark)**

**A galaxy**

**B planet**

**C star**

**D universe**

**(Question continues on next page)**

**(Turn over)**

**(c) Which of these represents the brightness of stars at a standard distance? (1 mark)**

**A absolute magnitude**

**B colour**

**C diameter**

**D temperature**

**(TOTAL FOR QUESTION 1 = 3 MARKS)**

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**(Questions continue on next page)**

**(Turn over)**

**2 A student investigates a transformer.**

**This is the student's method.**

- **use a primary coil with 10 turns**
- **connect the primary coil to a constant maximum input voltage**
- **measure the output voltage across the secondary coil**
- **repeat using an increasing number of turns on the primary coil**

**The table shows the student's results.**

<b>Number of turns on primary coil</b>	<b>Output voltage in V</b>
<b>10</b>	<b>39.6</b>
<b>20</b>	<b>19.7</b>
<b>40</b>	<b>9.9</b>
<b>60</b>	<b>6.6</b>
<b>80</b>	<b>5.0</b>
<b>100</b>	<b>4.0</b>

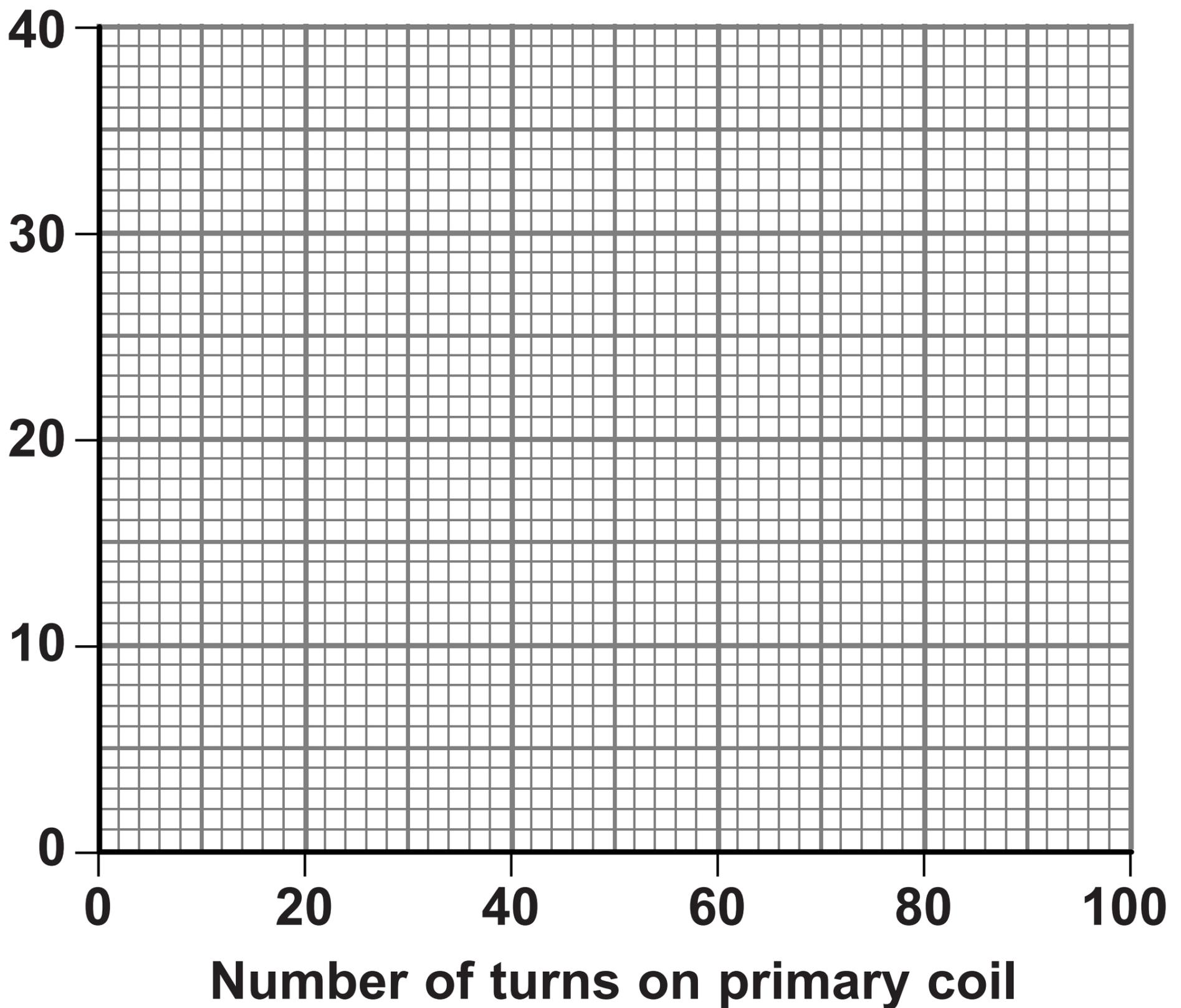
**(Question continues on next page)**

**(Turn over)**

**(a) (i) Plot a graph of the student's results on the grid. (1 mark)**

**(ii) Draw a curve of best fit. (1 mark)**

**Output  
voltage in V**



**(Question continues on next page)**

**(Turn over)**

**(iii) Describe the relationship between the output voltage and the number of turns on the primary coil. (2 marks)**

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**(Question continues on next page)**

**(Turn over)**

- (b) (i) State the formula linking input and output voltages and the turns ratio for the transformer. (1 mark)**

**(Question continues on next page)**

**(Turn over)**

**10**

**(ii) The input voltage of the transformer is 6.8 V.**

**Calculate the number of turns on the secondary coil. (2 marks)**

**number of turns = \_\_\_\_\_**

**(TOTAL FOR QUESTION 2 = 7 MARKS)**

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**(Questions continue on next page)**

**(Turn over)**

**3 This question is about sound waves.**

**(a) Describe an experiment to measure the speed of sound in air.**

**You may draw a diagram to help your answer. (5 marks)**

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**(Continue your answer on next page)**

**(Turn over)**



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**(Question continues on next page)**

**(Turn over)**

**(b) An oscilloscope can be used to determine the frequency of a sound wave.**

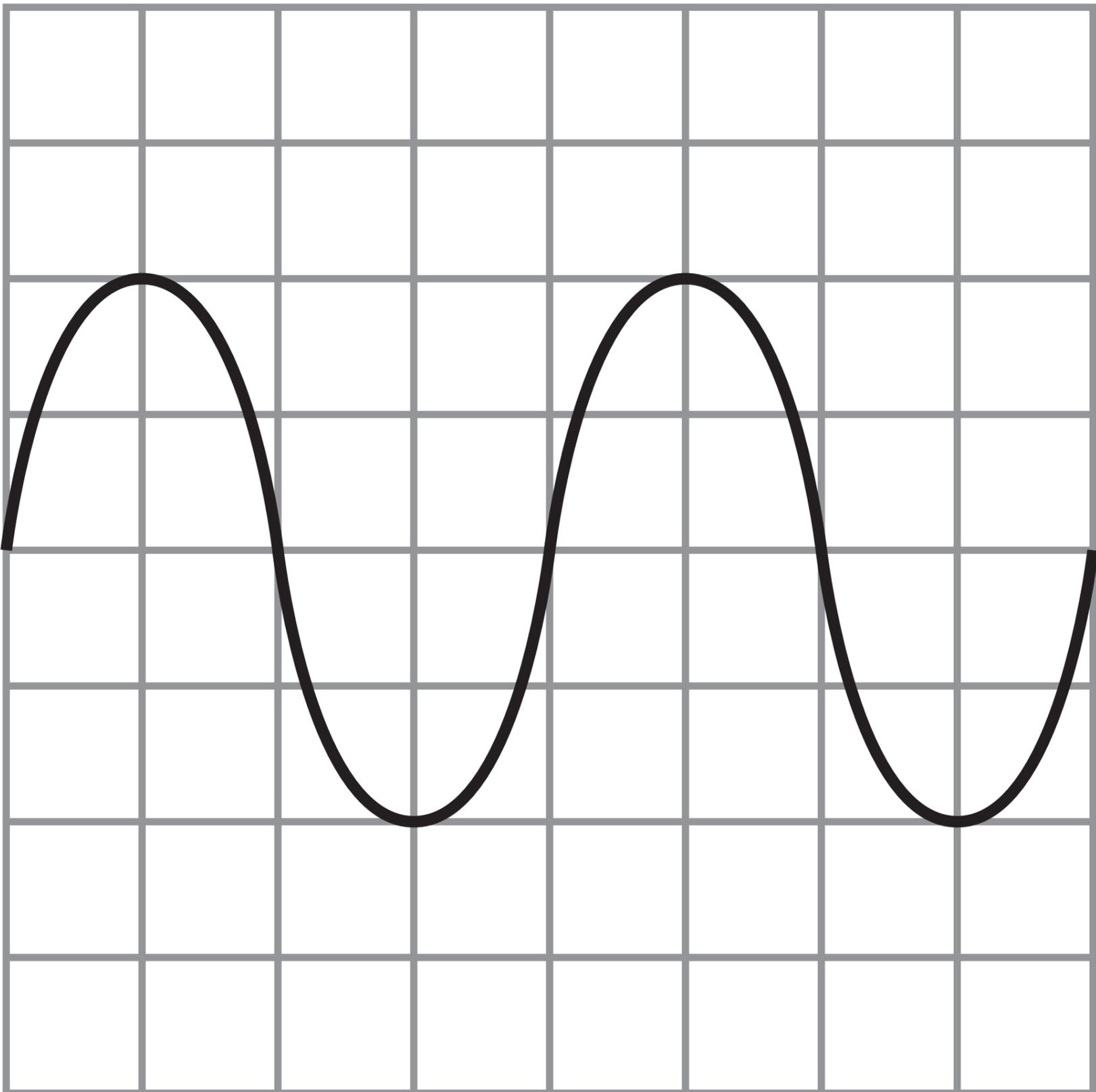
**The diagram on page 15 shows an oscilloscope trace of a sound wave.**

**(Question continues on next page)**

**Oscilloscope settings**

**y direction: 1 square = 1 V**

**x direction: 1 square = 0.25 ms**



**(Question continues on next page)**

**(Turn over)**

**16**

- (i) Calculate the period of this sound wave. (3 marks)**

**period = \_\_\_\_\_ s**

**(Question continues on next page)**

**(Turn over)**

- (ii) Calculate the frequency of this sound wave. (2 marks)

frequency = \_\_\_\_\_ Hz

**(TOTAL FOR QUESTION 3 = 10 MARKS)**

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**(Questions continue on next page)**

**(Turn over)**

**4 This is a question about alpha particles.**

**(a) Describe the nature of an alpha particle. (1 mark)**

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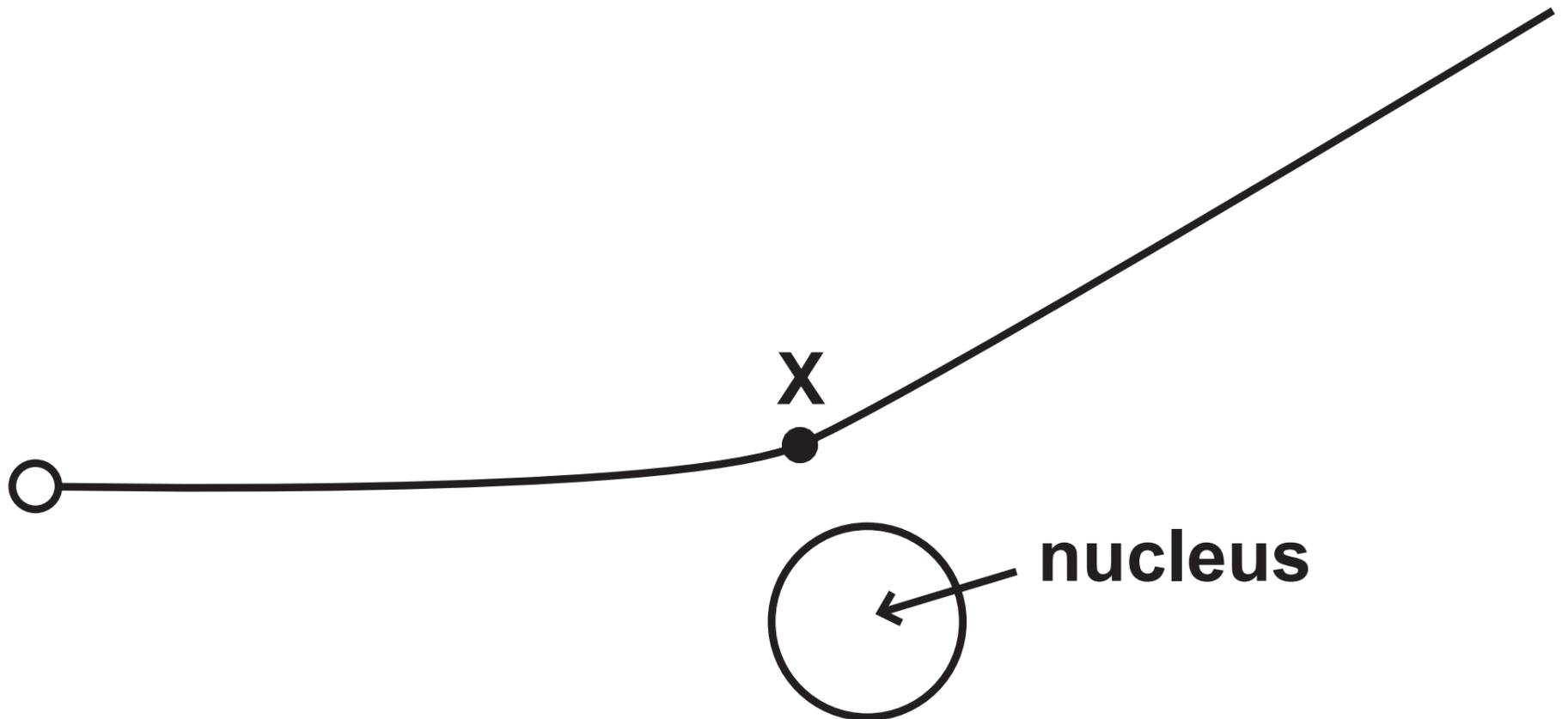
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**(Question continues on next page)**

**(Turn over)**

**(b) The diagram shows the path of an alpha particle as it passes close to a nucleus.**



**(i) Draw an arrow from point X to show the force on the alpha particle due to the nucleus.**

**Label this force Y. (2 marks)**

**(ii) Draw an arrow to show the force on the nucleus due to the alpha particle.**

**Label this force Z. (2 marks)**

**(Question continues on next page)**

**(Turn over)**



- (c) The alpha particle experiences a resultant force of 3.6 N and has a mass of  $6.6 \times 10^{-27}$  kg.

Calculate the acceleration of the alpha particle. (3 marks)

acceleration = \_\_\_\_\_ m/s<sup>2</sup>

**(TOTAL FOR QUESTION 4 = 11 MARKS)**

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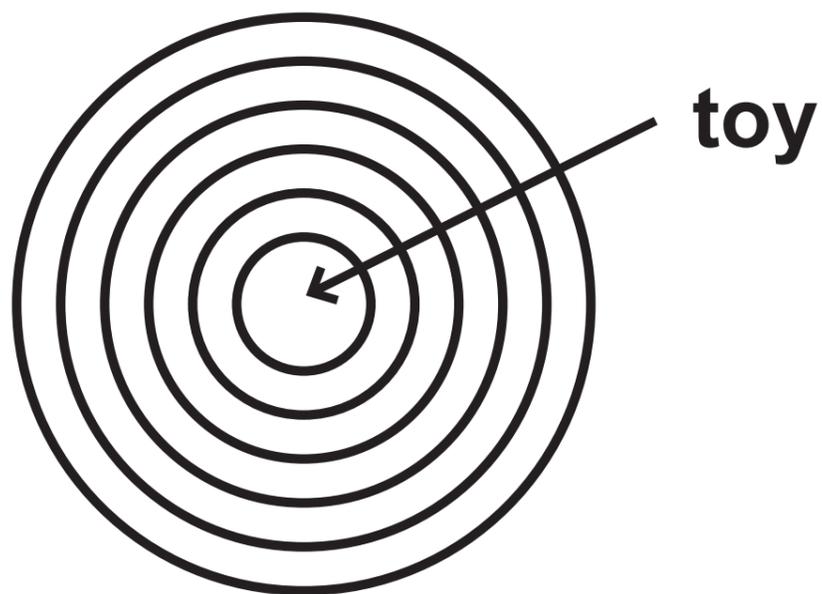
(Questions continue on next page)

(Turn over)

- 5 A toy produces continuous waves when floating on the surface of a pool of water.**

**The waves spread out as circular wavefronts.**

**Diagram 1 shows the wavefronts produced when the toy is not moving, as viewed from above.**

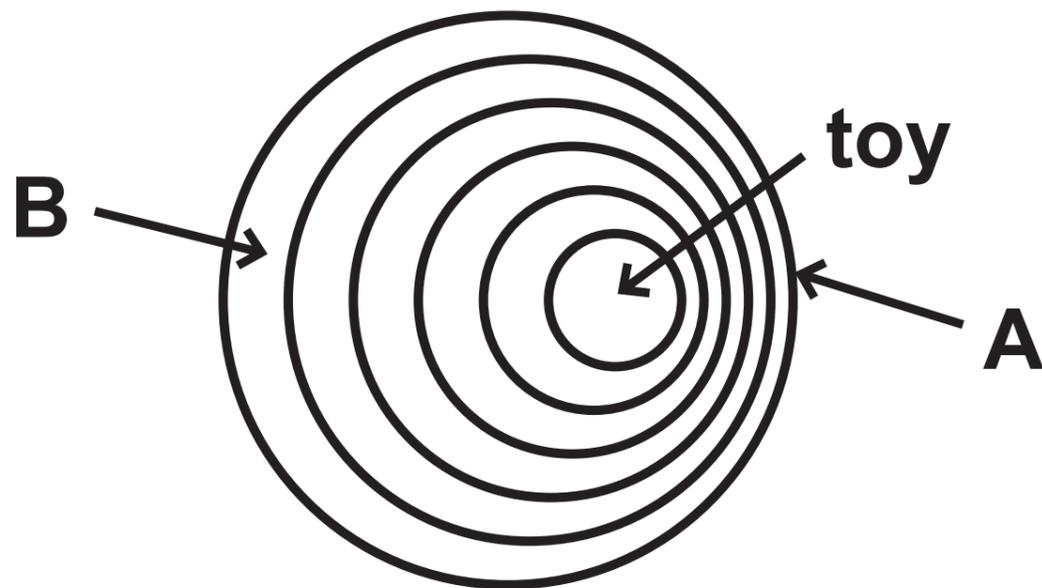


**Diagram 1**

**(Question continues on next page)**

**(Turn over)**

**Diagram 2 shows the wavefronts produced when the toy is moving across the surface of the pool of water.**



**Diagram 2**

- (a) Draw an arrow on diagram 2 to show the direction the toy is moving.  
(1 mark)**

**(Question continues on next page)**

**(Turn over)**



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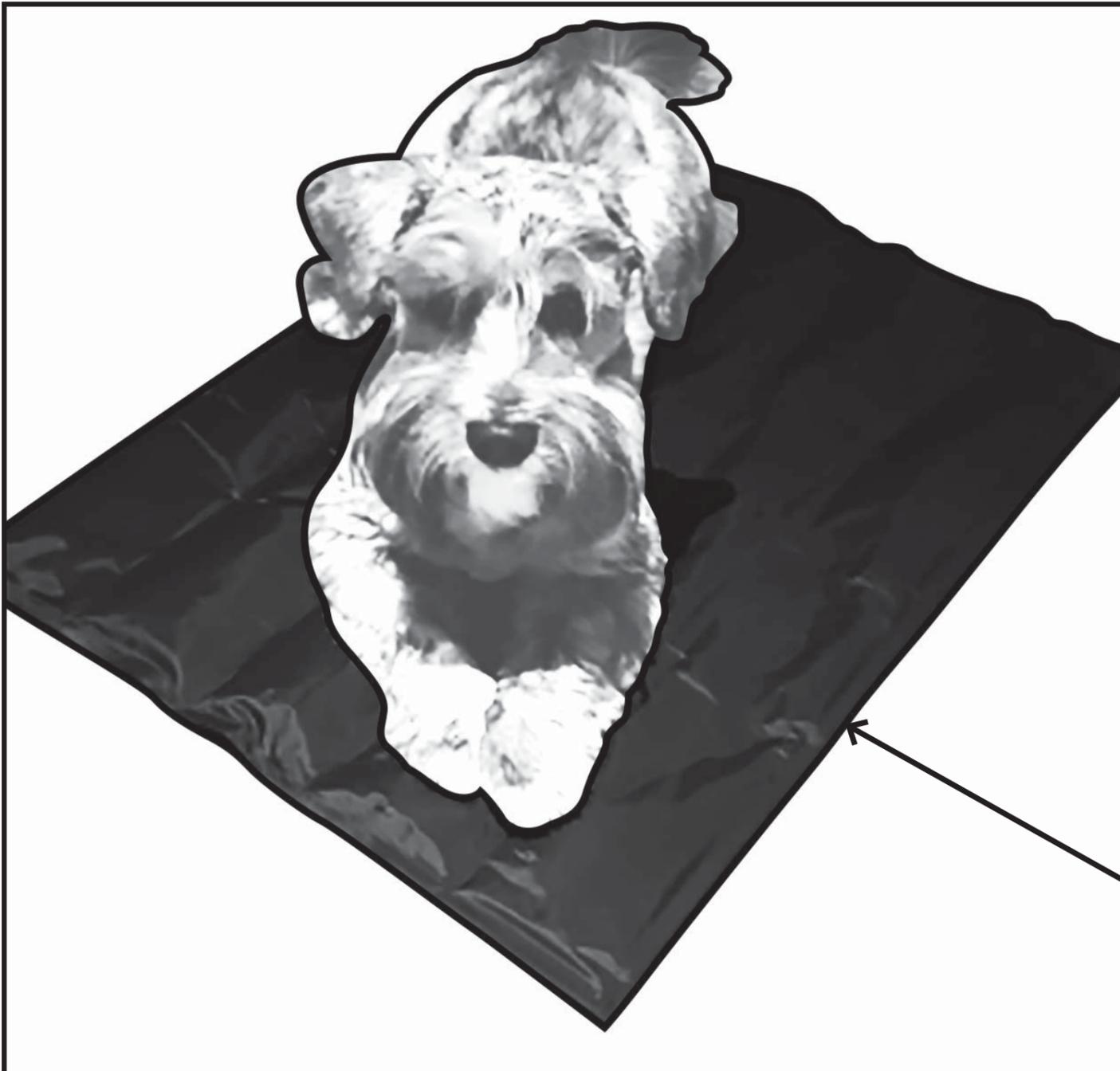
**(TOTAL FOR QUESTION 5 = 5 MARKS)**

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**(Questions continue on next page)**

**(Turn over)**

**6 A dog sits on a water-filled bag to keep cool.**



**water-filled bag**

**(Question continues on next page)**

**(Turn over)**

**(a) The table shows some data about the dog and the water in the bag.**

<b>mass of water in kg</b>	<b>8.7</b>
<b>power output of dog by heating in W</b>	<b>75</b>
<b>specific heat capacity of water in J/kg °C</b>	<b>4200</b>
<b>initial temperature of water in °C</b>	<b>16</b>

**(Question continues on next page)**

**(Turn over)**

The dog sits on the bag for 22 minutes.

- (i) Calculate the energy transferred from the dog to the water by heating in 22 minutes. (3 marks)

energy = \_\_\_\_\_ J

- (ii) State an assumption you have made when calculating the energy transferred. (1 mark)

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(Question continues on next page)

(Turn over)

- (iii) Calculate the temperature of the water after 22 minutes. (4 marks)

temperature = \_\_\_\_\_ °C

(Question continues on next page)

(Turn over)



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**(TOTAL FOR QUESTION 6 = 11 MARKS)**

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**(Questions continue on next page)**

**(Turn over)**

**7 (a) Give two pieces of evidence for the Big Bang theory. (2 marks)**

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**(b) Explain how this evidence supports the Big Bang theory. (4 marks)**

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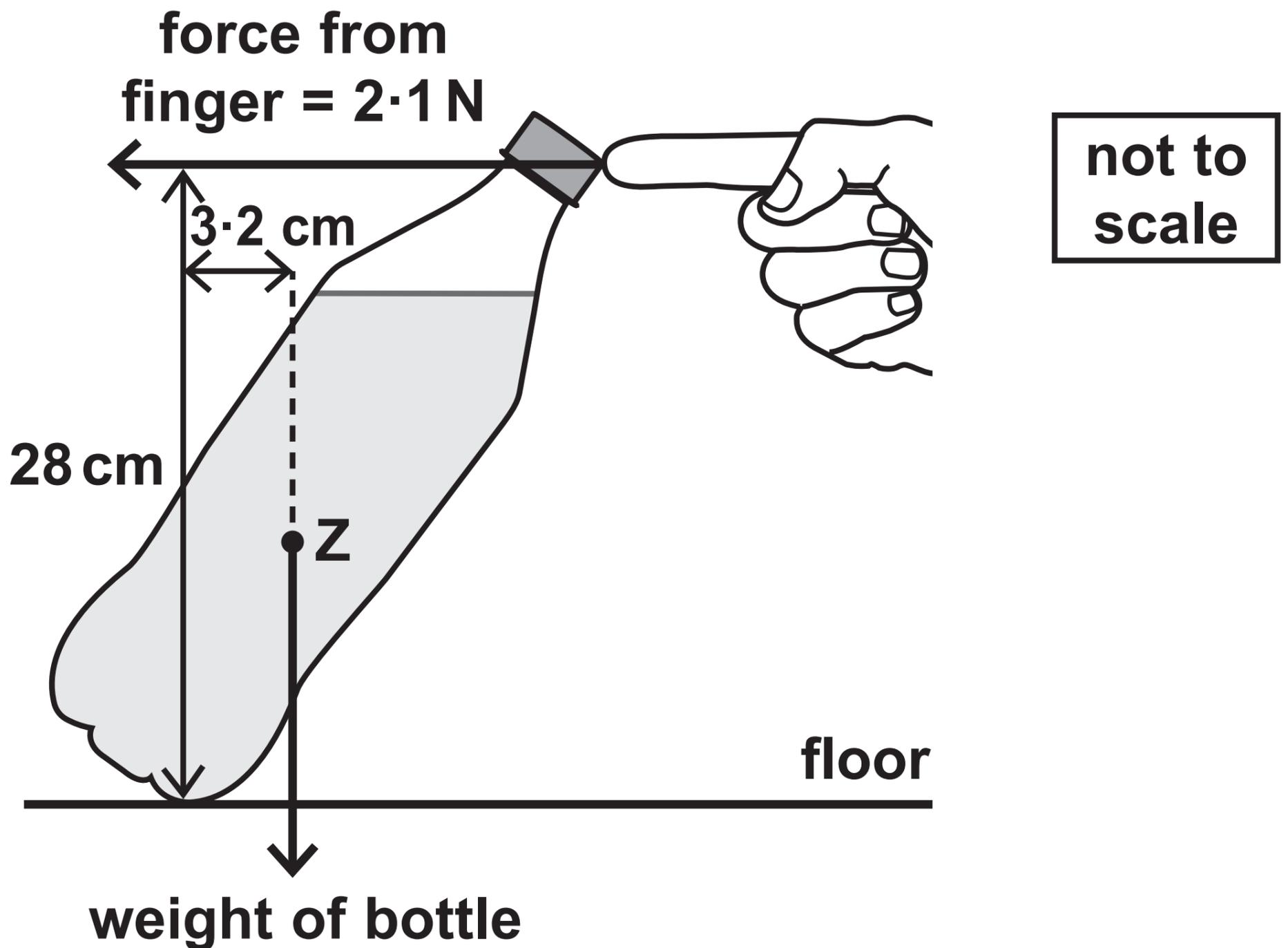
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**(Continue your answer on next page)**

**(Turn over)**



- 8 The diagram shows a bottle supported by a finger.



- (a) State the name of point Z. (1 mark)
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(Question continues on next page)

(Turn over)

- (b) (i) State the formula linking moment, force and perpendicular distance from the pivot. (1 mark)**

**(Question continues on next page)**

**(Turn over)**

**36**

**(ii) The bottle does not move.**

**Calculate the weight of the bottle.  
(4 marks)**

**weight of bottle = \_\_\_\_\_ N**

**(TOTAL FOR QUESTION 8 = 6 MARKS)**

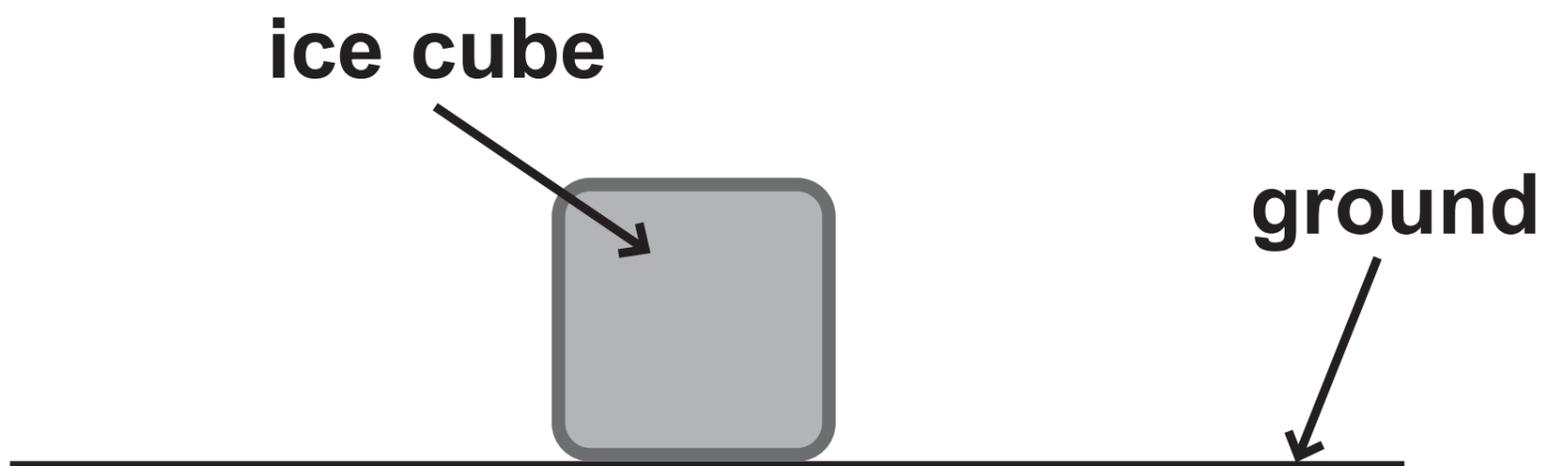
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**(Questions continue on next page)**

**(Turn over)**

**9 This is a question about a melting ice cube.**

**(a) The diagram shows an ice cube placed on the ground.**



**(Question continues on next page)**

**(Turn over)**

- (i) The mass of the ice cube is 3.7 g and its area of contact with the ground is  $2.6 \times 10^{-4} \text{ m}^2$ .

Calculate the pressure the ice cube exerts on the ground.

(4 marks)

pressure = \_\_\_\_\_ Pa

(Question continues on next page)

(Turn over)

- (ii) The ice cube melts and becomes a puddle with a larger cross-sectional area.**

**Explain how the pressure of the ice cube on the ground changes when it melts. (2 marks)**

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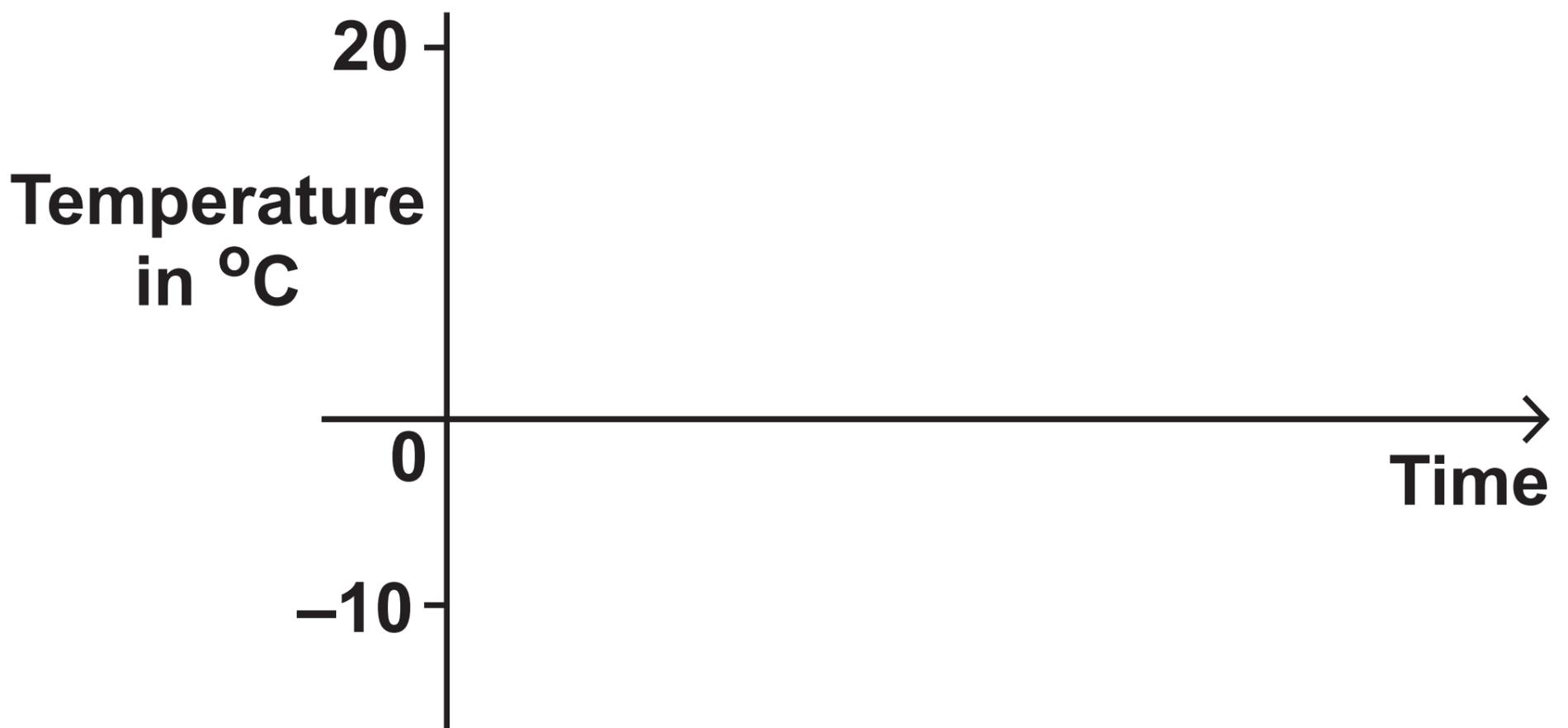
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**(Turn over)**

**(b) Ice melts at a temperature of  $0^{\circ}\text{C}$ .**

**On the axes, sketch how the temperature of the ice cube changes as it rises from a temperature of  $-10^{\circ}\text{C}$  to a temperature of  $20^{\circ}\text{C}$ .  
(3 marks)**



**(Question continues on next page)**

**(Turn over)**

