Write your name here

Surname	Other names

Pearson Edexcel International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Physics

Unit: 4PH0
Paper: 2P

Friday 15 June 2018 – Morning
Time: 1 hour

Paper Reference
4PH0/2P

You must have:
Ruler, calculator

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.*
- 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 ☒.

Information

- 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.*

Advice

- 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.

Turn over ▶

P52401A

1/1/1/1/1/

P 5 2 4 0 1 A 0 1 2 0

Pearson

EQUATIONS

You may find the following equations useful.

energy transferred = current × voltage × time $E = I \times V \times t$

pressure × volume = constant $p_1 \times V_1 = p_2 \times V_2$

$$\text{frequency} = \frac{1}{\text{time period}} \qquad f = \frac{1}{T}$$

$$\text{power} = \frac{\text{work done}}{\text{time taken}} \qquad P = \frac{W}{t}$$

$$\text{power} = \frac{\text{energy transferred}}{\text{time taken}} \qquad P = \frac{W}{t}$$

$$\text{orbital speed} = \frac{2\pi \times \text{orbital radius}}{\text{time period}} \qquad v = \frac{2 \times \pi \times r}{T}$$

$$\frac{\text{pressure}}{\text{temperature}} = \text{constant} \qquad \frac{p_1}{T_1} = \frac{p_2}{T_2}$$

$$\text{force} = \frac{\text{change in momentum}}{\text{time taken}}$$

Where necessary, assume the acceleration of free fall, $g = 10\ \text{m/s}^2$.

BLANK PAGE

Answer ALL questions.

1 (a) Which of these quantities is a vector?

(1)

☒ **A** acceleration

☒ **B** energy

☒ **C** power

☒ **D** speed

(b) Which of these is a correct unit for momentum?

(1)

☒ **A** kg m/s

☒ **B** kg m^2/s

☒ **C** kg m/s^2

☒ **D** kg m^2/s^2

(c) The photograph shows a toy train at rest on a horizontal surface.

(i) Why is the toy train at rest?

(1)

- ☒ **A** a resultant downward force acts on the train
- ☒ **B** a resultant upward force acts on the train
- ☒ **C** no resultant force acts on the train
- ☒ **D** no forces act on the train

(ii) The mass of the toy train is 150 g.

State the equation linking weight, mass and gravitational field strength, *g*.

(1)

(iii) Calculate the weight of the toy train.

(3)

weight = ... N

(Total for Question 1 = 7 marks)

2 This question is about waves.

(a) Diagram 1 shows a small boat on the surface of the sea.

The boat moves up and down as water waves pass underneath it.

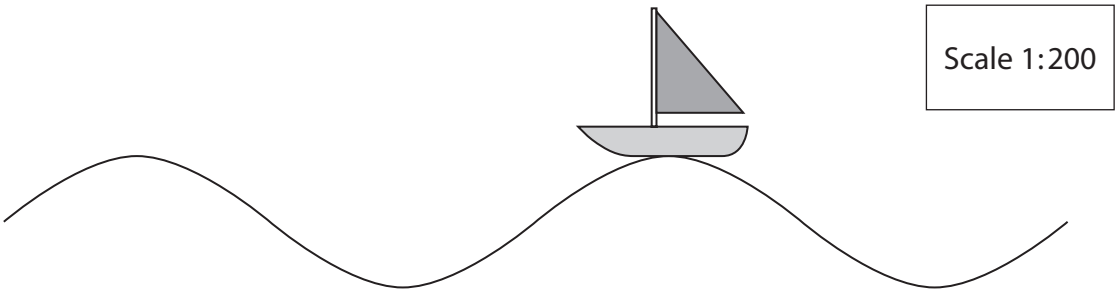


Diagram 1

(i) Using diagram 1, calculate the wavelength of the water waves.
[1 cm on the diagram = 200 cm]

(2)

wavelength = ... cm

(ii) State the equation linking wave speed, frequency and wavelength.

(1)

(iii) The frequency of the water wave is 0.4 Hz.

Calculate the speed of the water wave.

(2)

speed = ... m/s

(iv) Water waves are transverse.

State another example of a transverse wave.

(1)

.....

(b) Diagram 2 shows waves passing through an opening in a harbour wall, with a boat in a calm area of water where there are no waves.

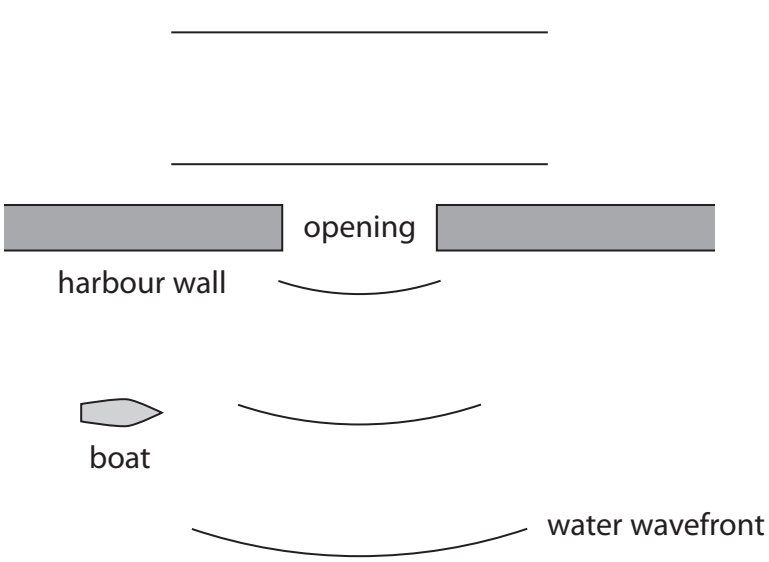


Diagram 2

(i) State the wave phenomenon that causes the waves to spread out as they pass through the opening in the harbour wall.

(1)

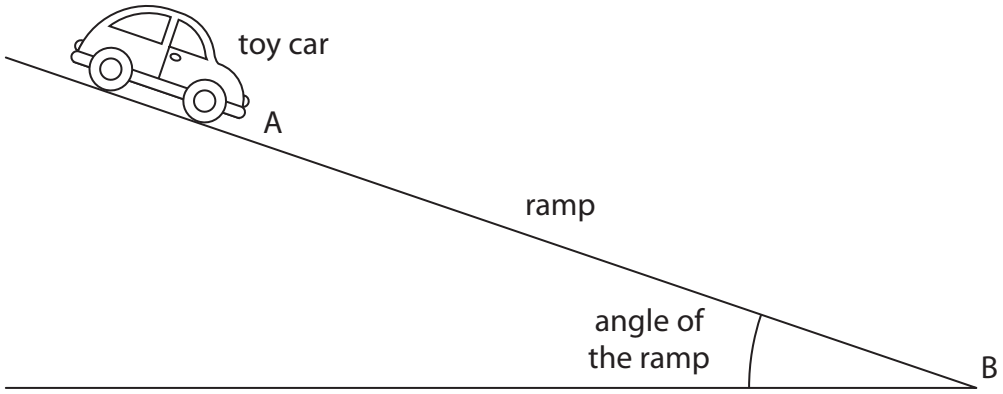
(ii) Discuss what would happen to the boat if the size of the opening in the harbour wall changed.

(3)

(Total for Question 2 = 10 marks)

BLANK PAGE

3 A student uses this apparatus to investigate how the angle of a ramp affects the time taken for a toy car to travel down the ramp.



This is the student's method.

- set the angle of the ramp to 10° and measure the time for the car to travel from A to B
- repeat the experiment for five different angles, using the same car travelling from A to B

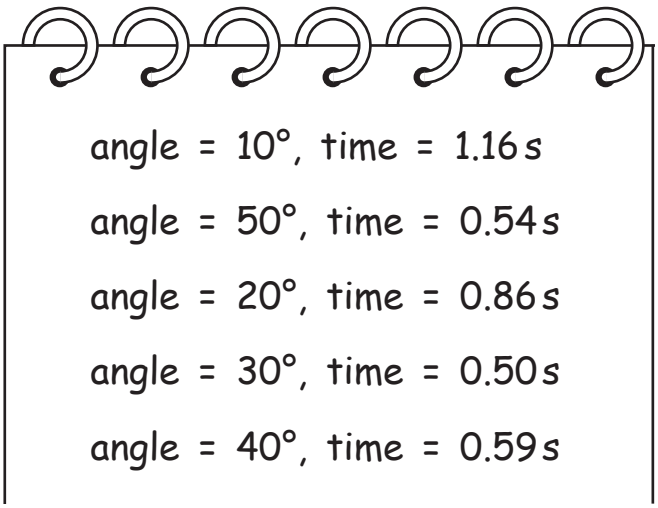
(a) The table lists some variables in this investigation.

Place one tick (✓) in each row to show the independent, dependent and control variables.

(4)

	Independent variable	Dependent variable	Control variable
Type of toy car			
Time to travel from A to B			
Angle of ramp			
Distance travelled down ramp			

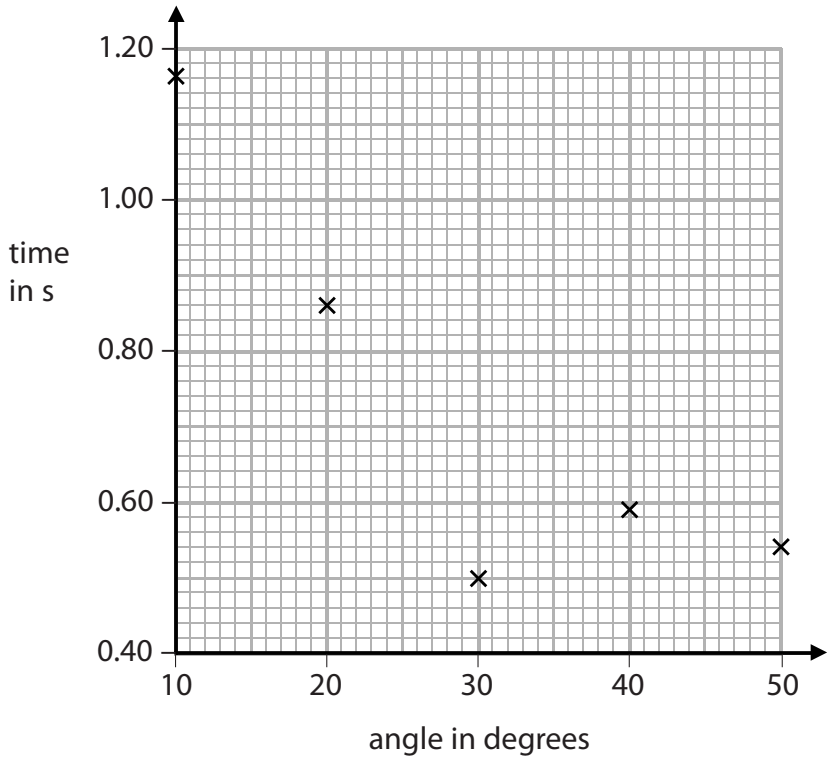
(b) These are the student's results.



Draw a table of the student's results.

(3)

(c) The graph shows the results of the student's investigation.



(i) Circle the anomalous point on the graph.

(1)

(ii) Suggest how the student should deal with the anomalous result.

(1)

.....

.....

(iii) Draw the curve of best fit on the graph.

(1)

(iv) Suggest why the student did not start either axis from zero.

(1)

.....

.....

(Total for Question 3 = 11 marks)

4 A student uses an electromagnet to pick up small pieces of metal made from iron and steel.

(a) Describe the construction of an electromagnet.

You may draw a diagram to help your answer.

(3)

(b) When the student turns off the electromagnet, he observes that the pieces of steel remain on the electromagnet but the pieces of iron fall off.

Explain this observation.

(3)

.....

.....

.....

.....

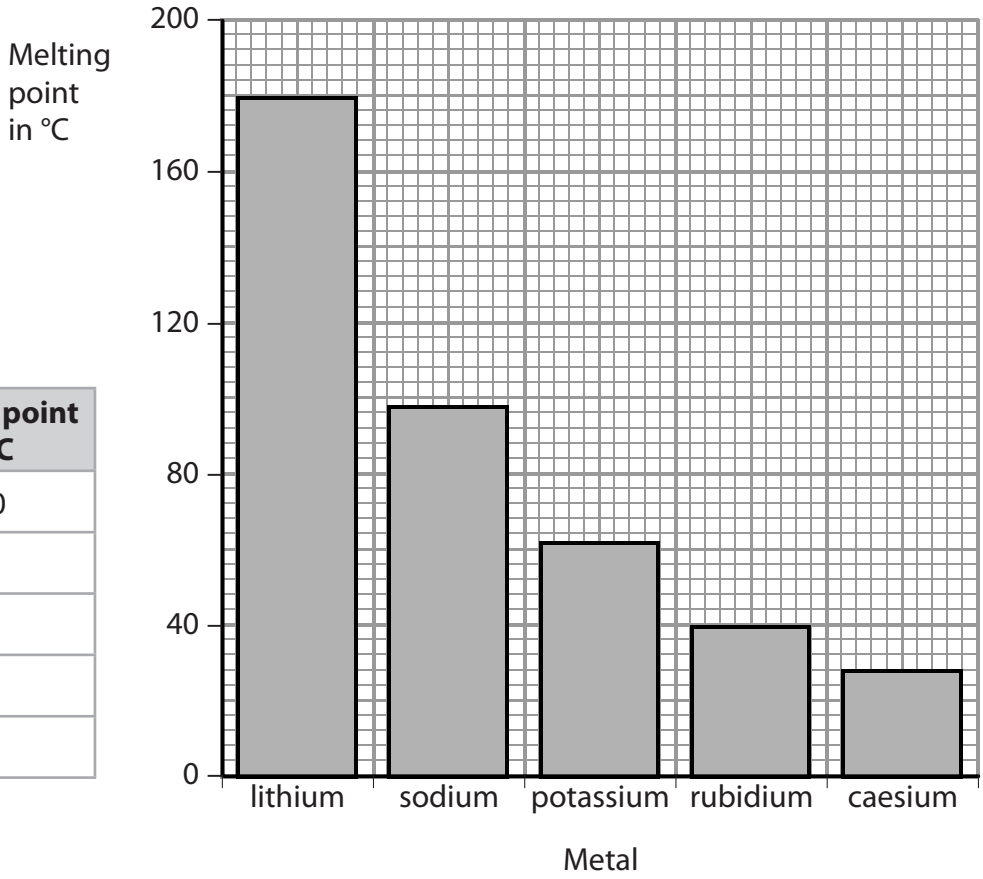
.....

.....

(Total for Question 4 = 6 marks)

5 The table and graph show the melting points of different metals.

Metal	Melting point in °C
lithium	180
sodium	97
potassium	63
rubidium	39
caesium	28



(a) (i) What is the name of the type of graph shown?

(1)

.....

(ii) Give a reason why this is the correct way to display the data.

(1)

.....

.....

(b) When these metals melt, they turn from a solid into a liquid.

(i) Compare the arrangement and motion of particles in a solid and in a liquid.

You may draw a diagram to help your answer.

(4)

(ii) Describe the changes that occur when a liquid boils to form a gas.

Refer to particles in your answer.

(2)

(Total for Question 5 = 8 marks)

6 Two scientists, Geiger and Marsden, used alpha particles to investigate the structure of the atom.

(a) The scientists directed a beam of alpha particles at a thin strip of gold foil.

They observed that most of the alpha particles passed straight through the gold foil.

State the conclusion that was made about the structure of the atom from this observation.

(1)

.....

.....

(b) A small number of the alpha particles were deflected by more than 90 degrees as they passed through the gold foil.

Explain why this shows that the centre of the atom has a positive charge.

(3)

.....

.....

.....

.....

.....

.....

(Total for Question 6 = 4 marks)

7 A company has 50 holiday homes located on the coast of an island.

The company wants to develop a renewable method of generating electricity for the homes.

They consider these three options.

- solar cells
- wind turbines
- geothermal

Discuss the advantages and disadvantages of each option.

(6)

(Total for Question 7 = 6 marks)

8 (a) A man stands on a wooden board to paint a wall, as shown in diagram 1.

The diagram shows some of the forces acting.

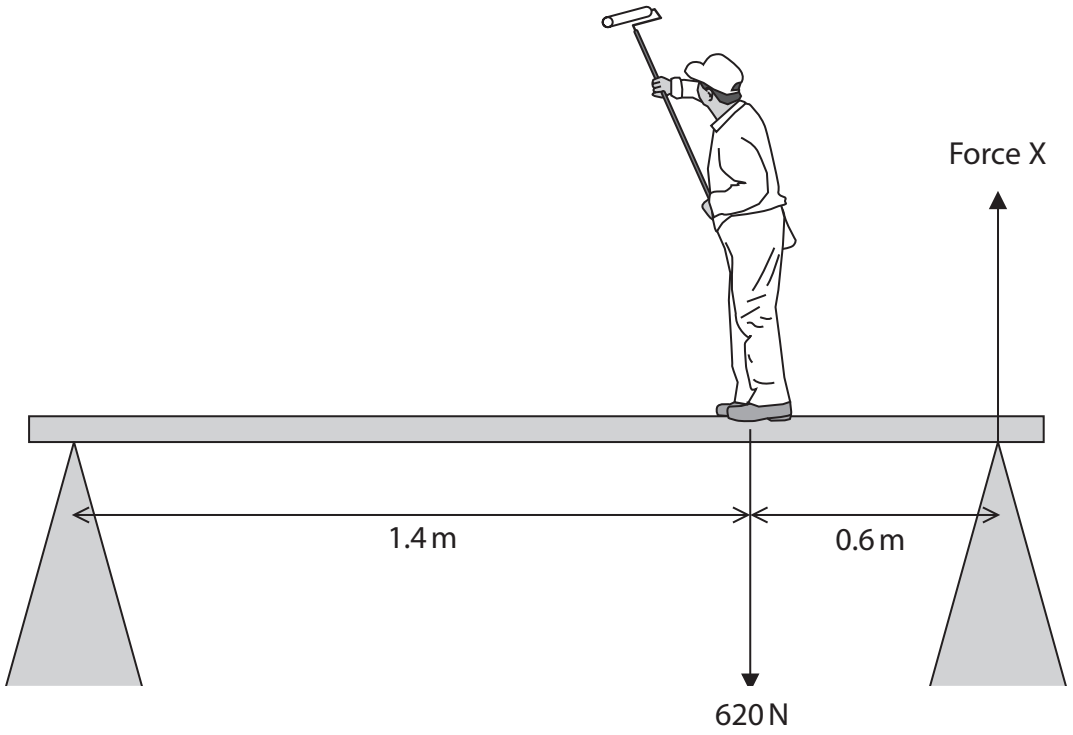


Diagram 1

(i) State the principle of moments.

(1)

.....

.....

(ii) Calculate force X.
[ignore the weight of the wooden board]

(4)

force X = ... N

(b) The man walks to the other end of the wooden board, as shown in diagram 2.

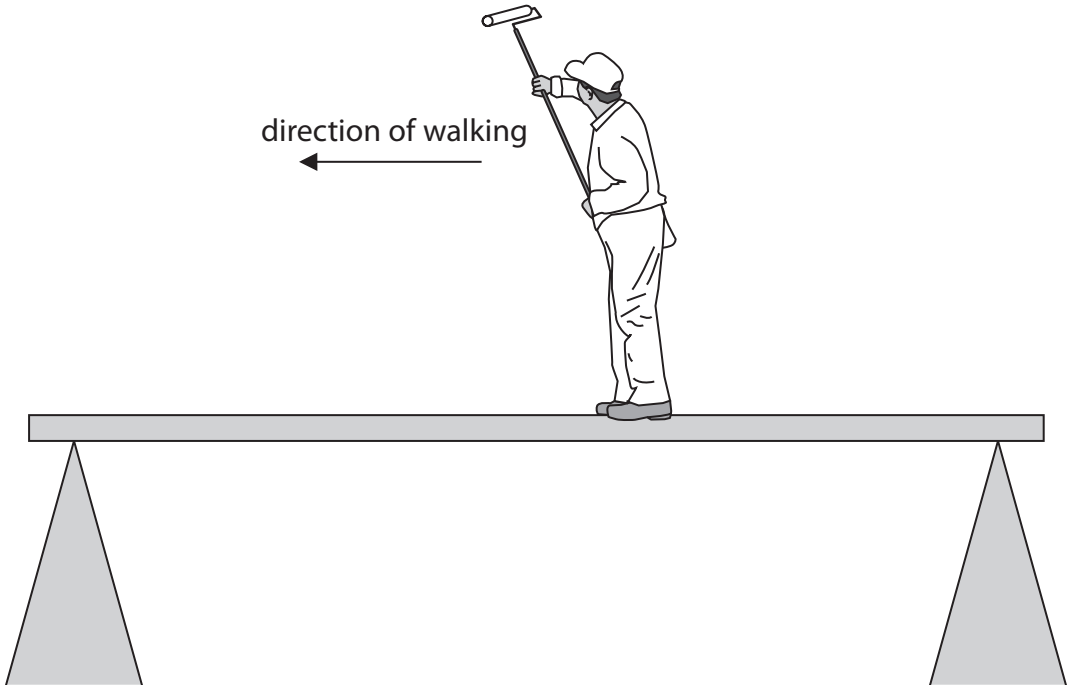


Diagram 2

Explain the change in force X as the man walks along the wooden board.

(3)

(Total for Question 8 = 8 marks)

TOTAL FOR PAPER = 60 MARKS

BLANK PAGE