Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE (9–1)

Centre Number | Candidate Number

Time 1 hour 10 minutes

Paper reference **4SS0/1P**

Science (Single Award)

Physics
PAPER: 1P

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.
- 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.
- Good luck with your examination.

Turn over ▶

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Pearson

FORMULAE

You may find the following formulae useful.

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

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

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

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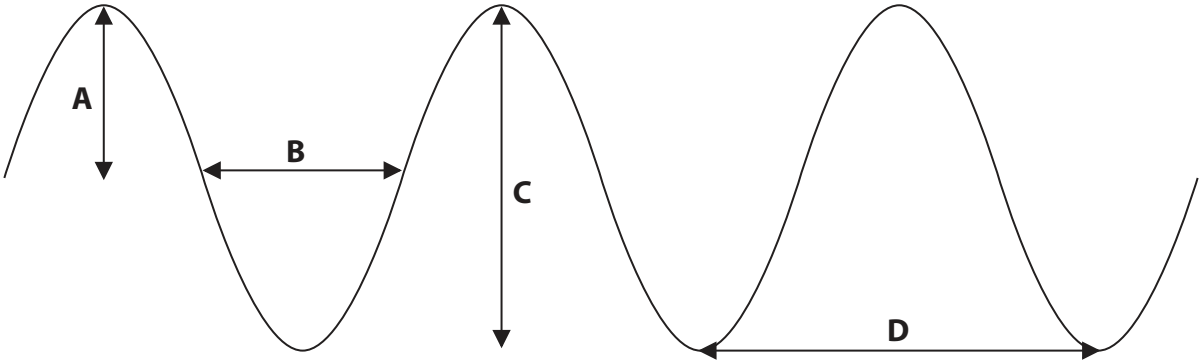
Answer ALL questions.

1 This question is about waves.

(a) The diagram shows a wave at an instant in time.



(i) Which arrow on the diagram shows the wavelength of the wave?

(1)

- ☒ **A**
- ☒ **B**
- ☒ **C**
- ☒ **D**

(ii) Which arrow on the diagram shows the amplitude of the wave?

(1)

- ☒ **A**
- ☒ **B**
- ☒ **C**
- ☒ **D**

(b) The boxes give some properties of waves, and definitions of these properties.

Draw a straight line linking each wave property to its correct definition.

(2)

Wave property	Definition
frequency	the time taken for one complete vibration of the wave
period	a line along which all waves are at the same stage of their vibration
wavefront	the number of complete vibrations of the wave each second

(c) Light and sound are two examples of waves.

The table shows whether waves can transfer energy and whether they can be reflected and refracted.

Which row of the table is correct for light waves and for sound waves?

(1)

	Both can transfer energy	Both can be reflected and refracted
☒ **A**	no	no
☒ **B**	yes	no
☒ **C**	no	yes
☒ **D**	yes	yes

(Total for Question 1 = 5 marks)

2 The photograph shows a truck with a crane that is used to move large bags of building materials.

stabilising leg

(Source: © Alistair Petrie/Alamy Stock Photo)

(a) (i) State the formula linking work done, force and distance moved.

(1)

(ii) A bag of building materials has a weight of 8750 N.

Calculate the work done on the bag when it is lifted a vertical distance of 230 cm from the ground until it is stationary again.

Give the unit.

(3)

work done = ... unit .....

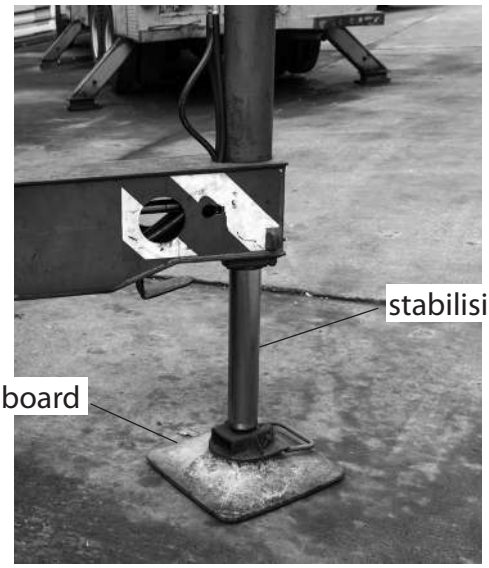
(iii) The crane takes 7.0 s to lift the bag.

Calculate the mean power output of the crane when it is lifting the bag.

(2)

mean power output = ... W

(b) The truck has a stabilising leg which is positioned on a wooden board.



(Source: © JARIRIYAWAT/Shutterstock)

(i) Give a reason why the wooden board is used.

(1)

.....

.....

(ii) State the formula linking pressure, force and area.

(1)

(iii) The wooden board is a square with side length 0.50 m.

The pressure the board exerts on the ground is 148 kPa.

Calculate the force exerted by the board on the ground.

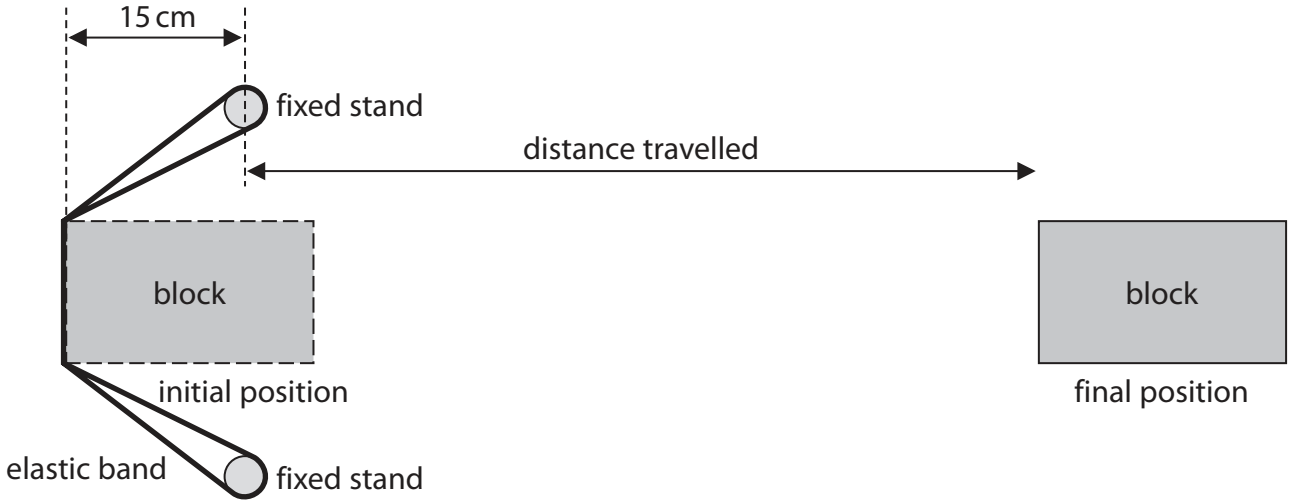
(4)

force = ... N

(Total for Question 2 = 12 marks)

3 A student does an investigation to see how the type of surface affects the motion of a sliding block.

The diagram shows the student's apparatus viewed from above with the block in its initial and final positions.



This is the student's method.

- attach an elastic band between two fixed stands
- push a 250 g block into the elastic band until the band is pushed back 15 cm
- release the block
- measure the distance travelled by the block from the stands
- release the block two more times and measure the distance travelled each time

The student then repeats this method with the apparatus set up on different surfaces.

(a) State the independent and dependent variables in the student's investigation.

(2)

independent .....

dependent .....

(b) The table shows the student's results.

Surface	Distance travelled in cm			
	trial 1	trial 2	trial 3	mean
lab bench	26	26	24	
wooden floor	18	16	19	18
porcelain tiles	41	46	48	45
carpet	6	4	5	5
glass sheet	37	37	35	36

(i) Calculate the mean distance travelled on the lab bench surface.

Give your answer to the nearest cm.

(2)

mean distance = ... cm

(ii) Give a reason why the data in the table shows that the student's results are reliable.

(1)

.....

.....

(c) The student plots a bar chart of the results.

Give a reason why a bar chart is the correct type of graph for this investigation.

(1)

.....

.....

.....

(Total for Question 3 = 6 marks)

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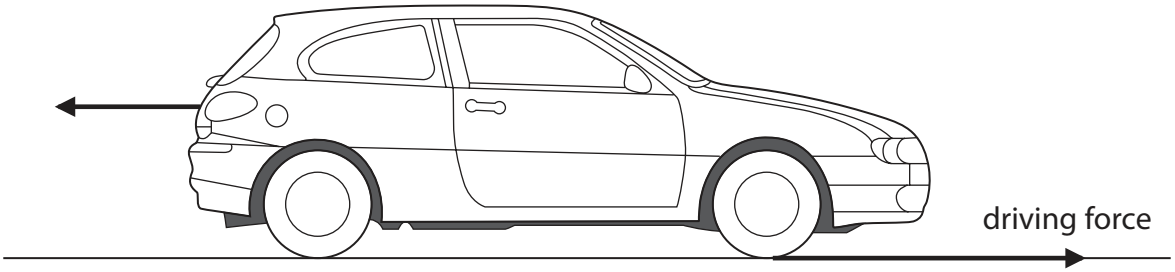
4 (a) A car accelerates along a level road.

The diagram shows some of the horizontal forces acting on the car as it accelerates.



(Source: DEEWI114481 © father/Shutterstock)

(i) A driving force acts on the car, as shown in the diagram.

State the name of the other force shown in the diagram.

(1)

.....

(ii) State the formula linking unbalanced force, mass and acceleration.

(1)

(iii) The unbalanced force acting on the car is 2900 N.

The mass of the car is 1200 kg.

Calculate the acceleration of the car.

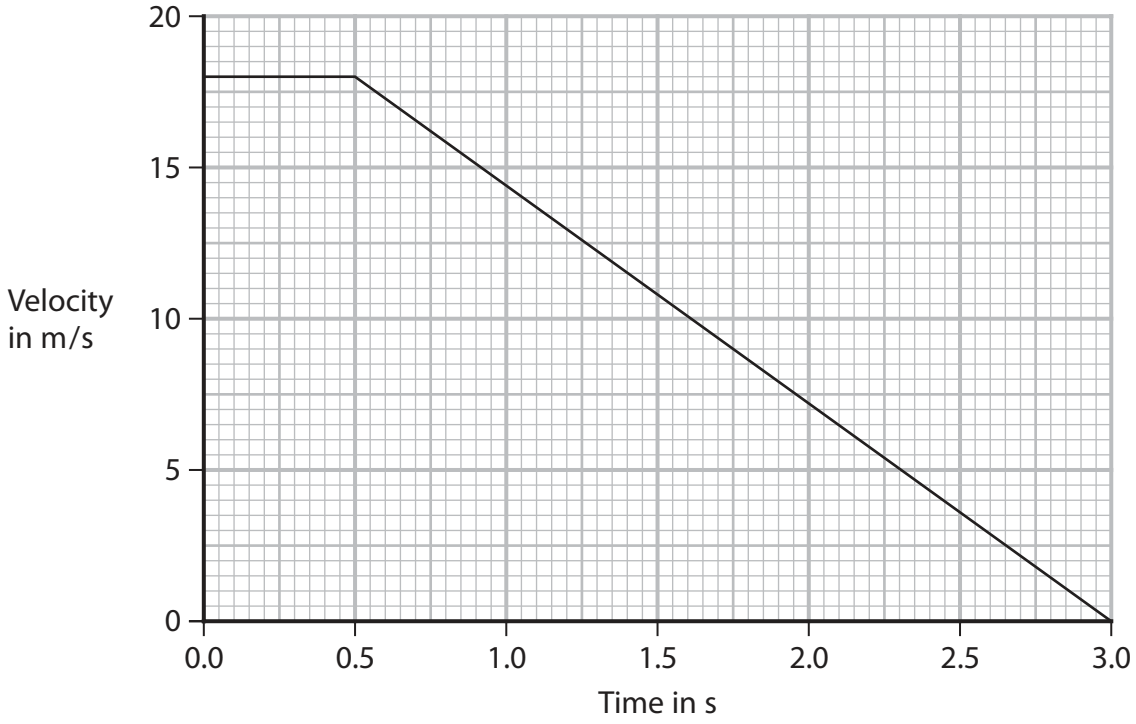
(2)

acceleration = ... m/s^2

(b) The driver sees an obstacle in the road and applies the brakes.

The driver has a reaction time of 0.5 s. He applies the brakes for 2.5 s.

The graph shows how the velocity of the car changes from when the driver sees the obstacle until the car stops.



(i) Describe how the thinking distance is affected by the condition of the car's brakes and the speed of the car.

(2)

condition of brakes .....

.....

speed of car .....

.....

(ii) Use the graph to calculate the braking distance.

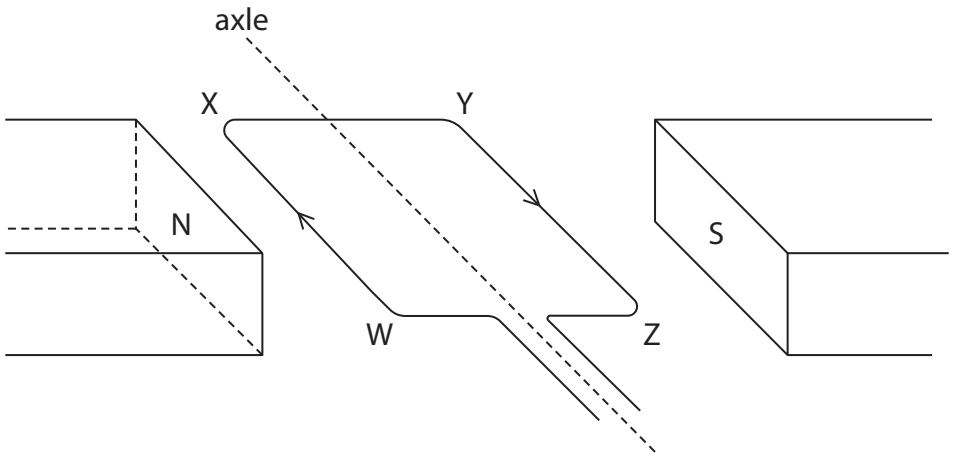
(3)

braking distance = ... m

(Total for Question 4 = 9 marks)

5 The diagram shows a coil of wire, WXYZ, positioned between the opposite poles of a magnet.

The arrows show the direction of the current in the coil.



(a) Draw arrows on the diagram to show the direction of the forces that act on the coil due to the magnet.

(2)

(b) Explain the motion of the coil of wire.

Refer to magnetic fields in your answer.

(4)

(c) Explain how the motion of the coil will change if the current is increased.

(2)

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(Total for Question 5 = 8 marks)

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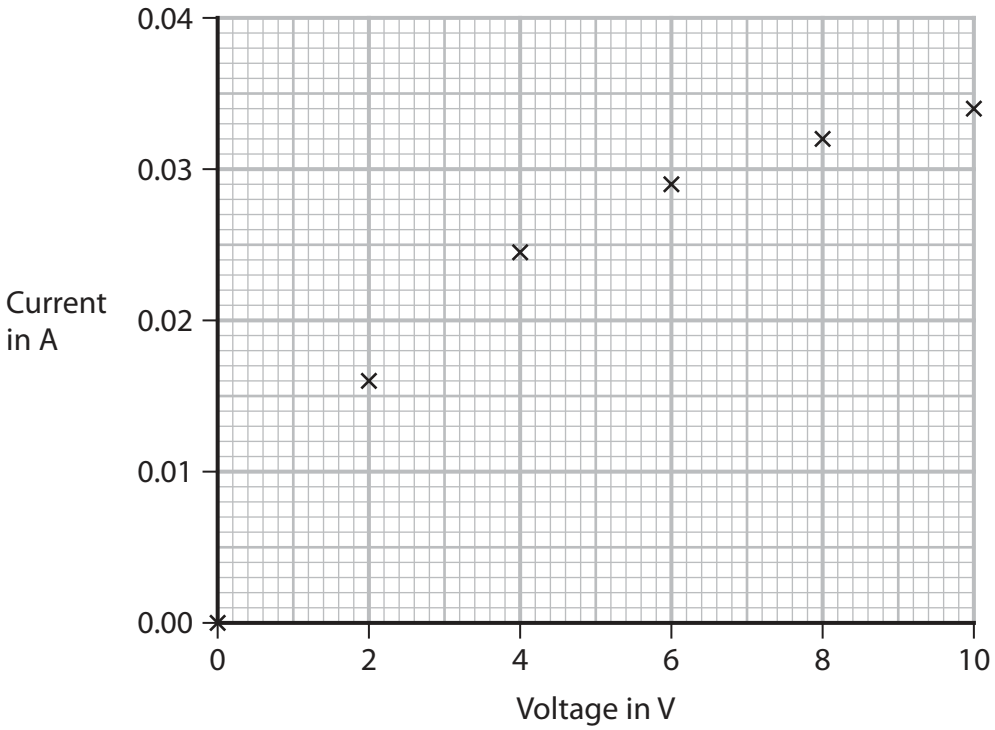
6 A student investigates how the current in a filament lamp varies as the voltage across the lamp is changed.

(a) Draw a circuit that the student could use for this investigation.

(4)

(b) The student completes the investigation.

The graph shows their results.



(i) Draw a curve of best fit.

(1)

(ii) Use the graph to determine the resistance of the filament lamp when the voltage across the lamp is 2.0 V.

(3)

resistance = ... Ω

(iii) Explain the change in the resistance of the filament lamp as the voltage across the lamp is increased from 2.0 V.

(2)

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(Total for Question 6 = 10 marks)

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7 This question is about the Sun.

(a) The Solar System consists of the Sun and other astronomical objects.

Complete the diagram to show how a planet and a comet orbit the Sun.

(2)

(b) The Sun is a yellow main sequence star.

(i) Name the evolutionary stage of the Sun before it became a main sequence star.

(1)

.....

(ii) The colour of a star is related to its surface temperature.

Explain what will happen to the colour of the Sun after it leaves the main sequence.

(2)

.....

.....

.....

.....

(c) The Sun emits a stream of charged particles called the solar wind.

The solar wind contains high-energy alpha and beta particles.

(i) Describe three differences between alpha and beta particles.

(3)

1 .....

.....

.....

2 .....

.....

.....

3 .....

.....

.....

(ii) A spacecraft travels through the Sun's solar wind on its journey from Earth to Mars.

Explain why the solar wind does not make the spacecraft radioactive.

(2)

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(Total for Question 7 = 10 marks)

TOTAL FOR PAPER = 60 MARKS

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