Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel Level 3 GCE

Wednesday 13 May 2026

Morning (Time: 1 hour 30 minutes)

Paper reference **8PH0/01**

Physics

Advanced Subsidiary

PAPER 1: Core Physics I

You must have:
Scientific calculator and ruler
Data, Formulae and Relationships Booklet (enclosed)

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions in Sections A and B.
- Answer the questions in the spaces provided – *there may be more space than you need.*

Information

- The total mark for this paper is 80.
- 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 the question marked with an **asterisk** (*), marks will be awarded for your ability to structure your answers logically, showing how the points that you make are related or follow on from each other where appropriate.

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.
- You are advised to show your working in calculations including units where appropriate.

Turn over ▶

P79082A

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P 7 9 0 8 2 A 0 1 2 8

Pearson

SECTION A

Answer ALL questions.

All multiple choice questions must be answered with a cross in the box ☒ for the correct answer from A to D. 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 physical quantity can be either a vector or a scalar.

Which row of the table shows two vector quantities?

☒	**A**	distance	velocity
☒	**B**	momentum	displacement
☒	**C**	acceleration	work done
☒	**D**	kinetic energy	weight

(Total for Question 1 = 1 mark)

2 A student used a micrometer to measure the diameter of a ball bearing.

The measurements made by the student were

4.56 mm 4.68 mm 4.50 mm

Which of the following gives the percentage uncertainty in the measurement of the diameter?

☒ **A** $(4.68 - 4.50) \times 100$

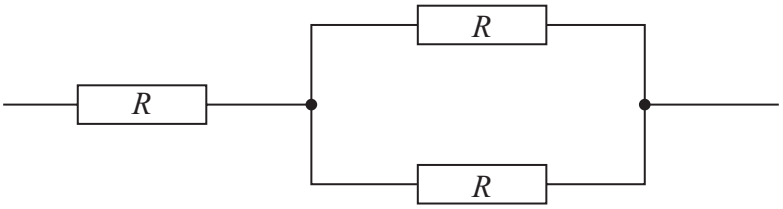
☒ **B** $\dfrac{4.68 - 4.50}{2} \times 100$

☒ **C** $\dfrac{4.68 - 4.50}{(4.56 + 4.68 + 4.50) / 3} \times 100$

☒ **D** $\dfrac{(4.68 - 4.50) / 2}{(4.56 + 4.68 + 4.50) / 3} \times 100$

(Total for Question 2 = 1 mark)

3 Three identical resistors of resistance R are connected, as shown.



Which of the following is the total resistance of this combination of resistors?

☒ **A** $\frac{R}{3}$

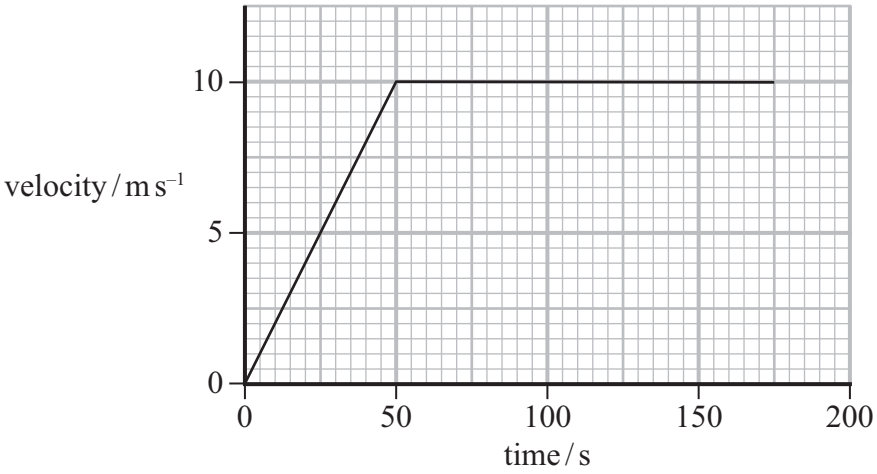
☒ **B** $\frac{3R}{2}$

☒ **C** $\frac{5R}{2}$

☒ **D** $3R$

(Total for Question 3 = 1 mark)

4 A cyclist rode along a straight length of track. The graph shows how the velocity of the cyclist varied with time.



Which of the following gives the average velocity of the cyclist over 175 s?

☒ **A** $\frac{(0+10)}{2}$

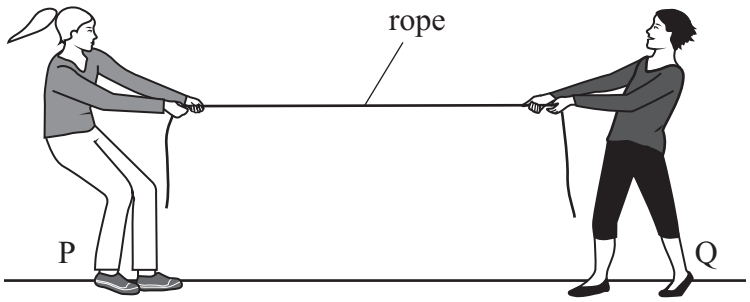
☒ **B** $\frac{\left(\frac{10}{2}+10\right)}{2}$

☒ **C** $\frac{\frac{1}{2}(10\times 50)+(10\times 125)}{175}$

☒ **D** $\frac{10\times 175}{175}$

(Total for Question 4 = 1 mark)

5 A tug of war takes place between person P and person Q, as shown.



P and Q pull on the rope. The rope and both people are stationary.

Which row of the table is a Newton's third law pair of forces for this situation?

		Force 1	Force 2
☒	**A**	pull of Q on the rope	pull of P on the rope
☒	**B**	pull of the rope on Q	pull of P on the rope
☒	**C**	pull of the rope on P	pull of P on the rope
☒	**D**	pull of the rope on P	pull of Q on the rope

(Total for Question 5 = 1 mark)

6 A copper wire is connected in series with a variable power supply. The potential difference across the wire is increased and the temperature of the wire changes.

Which of the following statements is correct for the wire?

☒ **A** The number of conduction electrons increases.

☒ **B** The number of conduction electrons decreases.

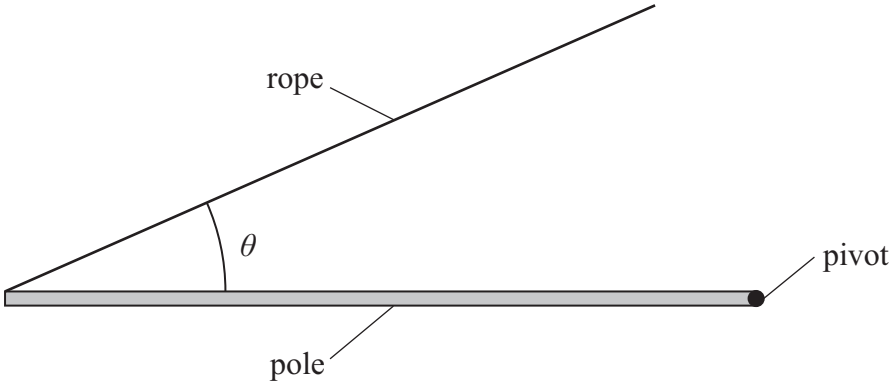
☒ **C** The rate of collision between conduction electrons and copper ions increases.

☒ **D** The rate of collision between conduction electrons and copper ions decreases.

(Total for Question 6 = 1 mark)

7 A uniform pole of mass m is attached to a pivot at one end. The pole is held in a horizontal position by a rope attached to the other end.

The rope makes an angle θ with the pole, as shown.



Which of the following gives the tension in the rope?

☒ **A** $\frac{mg}{2\sin\theta}$

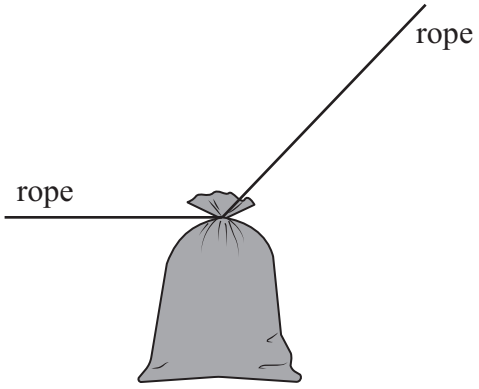
☒ **B** $\frac{mg}{2\cos\theta}$

☒ **C** $2mg\sin\theta$

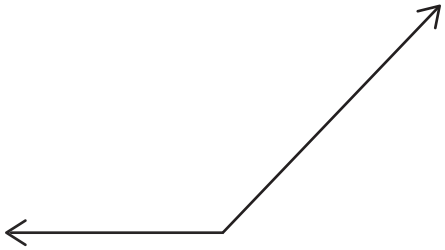
☒ **D** $2mg\cos\theta$

(Total for Question 7 = 1 mark)

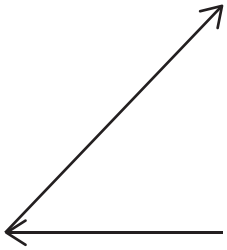
8 A sack is held in a stationary position by two ropes, as shown.



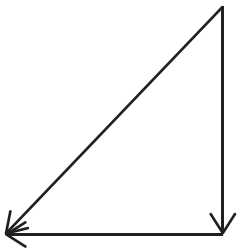
Which of the following shows a correct vector force diagram for the sack?



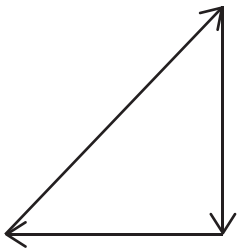
A



B



C



D

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(Total for Question 8 = 1 mark)

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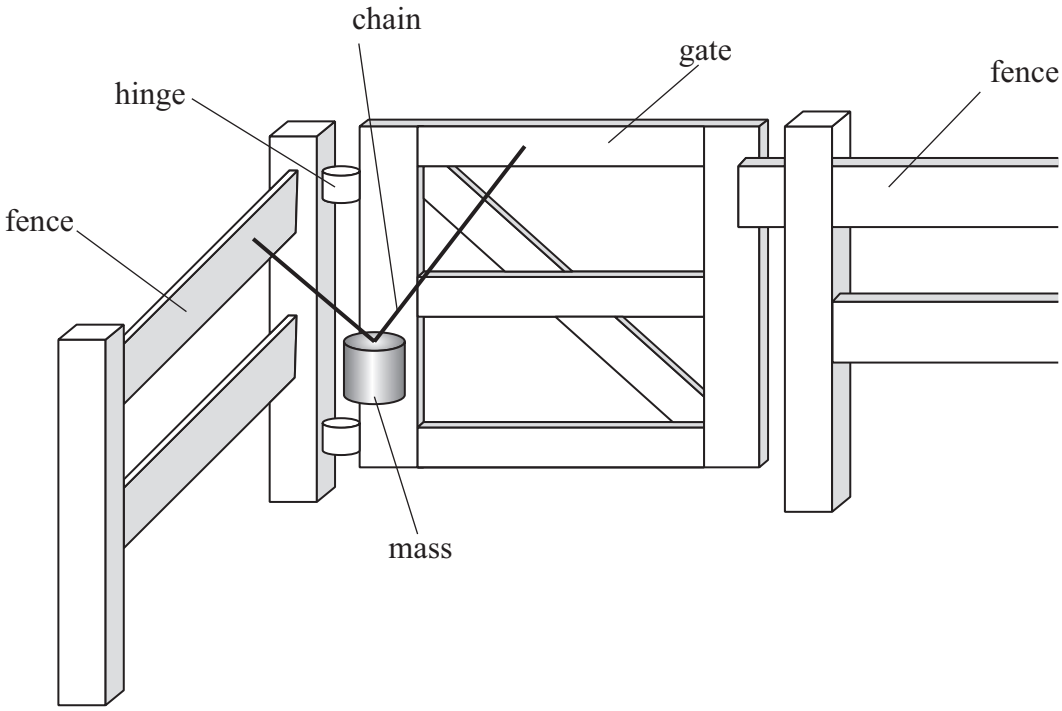
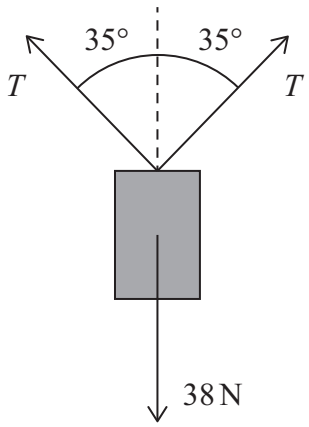
9 The diagram shows a self-closing gate.
The gate is closed by a mass attached to two chains that are connected to the gate and a fence.



(a) When the gate is shut, the chains make angles of 35° to the vertical. The forces on the mass are as shown.



Calculate the magnitude of T.

weight of mass = 38 N

(2)

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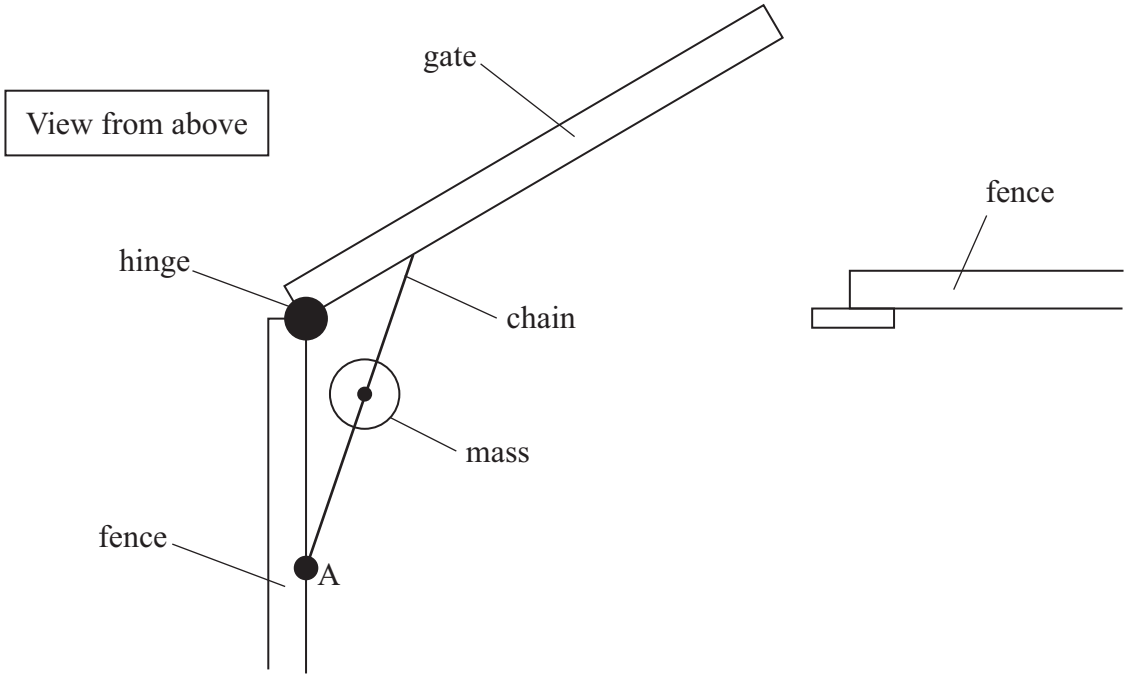
T = ...

(b) The gate is attached to the fence with a hinge. The gate is open, as shown.



The chain connects to the fence at point A.

The chain supports the hanging mass.

A walker suggests the following.

"The gate will close more quickly if the mass is larger, or if point A is moved away from the hinge."

Assess the suggestion made by the walker.

(3)

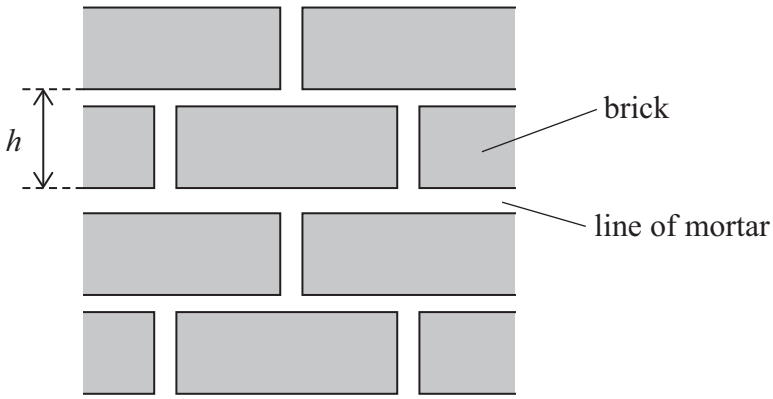
(Total for Question 9 = 5 marks)

10 Two groups of students were challenged to find a value for the acceleration of freefall, g. Each group released a ball from rest out of a window.

(a) The students determined the drop height by counting the number of bricks from the point of release to the ground. They used a metre rule to measure the height h of a brick plus a line of mortar, as shown.

The drop height was calculated using

drop height = $h \times$ number of bricks



Explain how the students' method to determine the drop height could be modified to reduce the percentage uncertainty.

(2)

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(b) Each group measured the time t taken for the ball to fall to the ground.

The groups recorded the following results and calculated a value for g.

	t / s				t_{mean} / s
Group A	1.02	1.11	0.98	0.92	1.01
Group B	1.05	1.03	1.11	0.98	1.04

drop height = 4.950 m

Group B claimed that their results were both more accurate and more precise than Group A's results.

Assess the claim made by Group B.

Your answer should include calculations.

(4)

(c) In one drop, the ball had a kinetic energy of 6.8 J just before it hit the ground.

Calculate the average resistive force acting on the ball as it fell.

drop height = 4.950 m
mass of ball = 150 g

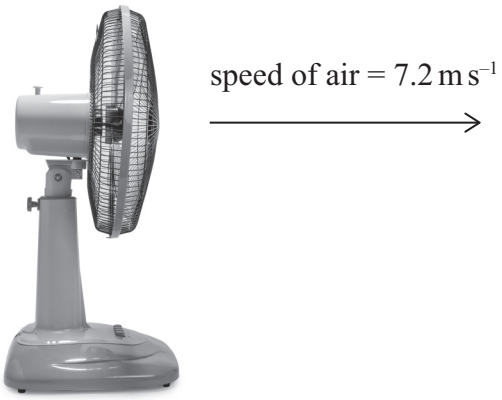
(3)

Average resistive force = ...

(Total for Question 10 = 9 marks)

11 A fan contains an electric motor which rotates the blades of the fan.

(a) When the fan is operating on full power, air passes through the blades at a rate of $1.3\,kg\,s^{-1}$ and leaves the blades at a speed of $7.2\,m\,s^{-1}$, as shown.



(Source: © MERCURY studio/Shutterstock)

(i) Calculate the efficiency of the fan.

potential difference across the motor = 230 V
current in the motor = 0.67 A

(4)

Efficiency = ...

(ii) The fan motor is not 100% efficient.

State **two** reasons why there is an increase in the thermal energy of the fan motor.

(2)

(b) The fan was moved so that it was pointing upwards and then switched on.
A table tennis ball was placed in the air flow from the fan.

The table tennis ball remained in a fixed position above the fan, as shown.

(Source: © MERCURY studio/Shutterstock)

Explain why the table tennis ball remained in a fixed position above the fan.

(3)

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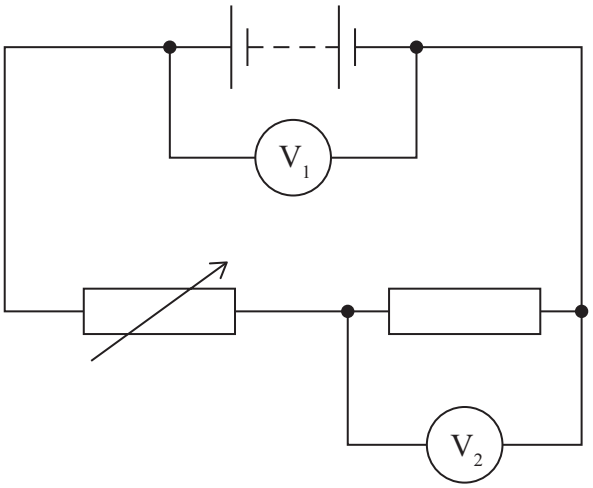
(Total for Question 11 = 9 marks)

12 A battery with internal resistance is connected in series with a variable resistor and a fixed resistor.

Voltmeter V_1 is connected across the battery and voltmeter V_2 is connected across the fixed resistor, as shown.

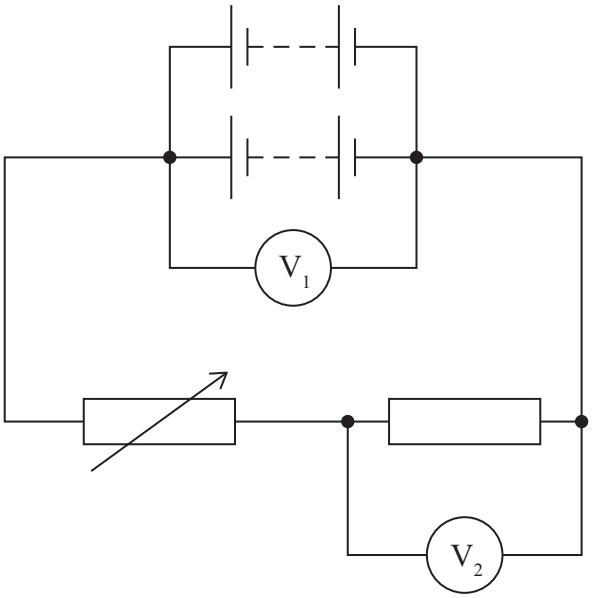


(a) The resistance of the variable resistor is decreased. Both voltmeter readings change.

Explain the change in the readings of V_1 and V_2.

(4)

(b) A student connects another battery with the same e.m.f. and internal resistance in parallel with the first battery, as shown.



Explain how the reading on V_1 changes when the second battery is added to the circuit.

(4)

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(Total for Question 12 = 8 marks)

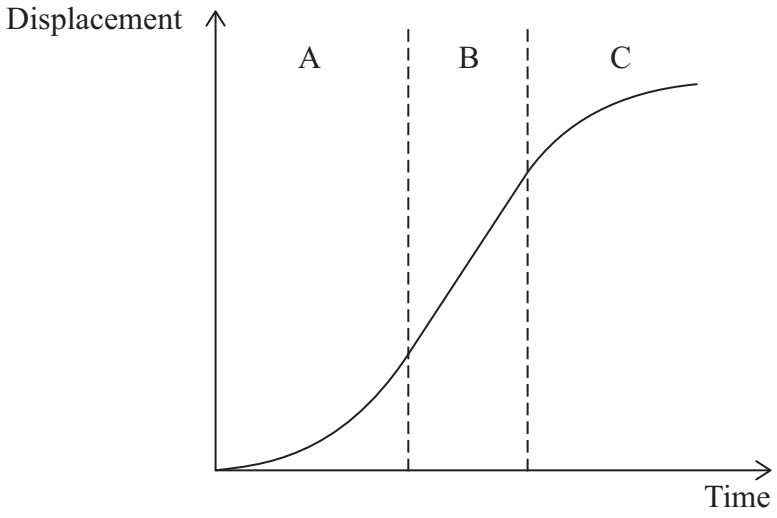
***13** A lorry travelled along a straight horizontal road, as shown.

(Source: © Mechanik/Shutterstock)

The diagram shows the horizontal forces acting on the lorry.

driving force ⟵●⟶ resistive force

A displacement-time graph for the lorry as it travelled along the road is shown.



Explain how the magnitude of the driving force compared with the magnitude of the resistive force acting on the lorry.

Your answer should make reference to sections A, B and C on the graph.

(Total for Question 13 = 6 marks)

14 Two football players are playing in a football match.

(a) Player X running at a speed of $5.2\,m\,s^{-1}$ collides with Player Y who is stationary.

Immediately after the collision the two players move off together.

Calculate the speed of the two players after the collision.

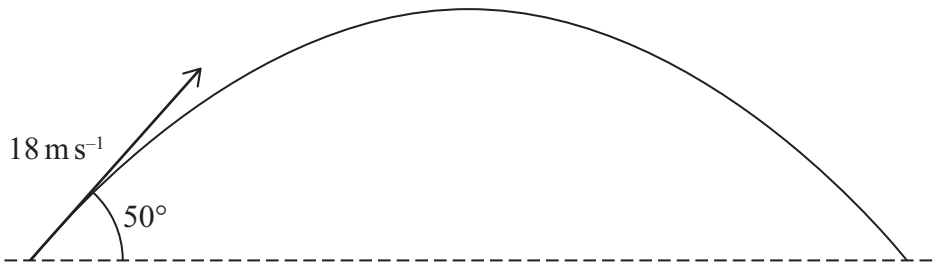
mass of Player X = 59 kg
mass of Player Y = 63 kg

(3)

Speed after the collision = ...

(b) Later in the match, Player X kicks the ball to Player Y who is running along the football pitch.

The ball has an initial velocity of $18\,m\,s^{-1}$ at an angle of 50° to the horizontal, as shown.

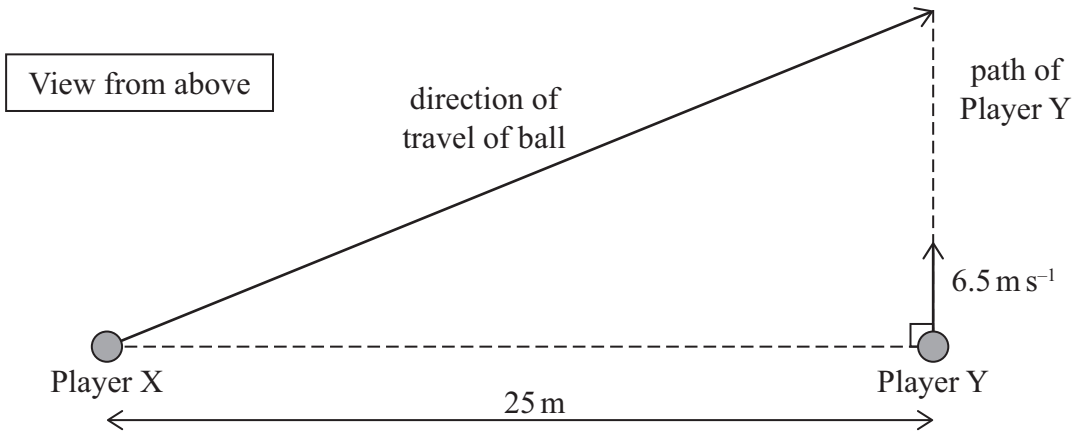


(i) Show that the ball is in the air for a time of about 2.8 s.

(3)

(ii) Player X kicks the ball to land in the path of Player Y who is running along the pitch at a speed of $6.5\,m\,s^{-1}$.

The two football players are 25 m apart when the ball is kicked, as shown.



Deduce whether the ball lands at the feet of Player Y.

(5)

(Total for Question 14 = 11 marks)

TOTAL FOR SECTION A = 56 MARKS

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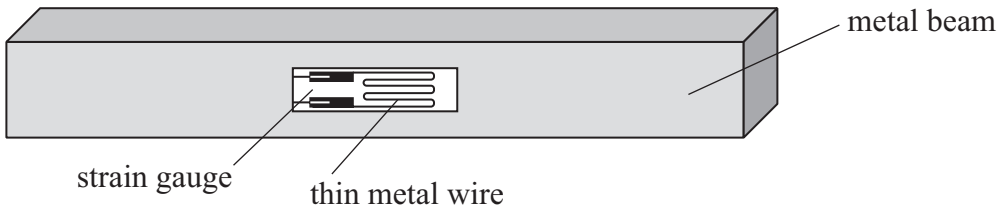
SECTION B

Answer ALL questions in the spaces provided.

15 A strain gauge contains a length of very thin metal wire. The strain gauge can be glued to a metal beam. When the beam is stretched, the wire in the strain gauge extends and the resistance of the wire increases.



(a) A strain gauge made of constantan wire has a resistance of 120 Ω.

Calculate the length of wire in the strain gauge.

resistivity of constantan wire = 4.9×10^{-7} Ω m
diameter of the constantan wire = 0.028 mm

(2)

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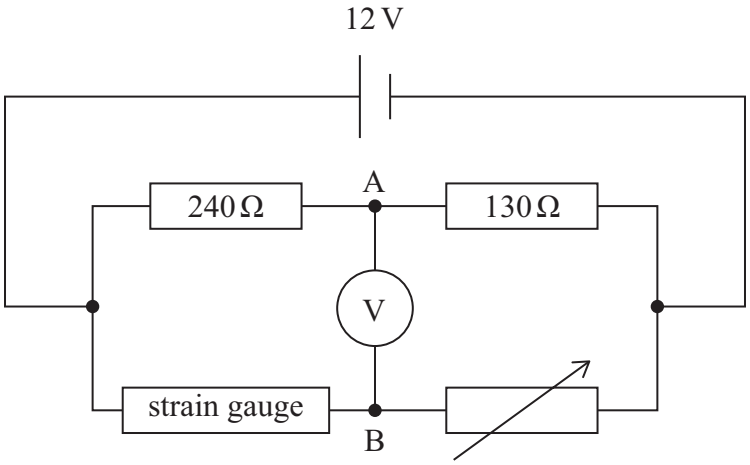
Length = ...

(b) The strain gauge is attached to a beam and a force is applied to stretch the beam. The strain gauge is connected into the circuit in the diagram below.

A voltmeter is connected between points A and B.



(i) When the resistance of the variable resistor is 80 Ω, the reading on the voltmeter is 0 V.

Determine the resistance of the strain gauge.

(3)

Resistance = ...

(ii) The force is removed from the beam and the resistance of the strain gauge decreases.

Explain why the voltmeter reading changes.

(3)

(iii) An engineer used the same circuit to investigate stretching two beams, P and Q, of identical dimensions. He attached the strain gauge to P and adjusted the variable resistor until the reading on the voltmeter was 0 V.

A tension force was applied and the voltmeter reading V_P was recorded.

He then attached the strain gauge to Q, which was made from a material with a smaller Young modulus.

He applied the same tension force to Q and the voltmeter reading V_Q was recorded.

Deduce how V_Q differs from V_P.

(3)

(Total for Question 15 = 11 marks)

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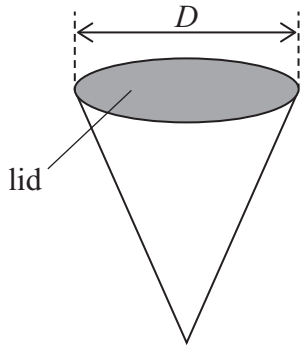
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

16 A student investigated the motion of a hollow cone as it fell through a fluid. A lid prevented fluid from entering the cone.

The student measured the diameter D of the lid, as shown.



(a) She measured D using a metre rule. The value of D was 25 mm.

Describe how D could be measured more accurately.

(2)

(b) The cone was released in the fluid and reached a constant velocity v.
A resistive force F acted on the cone as it fell through the fluid.

The following equation applies

$$F = 0.5\rho v^2 CA$$

where
C = constant for the cone
A = area of the lid of the cone
ρ = density of the fluid

(i) Show how the following equation is derived for the falling cone

$$m = \frac{\pi\rho v^2 D^2 C}{8g}$$

where m is the mass of the cone and the lid.

Assume that the upthrust acting on the cone is negligible.

(3)

(ii) The student placed ball bearings in the cone to vary m and measured corresponding values of v.

The results are recorded in the table.

m / kg	v / m s^{-1}	
0.071	1.50	
0.093	1.73	
0.122	1.97	
0.157	2.24	
0.173	2.35	

Plot a graph of m on the y-axis and v^2 on the x-axis on the grid opposite.

Use the additional column in the table for your processed data.

(5)

(iii) The equation shown can be used to calculate C.

$$m = \frac{\pi \rho v^2 D^2 C}{8g}$$

Calculate C for the cone used in this experiment. C has no unit.

$D = 2.55 \times 10^{-2}$ m
$\rho = 1000$ kg m^{-3}

(3)

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$C =$ .....

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(Total for Question 16 = 13 marks)

TOTAL FOR SECTION B = 24 MARKS
TOTAL FOR PAPER = 80 MARKS

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Pearson Edexcel Level 3 GCE

Wednesday 13 May 2026

Morning (Time: 1 hour 30 minutes)

Paper reference **8PH0/01**

Physics

Advanced Subsidiary

PAPER 1: Core Physics I

Data, Formulae and Relationships Booklet
Do not return this Booklet with the question paper.

Turn over ▶

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Pearson

List of data, formulae and relationships

Acceleration of free fall	$g = 9.81\ \text{m s}^{-2}$	(close to Earth's surface)
Electron charge	$e = -1.60 \times 10^{-19}\ \text{C}$	
Electron mass	$m_e = 9.11 \times 10^{-31}\ \text{kg}$	
Electronvolt	$1\ \text{eV} = 1.60 \times 10^{-19}\ \text{J}$	
Gravitational field strength	$g = 9.81\ \text{N kg}^{-1}$	(close to Earth's surface)
Planck constant	$h = 6.63 \times 10^{-34}\ \text{J s}$	
Speed of light in a vacuum	$c = 3.00 \times 10^{8}\ \text{m s}^{-1}$	

Mechanics

Kinematic equations of motion

$$s = \frac{(u + v)t}{2}$$

$$v = u + at$$

$$s = ut + \tfrac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

Forces

$$\Sigma F = ma$$

$$g = \frac{F}{m}$$

$$W = mg$$

moment of force $= Fx$

Momentum

$$p = mv$$

Work, energy and power

$$\Delta W = F\Delta s$$

$$E_k = \tfrac{1}{2}mv^2$$

$$\Delta E_{grav} = mg\Delta h$$

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

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

$$\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy input}}$$

$$\text{efficiency} = \frac{\text{useful power output}}{\text{total power input}}$$

Electricity

Potential difference

$$V = \frac{W}{Q}$$

Resistance

$$R = \frac{V}{I}$$

Electrical power and energy

$$P = VI$$

$$P = I^2R$$

$$P = \frac{V^2}{R}$$

$$W = VIt$$

Resistivity

$$R = \frac{\rho l}{A}$$

Current

$$I = \frac{\Delta Q}{\Delta t}$$

$$I = nqvA$$

Materials

Density

$$\rho = \frac{m}{V}$$

Stokes' law

$$F = 6\pi\eta r v$$

Hooke's law

$$\Delta F = k\Delta x$$

Young modulus

$$\text{Stress } \sigma = \frac{F}{A}$$

$$\text{Strain } \varepsilon = \frac{\Delta x}{x}$$

$$E = \frac{\sigma}{\varepsilon}$$

Elastic strain energy

$$\Delta E_{el} = \tfrac{1}{2} F \Delta x$$

Waves and particle nature of light

Wave speed

$$v = f\lambda$$

Speed of a transverse wave on a string

$$v = \sqrt{\frac{T}{\mu}}$$

Intensity of radiation

$$I = \frac{P}{A}$$

Power of a lens

$$P = \frac{1}{f}$$

$$P = P_1 + P_2 + P_3 + \ldots$$

Thin lens equation

$$\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

Magnification for a lens

$$m = \frac{\text{image height}}{\text{object height}} = \frac{v}{u}$$

Diffraction grating

$$n\lambda = d \sin\theta$$

Refractive index

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$

$$n = \frac{c}{v}$$

Critical angle

$$\sin C = \frac{1}{n}$$

Photon model

$$E = hf$$

Einstein's photoelectric equation

$$hf = \phi + \tfrac{1}{2} m v_{max}^2$$

de Broglie wavelength

$$\lambda = \frac{h}{p}$$

END OF DATA, FORMULAE AND RELATIONSHIPS LIST

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