Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel International GCSE (9–1)

Thursday 13 November 2025

Morning (Time: 1 hour 40 minutes) | Paper reference **4WPH1/1P**

Physics (Modular)

UNIT 1: 4WPH1
PAPER: 1P

You must have:
Ruler, calculator, Equation 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.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- Show all the steps in the calculations and state the units where required.

Information

- The total mark for this paper is 90.
- 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 ▶

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FORMULAE

You may find the following formulae useful.

$$\text{average speed} = \frac{\text{distance moved}}{\text{time taken}}$$

$$\text{acceleration} = \frac{\text{change in velocity}}{\text{time}} \qquad a = \frac{(v - u)}{t}$$

$$(\text{final speed})^2 = (\text{initial speed})^2 + (2 \times \text{acceleration} \times \text{distance moved})$$

$$v^2 = u^2 + (2 \times a \times s)$$

Force = mass × acceleration $\quad F = m \times a$

weight = mass × gravitational field strength $\quad W = m \times g$

momentum = mass × velocity $\quad p = m \times v$

$$\text{force} = \frac{\text{change in momentum}}{\text{time taken}} \qquad F = \frac{(mv - mu)}{t}$$

moment = force × perpendicular distance from the pivot

power = current × voltage $\quad P = I \times V$

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

voltage = current × resistance $\quad V = I \times R$

charge = current × time $\quad Q = I \times t$

energy transferred = charge × voltage $\quad E = Q \times V$

$$\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy output}} \times 100\%$$

work done = force × distance moved $\quad W = F \times d$

gravitational potential energy = mass × gravitational field strength × height

$$GPE = m \times g \times h$$

kinetic energy = ½ × mass × speed^2 $\quad KE = \frac{1}{2} \times m \times v^2$

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

$$\text{density} = \frac{\text{mass}}{\text{volume}} \qquad \rho = \frac{m}{V}$$

$$\text{pressure} = \frac{\text{force}}{\text{area}} \qquad p = \frac{F}{A}$$

pressure difference = height × density × gravitational field strength

$$p = h \times \rho \times g$$

change in thermal energy = mass × specific heat capacity × change in temperature

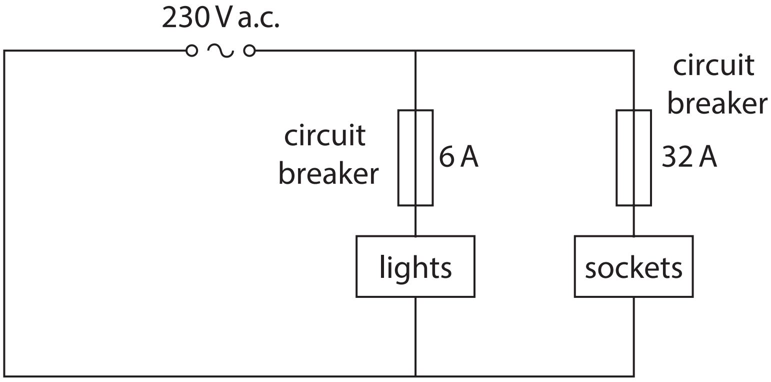
$$\Delta Q = m \times c \times \Delta T$$

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

Answer ALL questions.

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 This is a simplified diagram of the electrical wiring in a house.



(a) A current larger than 32 A flows in the sockets.

Describe how having the circuit breaker in series with the sockets protects the house.

(2)

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(b) A student suggests that fuses could be used instead of the circuit breakers.

Give two **disadvantages** of using fuses instead of circuit breakers.

(2)

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P 8 1 5 6 2 R A 0 4 2 8

(c) Explain why the wiring in the house includes an earth wire.

(2)

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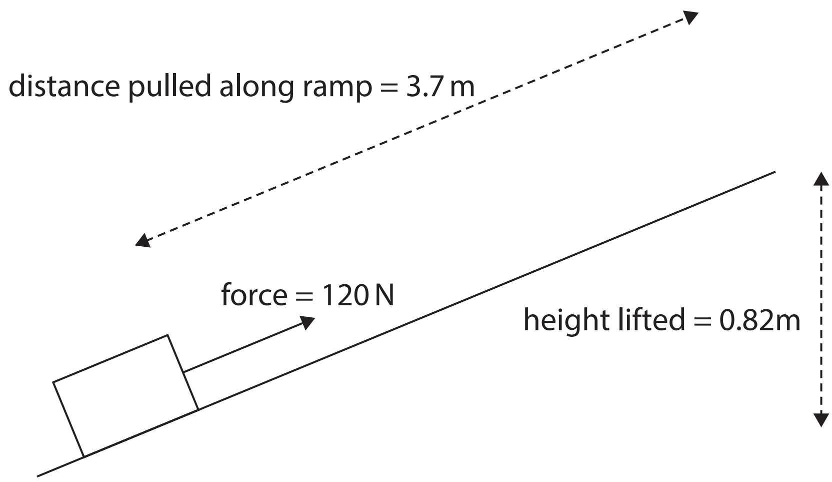
(Total for Question 1 = 6 marks)

2 The diagram shows a force pulling a block up a ramp.



(a) Show that the work done by the force is about 440 J.

Use the formula

work done = force × distance moved

(2)

(b) The block gains 12 J of energy in its gravitational store when it is lifted through a height of 0.82 m.

Calculate the mass of the block.

(2)

mass = ... kg

(c) A student states that most of the input energy is destroyed when the block is pulled up the ramp.

Comment on the student's statement.

(2)

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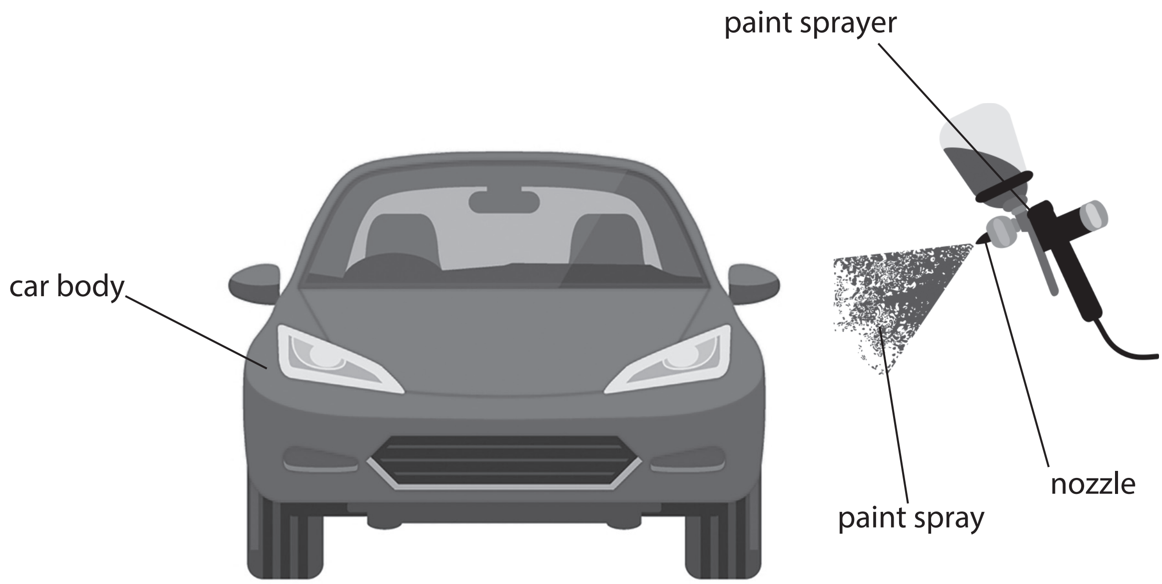
(Total for Question 2 = 6 marks)

3 The diagram shows an electrostatic paint sprayer used to paint a car body.



(Source: © incrediblephoto/Shutterstock)
(Source: © PaOlaLa/Shutterstock)

(a) The paint spray leaving the nozzle consists of droplets of paint with a positive charge.

The nozzle is positively charged.

Explain the advantage of using a charged nozzle.

(3)

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(b) The car body is made of metal.

Explain why the painting process will be less effective if the car body is **not** continuously discharged.

(3)

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(c) During spraying, there is a current of 250 mA in the paint sprayer.

(i) State the device used to measure current.

(1)

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(ii) Calculate the charge that flows through the paint sprayer in a time of 320 s.

(3)

charge = ... C

(Total for Question 3 = 10 marks)

4 A farm has a water heater that uses oil.

(a) Oil is a non-renewable resource.

Which of these is also a non-renewable resource?

(1)

- ☒ **A** coal
- ☒ **B** geothermal
- ☒ **C** solar
- ☒ **D** tidal

(b) The farm also uses wind turbines to generate electricity.

Discuss the advantages and disadvantages of using oil and wind as energy resources.

(4)

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(c) The farm heater transfers 19 MJ of energy to some water.

The water has a mass of 120 kg.

The water must have a temperature of 55 °C as it leaves the heater.

(i) Calculate the temperature of the water before it enters the heater.

Give your answer to 2 significant figures.

[for water, specific heat capacity = 4200 J/kg °C]

(5)

temperature = ... °C

(ii) In winter, the temperature of the water entering the heater is much lower than the temperature calculated in 4(c)(i).

Explain why the heater must have a higher power output in winter.

(2)

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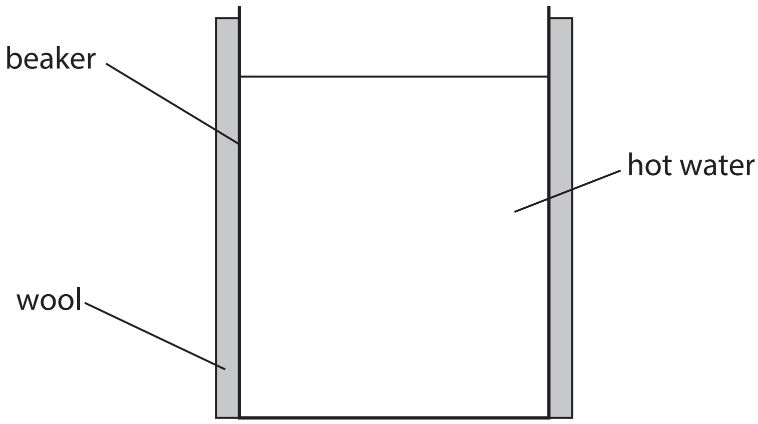
(Total for Question 4 = 12 marks)

5 The diagram shows a beaker of hot water wrapped in wool.

Wool is a material which has air trapped inside it.



A student investigates how the thickness of the wool affects the cooling of the hot water.

In the investigation, the student measures the final temperature of the water after a set time.

(a) Describe a method the student could use for this investigation.

You should include

- extra equipment needed
- ways to make sure the results are accurate
- variables that should be controlled

(6)

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

Thickness of wool in mm	Final temperature of water in °C
0.0	42
1.0	52
2.0	66
3.0	65
4.0	67
5.0	68

(i) Plot the student's results on the grid.

Start your y-axis scale at 40 °C.

(3)

(ii) Draw a circle around the anomalous result.

(1)

(iii) Draw a curve of best fit.

(1)

(iv) Estimate the final temperature of the water for wool with a thickness of 10 mm.

(1)

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(c) Explain how the wool reduces the rate of energy transfer from the water to the surroundings.

(4)

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(Total for Question 5 = 16 marks)

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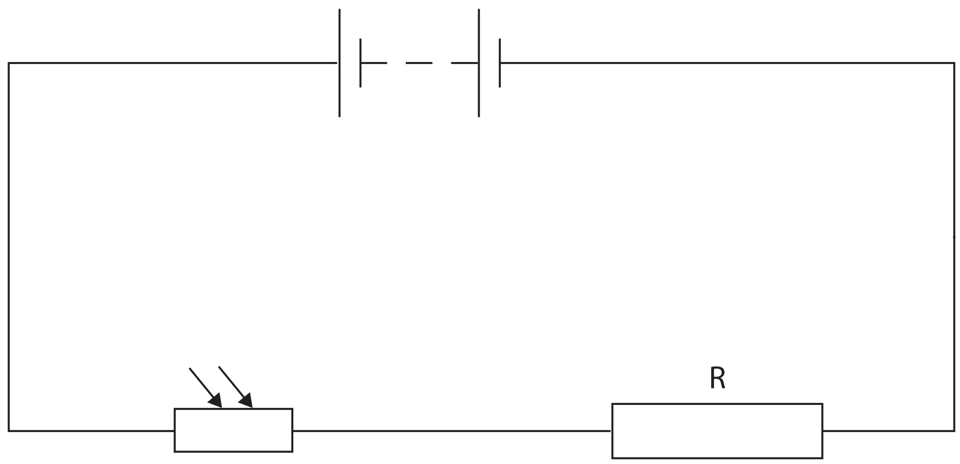
6 The diagram shows an electric circuit used to determine the brightness of the light in a room.



(a) Add a voltmeter to the diagram to measure the voltage of resistor R.

(2)

(b) (i) State the formula linking voltage, current and resistance.

(1)

(ii) The voltage across resistor R is 1.9 V.

The resistance of resistor R is 800 Ω.

Calculate the current in the circuit.

Give your answer in milliamps, mA.

(3)

current = ... mA

(c) Explain why the voltage across the light dependent resistor (LDR) decreases if the brightness of the light in the room increases.

(4)

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(d) Another resistor is connected in parallel with resistor R. The new resistor has a higher resistance than resistor R.

Explain what happens to the current in the LDR in the circuit diagram.

Assume that the brightness of the light in the room remains constant.

(2)

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(Total for Question 6 = 12 marks)

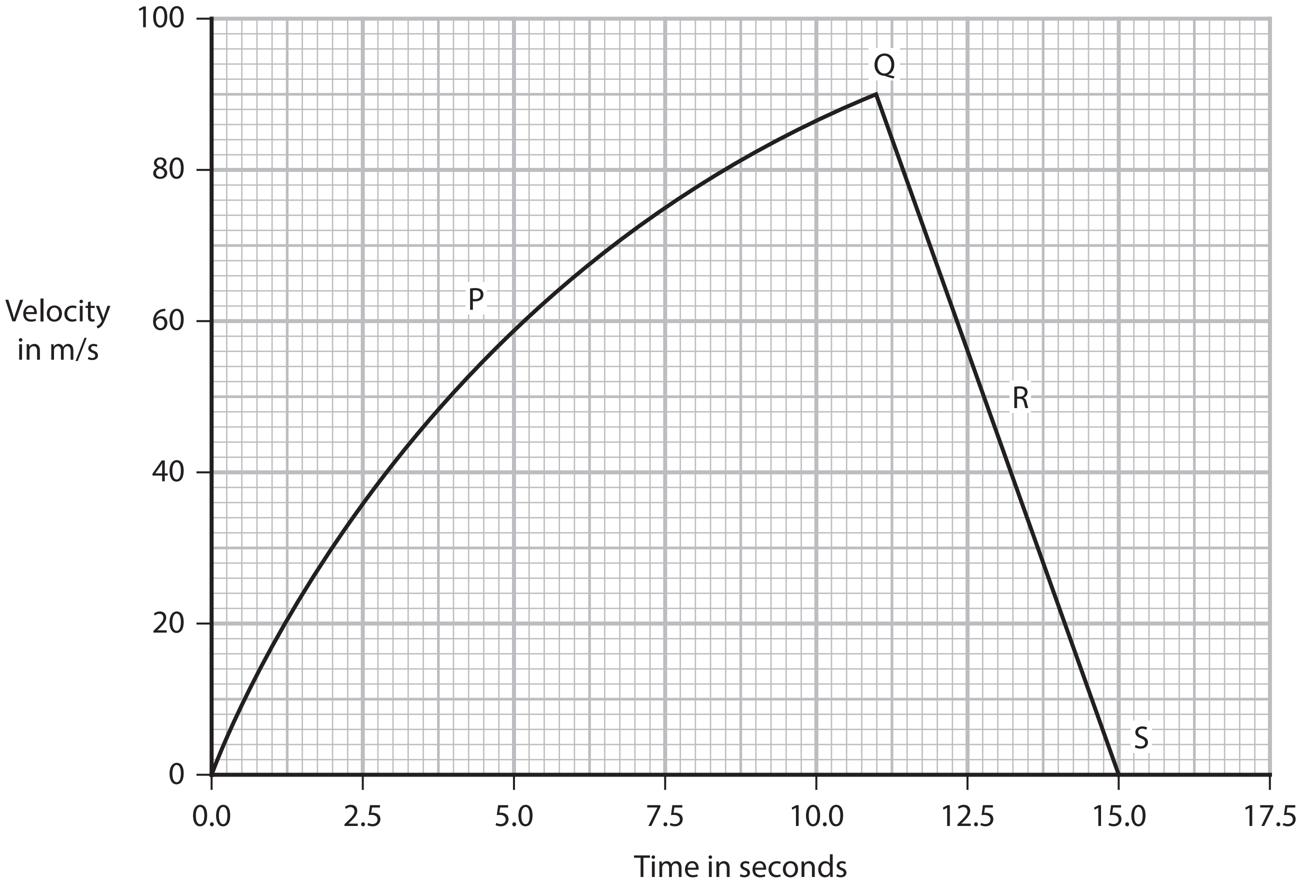
7 The photograph shows a car being driven along a straight race track.

(Source: © Shayne T Wright/Shutterstock)

The car starts from rest and accelerates along the straight race track.

After crossing the finish line, the driver applies the brakes to bring the car to rest.

The graph shows how the velocity of the car changes with time after the car starts to accelerate.



(a) What feature of the graph gives the magnitude of the acceleration of the car?

(1)

☒ **A** area between line and time axis

☒ **B** axes labels

☒ **C** curved section of the line

☒ **D** gradient of the line

(b) At which point on the graph does the driver of the car first apply the brakes?

(1)

- ☒ **A** P
- ☒ **B** Q
- ☒ **C** R
- ☒ **D** S

(c) Explain why the graph is a curve for the first 11.0 seconds.

(2)

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(d) Calculate the distance travelled by the car from 11.0 seconds to 15.0 seconds.

(3)

distance = ... m

(Total for Question 7 = 7 marks)

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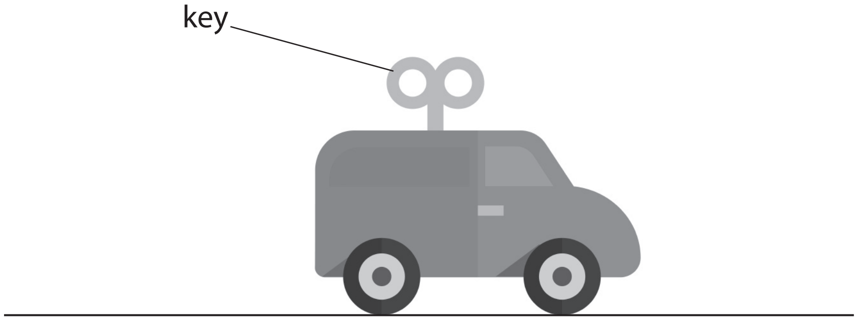
8 The diagram shows a toy car on a straight horizontal track.



(Source: © RedlineVector/Shutterstock)

When the key is turned, a spring inside the car compresses.

When the spring is released the car moves as energy is transferred from the spring to the car.

(a) Which energy store of the car **decreases** as the car moves?

(1)

- ☒ **A** elastic
- ☒ **B** gravitational
- ☒ **C** magnetic
- ☒ **D** thermal

(b) The resultant force on the car is 0.32 N and the mass of the car is 0.068 kg.

(i) Calculate the acceleration of the car.

(3)

acceleration = ... m/s^2

(ii) The frictional force on the car is 0.13 N.

Which of these is the forward force on the car due to the spring?

(1)

☒ **A** 0.13 N

☒ **B** 0.19 N

☒ **C** 0.32 N

☒ **D** 0.45 N

(iii) The speed of the car increases from 1.1 m/s to 2.6 m/s.

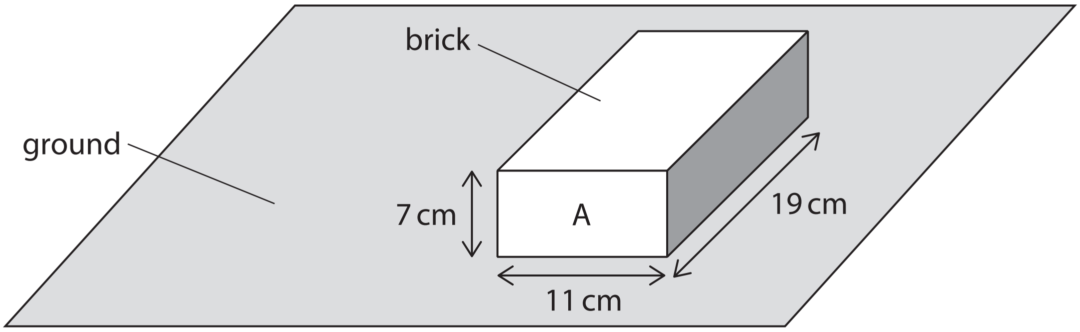
Calculate the kinetic energy gained by the car.

(3)

kinetic energy gained = ... J

(Total for Question 8 = 8 marks)

9 The diagram shows a brick placed on the ground.



(a) The brick exerts a pressure of 1.2 kPa on the ground.

Calculate the weight of the brick.

(3)

weight = ... N

(b) The brick is turned so that surface A is in contact with the ground.

Explain how this affects the pressure exerted by the brick on the ground.

(2)

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(Total for Question 9 = 5 marks)

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10 A child runs along a horizontal track.

(a) Describe a method to find the average speed of the child.

Include the measurements and apparatus required.

(3)

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(b) The child has a mass of 41 kg.

At the end of the track, the child has a speed of 5.6 m/s.

Calculate the momentum of the child at the end of the track.

(2)

momentum = ... kg m/s

(c) At the end of the track, the child jumps and lands on a mat.

The mat is thick and filled with soft material.

Explain why the mat reduces the risk of injury to the child.

(3)

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(Total for Question 10 = 8 marks)

TOTAL FOR PAPER = 90 MARKS

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Pearson Edexcel International GCSE (9–1)

Thursday 13 November 2025

Morning (Time: 1 hour 40 minutes)

Paper reference **4WPH1/1P**

Physics (Modular)

UNIT 1: 4WPH1

PAPER: 1P

Equation Booklet

Do not return this Booklet with the question paper.

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P 8 1 5 6 2 R A

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These equations may be required for both International GCSE Physics (4WPH1) and International GCSE Double Award (4WSD5) papers.

1. Forces and Motion	
average speed = $\dfrac{\text{distance moved}}{\text{time taken}}$	
acceleration = $\dfrac{\text{change in velocity}}{\text{time taken}}$	$a = \dfrac{(v-u)}{t}$
(final speed)^2 = (initial speed)^2 + (2 × acceleration × distance moved)	$v^2 = u^2 + (2 \times a \times s)$
force = mass × acceleration	$F = m \times a$
weight = mass × gravitational field strength	$W = m \times g$
2. Electricity	
power = current × voltage	$P = I \times V$
energy transferred = current × voltage × time	$E = I \times V \times t$
voltage = current × resistance	$V = I \times R$
charge = current × time	$Q = I \times t$
energy transferred = charge × voltage	$E = Q \times V$
3. Waves	
wave speed = frequency × wavelength	$v = f \times \lambda$
frequency = $\dfrac{1}{\text{time period}}$	$f = \dfrac{1}{T}$
refractive index = $\dfrac{\sin(\text{angle of incidence})}{\sin(\text{angle of refraction})}$	$n = \dfrac{\sin i}{\sin r}$
sin (critical angle) = $\dfrac{1}{\text{refractive index}}$	$\sin c = \dfrac{1}{n}$

4. Energy resources and energy transfers	
efficiency = $\dfrac{\text{useful energy output}}{\text{total energy output}} \times 100\%$	
work done = force × distance moved	$W = F \times d$
gravitational potential energy = mass × gravitational field strength × height	$GPE = m \times g \times h$
kinetic energy = $\frac{1}{2}$ × mass × speed^2	$KE = \frac{1}{2} \times m \times v^2$
power = $\dfrac{\text{work done}}{\text{time taken}}$	$P = \dfrac{W}{t}$
5. Solids, liquids and gases	
density = $\dfrac{\text{mass}}{\text{volume}}$	$\rho = \dfrac{m}{V}$
pressure = $\dfrac{\text{force}}{\text{area}}$	$p = \dfrac{F}{A}$
pressure difference = height × density × gravitational field strength	$p = h \times \rho \times g$
$\dfrac{\text{pressure}}{\text{temperature}}$ = constant	$\dfrac{p_1}{T_1} = \dfrac{p_2}{T_2}$
pressure × volume = constant	$p_1 \times V_1 = p_2 \times V_2$
8. Astrophysics	
orbital speed = $\dfrac{2 \times \pi \times \text{orbital radius}}{\text{time period}}$	$v = \dfrac{2 \times \pi \times r}{T}$

The equations on the following page will only be required for International GCSE Physics.

These additional equations may be required in International GCSE Physics papers 2P and 2PR.

1. Forces and Motion	
momentum = mass × velocity	$p = m \times v$
force = $\dfrac{\text{change in momentum}}{\text{time taken}}$	$F = \dfrac{(mv - mu)}{t}$
moment = force × perpendicular distance from the pivot	
5. Solids, liquids and gases	
change in thermal energy = mass × specific heat capacity × change in temperature	$\Delta Q = m \times c \times \Delta T$
6. Magnetism and electromagnetism	
relationship between input and output voltages for a transformer	$\dfrac{\text{input (primary) voltage}}{\text{output (secondary) voltage}} = \dfrac{\text{primary turns}}{\text{secondary turns}}$
input power = output power	$V_\text{p} I_\text{p} = V_\text{s} I_\text{s}$ for 100% efficiency
8. Astrophysics	
$\dfrac{\text{change in wavelength}}{\text{reference wavelength}} = \dfrac{\text{velocity of a galaxy}}{\text{speed of light}}$	$\dfrac{\lambda - \lambda_0}{\lambda_0} = \dfrac{\Delta\lambda}{\lambda_0} = \dfrac{v}{c}$

END OF EQUATION LIST