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)

## Tuesday 2 June 2026

Morning (Time: 2 hours)

Paper reference **4PH1/1P 4SD0/1P**

# Physics

## UNIT: 4PH1
## Science (Double Award) 4SD0
## PAPER: 1P

**You must have:**
Ruler, calculator, protractor, 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 any calculations and state the units.

### Information

- The total mark for this paper is 110.
- 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.

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

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

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

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

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

(final speed)$^2$ = (initial speed)$^2$ + (2 × acceleration × distance moved)

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

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

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

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** Epsilon Eridani is a star with a similar mass to the Sun.

(a) The box lists the stages in the life cycle of stars.

| | | |
|---|---|---|
| white dwarf | main sequence | red giant |
| supernova | nebula | red supergiant |

The table gives stages in the life cycle of Epsilon Eridani.

Complete the table by giving the correct word or phrase from the box for each stage.

**(4)**

| First stage | Second stage | Third stage | Fourth stage |
|---|---|---|---|
| | | | |

(b) (i) Nuclear fusion is the process that provides energy for stars.

Describe the process of nuclear fusion.

**(2)**

(ii) Explain why nuclear fusion in stars does not happen at low temperatures and pressures.

**(2)**

**(Total for Question 1 = 8 marks)**

**2** Venera 13 was a probe that fell through the atmosphere of the planet Venus and landed on its surface in 1982.

(Source: © DETLEV VAN RAVENSWAAY / SCIENCE PHOTO LIBRARY)

(a) The atmospheric pressure on the surface of Venus is 9 300 000 pascal.

(i) The density of the atmosphere on the surface of Venus is 65 kg/m$^3$.

Estimate the depth of the atmosphere on Venus.

Use the formula

pressure difference = depth × density × gravitational field strength

[for Venus, gravitational field strength = 8.9 N/kg]

**(2)**

depth = ..... m

(ii) State an assumption you have made to complete the calculation.

**(1)**

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(b) The mean temperature on Venus is 453 °C. At this temperature, the atmospheric pressure on the surface of Venus is 9.3 million pascal.

(i) The temperature on the surface of Venus can change.

Calculate the atmospheric pressure on the surface of Venus when the temperature is 482 °C.

**(4)**

pressure = ..... million Pa

(ii) State the assumptions you have made to complete this calculation.

**(2)**

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(c) On the surface of Venus, a gas molecule has a mean kinetic energy of $6.1 \times 10^{-21}$ J.

Calculate the mean speed of the gas molecule.

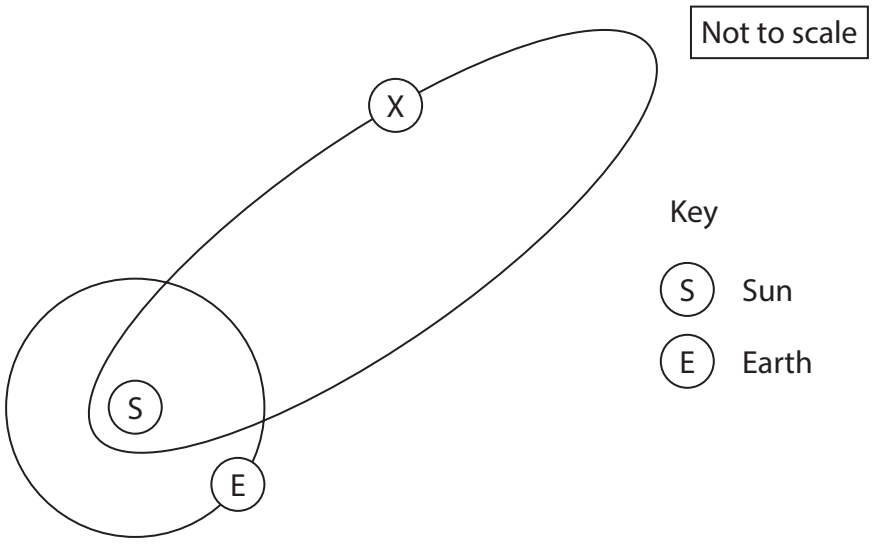
[mass of molecule = $7.3 \times 10^{-26}$ kg]

**(3)**

speed = ..... m/s

**(Total for Question 2 = 12 marks)**

**3** The diagram shows the orbit of the Earth around the Sun, and the orbit of object X.




(a) Object X has a highly elliptical orbit.

(i) Which of these is object X?

**(1)**

- ☒ **A** comet
- ☒ **B** galaxy
- ☒ **C** star
- ☒ **D** universe

(ii) On the diagram, draw an arrow from object X to show the direction of the force responsible for keeping object X in orbit.

**(1)**

(b) The Moon orbits the Earth in 28 days.

The radius of the Moon's orbit is 390 000 km.

Calculate the orbital speed of the Moon.

Give your answer in km/s.

**(3)**

orbital speed = ..... km/s

(c) Suggest why the gravitational field strength on the Moon is different from the gravitational field strength on the Earth.

**(1)**

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**(Total for Question 3 = 6 marks)**

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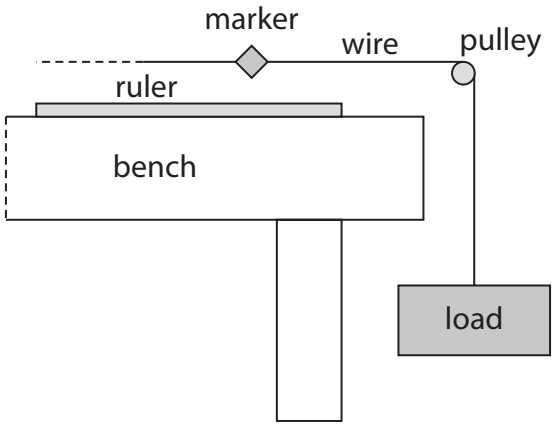
**4** A student investigates how the extension of a metal wire varies with applied force provided by a load.

The diagram shows some of the apparatus the student uses.




(a) Describe a method that a student could use for their investigation.

Refer to safety in your answer.

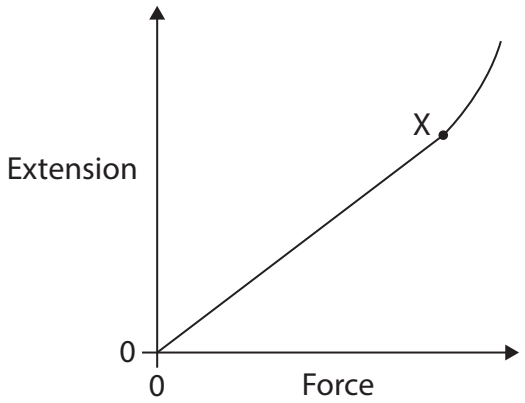
**(5)**

(b) Add one tick (✓) to each row of the table to show the independent, dependent and control variables in this investigation.

**(3)**

| Name of variable | Independent | Dependent | Control |
|---|---|---|---|
| extension | | | |
| material of wire | | | |
| temperature | | | |
| applied force | | | |

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




(i) Describe the relationship shown by the graph.

**(3)**

(ii) Point X on the graph is called the elastic limit.

Explain what will happen to the wire if the applied force is removed before the extension of the wire reaches point X.

**(2)**

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**(Total for Question 4 = 13 marks)**

**5** A street has many street lamps.

(a) Suggest why the street lamps are connected in parallel.

**(1)**

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(b) Diagram 1 shows one street lamp, a person and a puddle of water.

The puddle of water reflects light from the street lamp into the person's eyes.

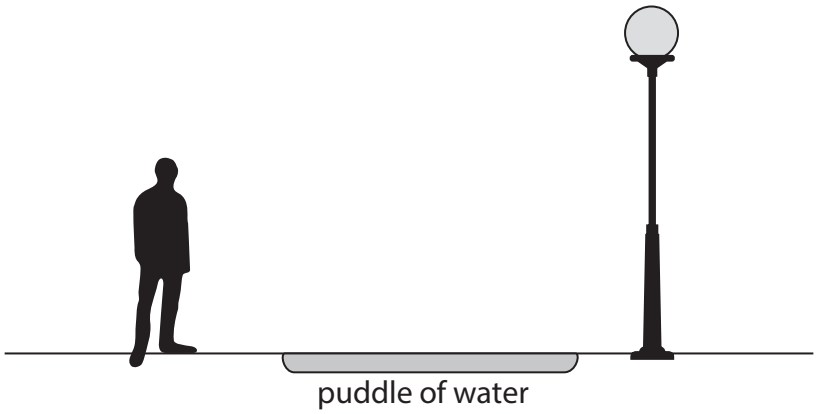


**Diagram 1**

On diagram 1, draw a ray of light from the street lamp that is reflected by the puddle to the person's eyes.

**(3)**

(c) A different ray of light from a street lamp passes through the glass in a window as shown in diagram 2.

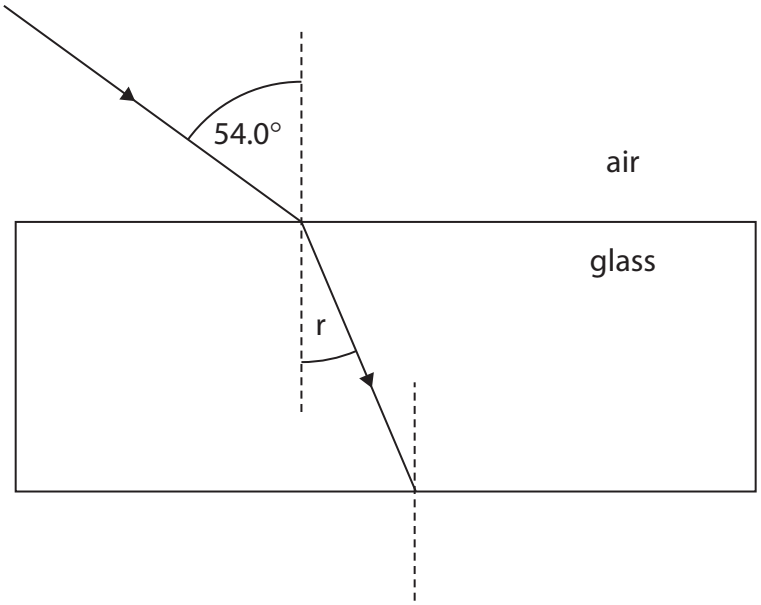


**Diagram 2**

(i) Using diagram 2, determine the angle of refraction, r.

**(1)**

r = ..... degrees

(ii) At the point where the ray of light enters the glass in the window, the angle of incidence is 54.0°.

Calculate the refractive index of the glass in the window.

Give your answer to three significant figures.

**(4)**

refractive index = .....

(iii) On diagram 2, draw a straight line to show the path of the ray of light after it leaves the glass.

**(2)**

(d) Another ray of light enters the glass in the window as shown in diagram 3.

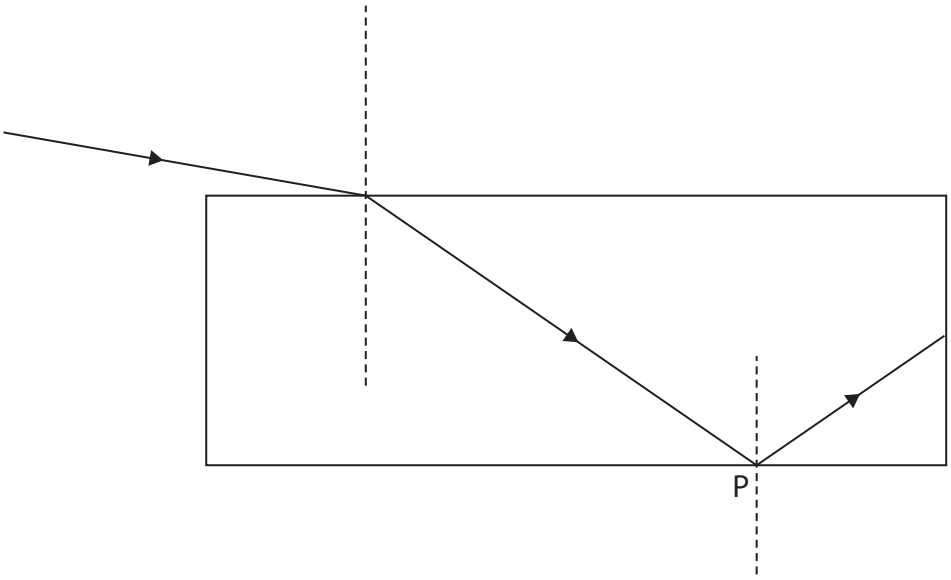


**Diagram 3**

Explain what happens to this ray of light at point P.

**(2)**

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**(Total for Question 5 = 13 marks)**

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**6** The photographs show two different types of oven.

(Source: © goffkein.pro/Shutterstock)

**Microwave oven**

(Source: © Pixel-Shot/Shutterstock)

**Hot electric oven**

(a) Which part of the electromagnetic spectrum is used to heat food in the hot electric oven?

**(1)**

- ☒ **A** gamma
- ☒ **B** infrared
- ☒ **C** ultraviolet
- ☒ **D** radio

(b) (i) Give a property that all electromagnetic waves have in common.

**(1)**

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.....

(ii) The microwave oven uses microwave radiation with a wavelength of 12 cm.

Calculate the frequency of this microwave radiation.

[speed of microwaves = $3.0 \times 10^8$ m/s]

**(3)**

frequency = ..... Hz

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(c) The electromagnetic radiation in the hot electric oven heats the surface of the food.

Explain how the inside of the food increases in temperature.

Refer to a method of heat transfer in your answer.

**(2)**

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**(Total for Question 6 = 7 marks)**

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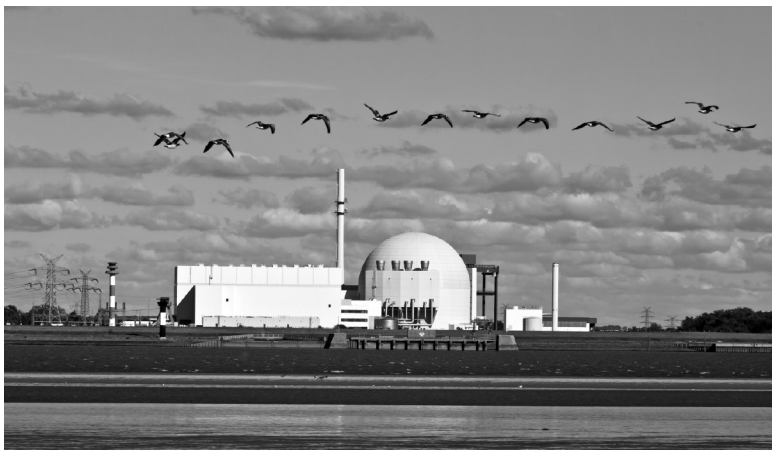
**7** The photograph shows a Thorium Molten Salt Reactor. This type of nuclear reactor uses an isotope of thorium as its primary fuel source.



(Source: © Gabriele Rohde/Shutterstock)

(a) This nuclear equation shows how the isotope thorium-232 is transformed into thorium-233.

$$^{X}_{Y}n + {}^{232}_{90}Th \rightarrow {}^{233}_{90}Th$$

This nuclear equation shows how thorium-233 decays into uranium-233.

$${}^{233}_{90}Th \rightarrow 2^{0}_{Z}\beta + {}^{233}_{92}U$$

Determine the values of X, Y and Z.

**(3)**

X = .....

Y = .....

Z = .....

(b) A uranium-233 nucleus can absorb a neutron and become part of a chain reaction.

Describe how a chain reaction occurs.

**(3)**

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(c) Iodine-129 is a waste product of nuclear fission.

The half-life of iodine-129 is 15.7 million years.

(i) Describe what is meant by the term **half-life**.

**(2)**

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(ii) A sample of iodine-129 has an activity of 72 MBq.

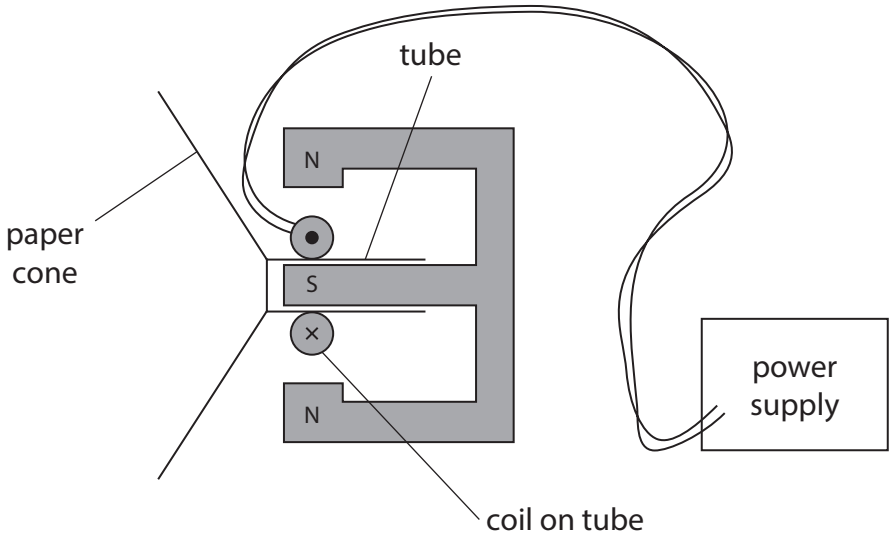
Calculate the time it will take for the activity of this sample to decay to 6.25% of its original activity.

**(4)**

time = ..... million years

**(Total for Question 7 = 12 marks)**

**8** The diagram shows a loudspeaker connected to an alternating current (a.c.) power supply.




(a) (i) State how direct current (d.c.) differs from alternating current (a.c.).

**(1)**

(ii) Explain how the loudspeaker produces sound using the a.c. power supply.

**(3)**

(b) The loudspeaker is disconnected from the power supply.

The wires from the loudspeaker are then connected to a very sensitive ammeter.

When a sound is directed towards the paper cone, the loudspeaker behaves as a microphone.

Explain why there is a reading on the ammeter when a sound is directed towards the paper cone.

**(4)**

**(Total for Question 8 = 8 marks)**

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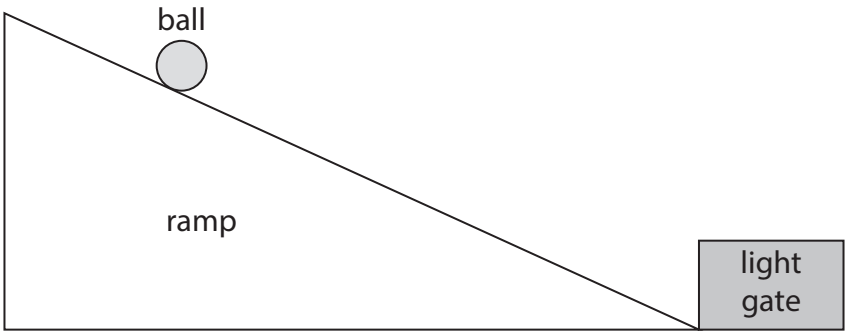
**9** A student releases a ball on a ramp as shown in the diagram.




The ball has an initial speed of 0 m/s.

The student uses a light gate to determine the final speed of the ball.

(a) Table 1 shows the student's results.

| | |
|---|---|
| **Diameter of ball in m** | 0.048 |
| **Time for ball to pass through light gate in s** | 0.028 |

**Table 1**

(i) Using the data from table 1, show that the final speed of the ball is about 2 m/s.

**(2)**

(ii) The ball rolls along the ramp for a distance of 0.63 m.

Calculate the acceleration of the ball.

**(3)**

acceleration = ..... m/s$^2$

(b) The student uses this method to investigate how the distance rolled along the ramp affects the final speed of the ball.

- position the ball on the ramp and release the ball
- measure the distance the ball rolls along the ramp
- use the light gate to determine the final speed of the ball
- determine the (final speed of ball)$^2$

The student repeats the method using different distances along the ramp.

Table 2 shows the student's results.

| Distance rolled along ramp in m | (Final speed of ball)$^2$ in (m/s)$^2$ |
|---|---|
| 0.00 | 0.00 |
| 0.10 | 0.44 |
| 0.20 | 0.86 |
| 0.30 | 1.31 |
| 0.40 | 1.75 |
| 0.50 | 2.19 |

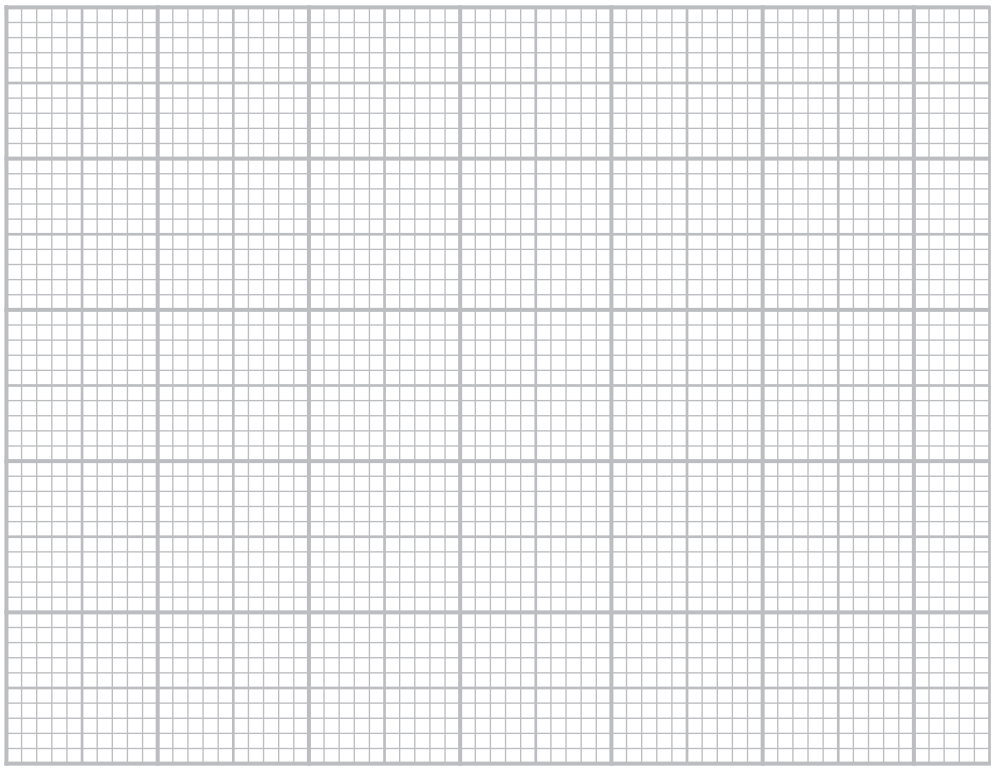
**Table 2**

(i) Plot the data on the grid.

**(3)**

(ii) Draw a line of best fit.

**(1)**



(iii) Determine the gradient of the line of best fit.

**(1)**

gradient = .....

(iv) The student uses the gradient of this graph to find the acceleration due to gravity and obtains a value of 7.6 m/s$^2$.

The accepted value of the acceleration due to gravity is 9.8 m/s$^2$.

Explain one change the student could make to improve the accuracy of their investigation.

**(2)**

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**(Total for Question 9 = 12 marks)**

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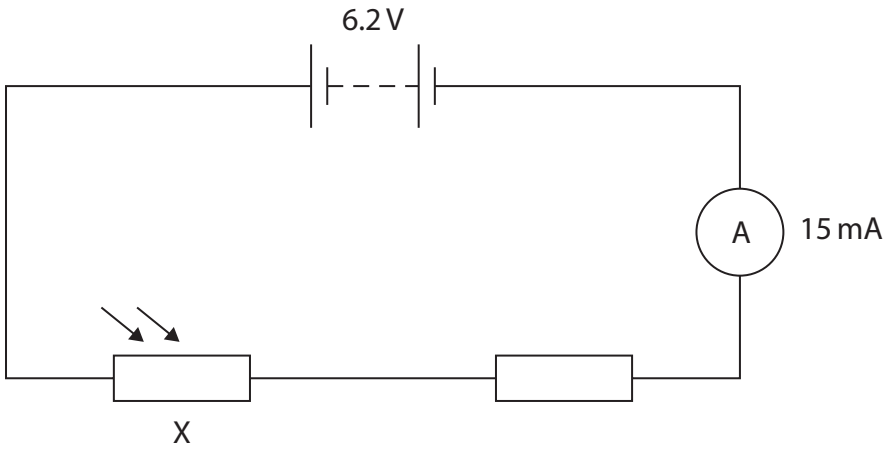
**10** A diagram shows an electric circuit.




(a) (i) Component X changes the current in the circuit if there is a change in the brightness of light.

Give the name of component X.

**(1)**

.....

(ii) On the diagram, draw a voltmeter to measure the voltage of the fixed resistor.

**(2)**

(b) (i) The resistance of component X is 220 ohms.

The battery has a voltage of 6.2 V. The ammeter reading is 15 mA.

Calculate the resistance of the fixed resistor.

**(4)**

resistance = ..... ohms

(ii) Explain how an extra resistor could be used to double the current measured by the ammeter.

You should draw a circuit diagram to support your answer.

**(5)**

**(Total for Question 10 = 12 marks)**

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**11** A vehicle travels at constant speed along a flat road.

(a) The kinetic energy store (KE) of the vehicle is 52 000 J.

The driver applies the brakes.

(i) Which of these is the work done by friction to slow the vehicle down to 0 m/s?

**(1)**

☒ **A** 520 J

☒ **B** 5200 J

☒ **C** 52 000 J

☒ **D** 520 000 J

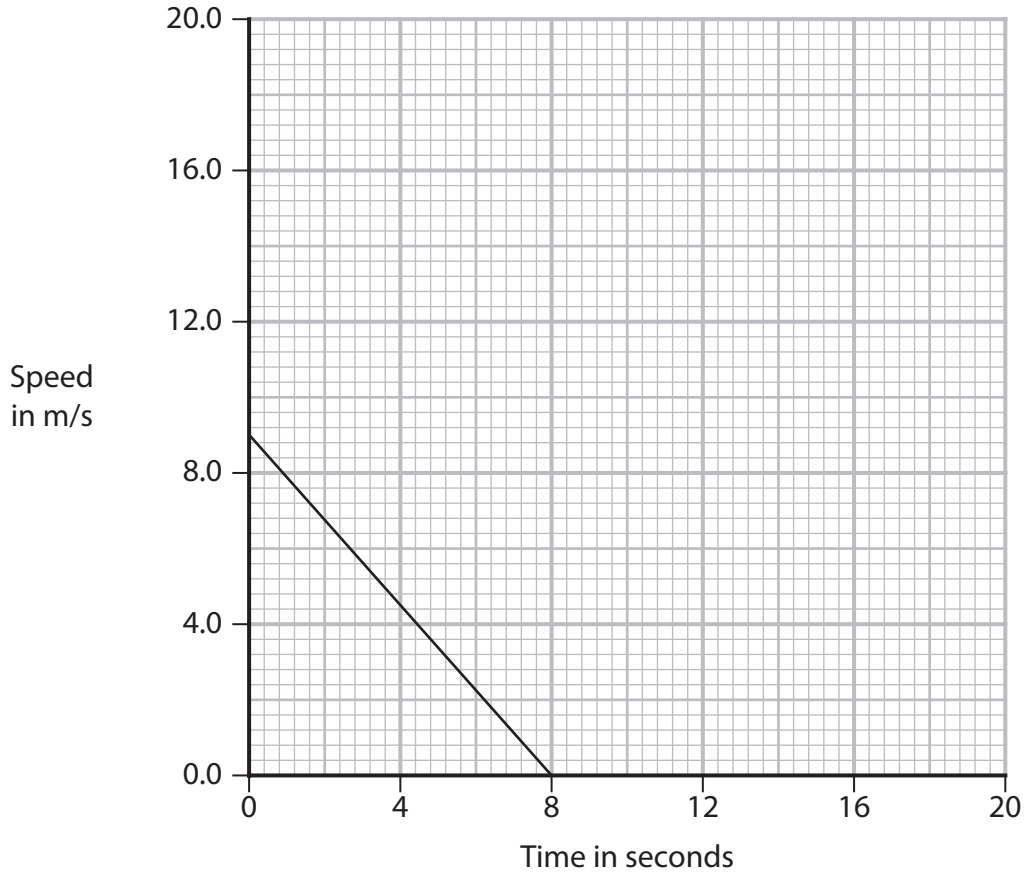
(ii) After the brakes are applied, the braking distance is 36 m.

Calculate the braking force applied to the vehicle.

**(2)**

braking force = ..... N

(b) The graph shows how the speed of the vehicle changes with time when the braking distance is 36 m.




On another journey, the vehicle is travelling at twice the initial speed and decelerates with the same braking force.

Using information from the graph, explain how the new braking distance compares to the original braking distance.

**(4)**

**(Total for Question 11 = 7 marks)**

**TOTAL FOR PAPER = 110 MARKS**

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# Pearson Edexcel International GCSE (9–1)

## Tuesday 2 June 2026

Morning (Time: 2 hours)

Paper reference **4PH1/1P 4SD0/1P**

# Physics

**UNIT: 4PH1**

**Science (Double Award) 4SD0**

**PAPER: 1P**

**Equation Booklet**

**Do not return this Booklet with the question paper.**

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These equations may be required for both International GCSE Physics (4PH1) and International GCSE Combined Science (4SD0) papers.

| **1. Forces and Motion** | |
|---|---|
| average speed = $\frac{\text{distance moved}}{\text{time taken}}$ | |
| acceleration = $\frac{\text{change in velocity}}{\text{time taken}}$ | $a = \frac{(v-u)}{t}$ |
| (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 = $\frac{1}{\text{time period}}$ | $f = \frac{1}{T}$ |
| refractive index = $\frac{\sin(\text{angle of incidence})}{\sin(\text{angle of refraction})}$ | $n = \frac{\sin i}{\sin r}$ |
| $\sin(\text{critical angle}) = \frac{1}{\text{refractive index}}$ | $\sin c = \frac{1}{n}$ |

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

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 | $V_p I_p = V_s I_s$ 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**