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 4PH1/1PR 4SD0/1PR

Physics

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

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 ▶

P79538A

P:1/1/1/1/

P 7 9 5 3 8 A 0 1 3 6

Pearson

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 $p_1 \times V_1 = p_2 \times V_2$

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

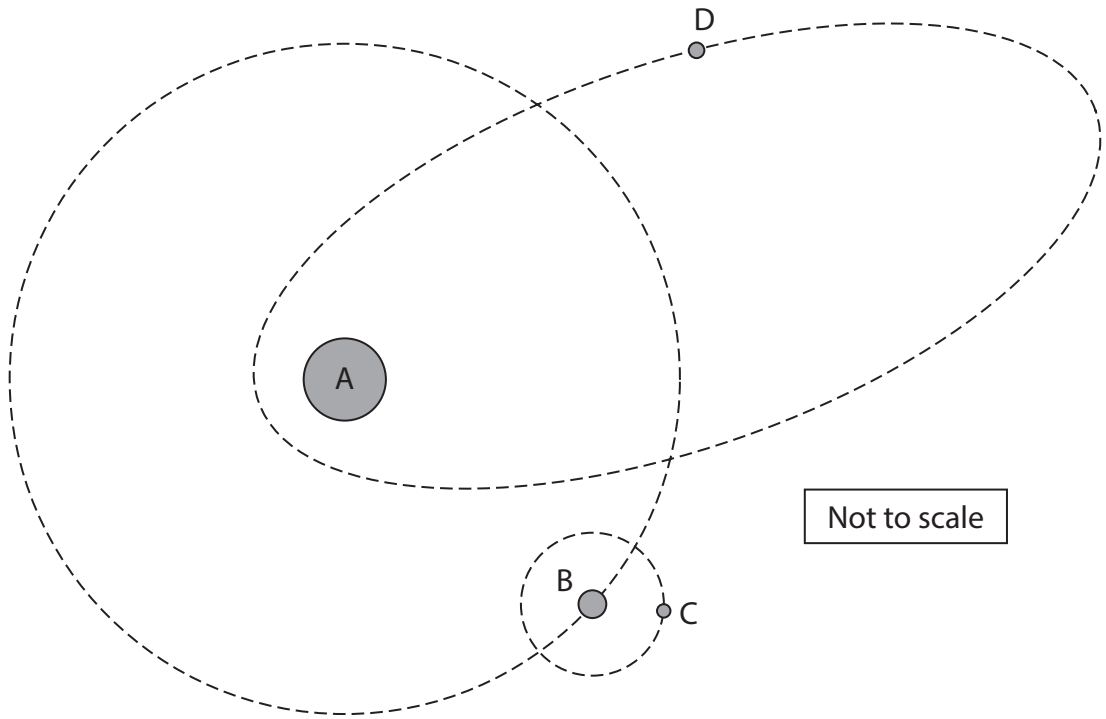
Where necessary, assume the acceleration of free fall, $g = 10\ \text{m/s}^2$.

BLANK PAGE

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 The diagram shows the orbits of some of the objects in the solar system.



(a) Give the names of objects A, B, C and D.

(4)

A .....

B .....

C .....

D .....

(b) The Sun is a main sequence star.

Describe the future evolution of the Sun after it leaves the main sequence.

(2)

.....

.....

.....

.....

.....

.....

(Total for Question 1 = 6 marks)

DO NOT WRITE IN THIS AREA

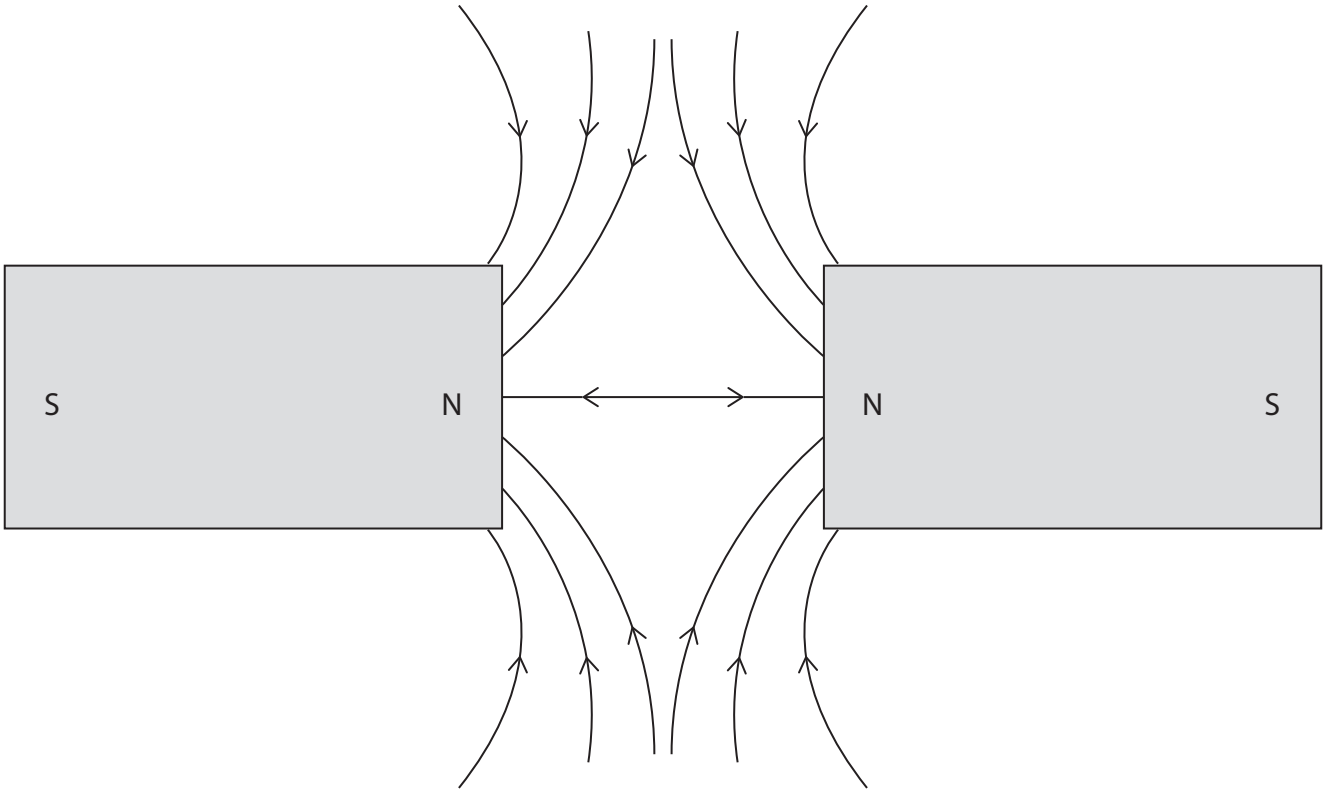
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

2 This question is about magnetism.

(a) A student draws a diagram of the magnetic field between two bar magnets with north poles facing each other.

The student has made two mistakes in the diagram.



(i) Identify the mistakes in the student's diagram.

You may draw on the diagram to help your answer.

(2)

.....

.....

.....

.....

(ii) Give the name of a piece of equipment that can be used to show the direction of a magnetic field.

(1)

.....

(b) Which of these will **not** experience a magnetic force when at rest in a magnetic field?

(1)

- ☒ **A** plastic rod
- ☒ **B** bar magnet
- ☒ **C** copper wire with a current at right angles to the field
- ☒ **D** iron bar

(c) A teacher demonstrates magnetism by placing a strong magnet above some small nails made from steel.

The steel nails are attracted to the magnet and stick to it.

The teacher removes the steel nails from the magnet and puts the magnet away.

A student observes that the steel nails are attracted to each other and stick together, even though the magnet is no longer present.

Explain this observation.

(2)

.....

.....

.....

.....

.....

.....

(Total for Question 2 = 6 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

3 Photograph 1 shows a water bath with its plastic lid.

Water is placed in the water bath.

The water bath heats the water and then keeps the water at a constant temperature.

Photograph 1

(a) The water bath is connected to mains electricity.

Mains electricity provides alternating current (a.c.).

Describe what is meant by the term **alternating current (a.c.)**.

(2)

.....

.....

.....

.....

(b) 720 000 J of energy is transferred to the heating element in the water bath in a time of 30 minutes.

Calculate the power of the heating element.

(3)

power = ... W

(c) A technician switches on the water bath before a science lesson so that the water has enough time to reach a temperature of 60 °C.

The technician also covers the water bath with the plastic lid, as shown in photograph 2.

Photograph 2

Explain why the lid reduces the time taken for the water in the water bath to reach a temperature of 60 °C.

(5)

(Total for Question 3 = 10 marks)

BLANK PAGE

4 This question is about microwaves.

(a) Diagram 1 represents a microwave.

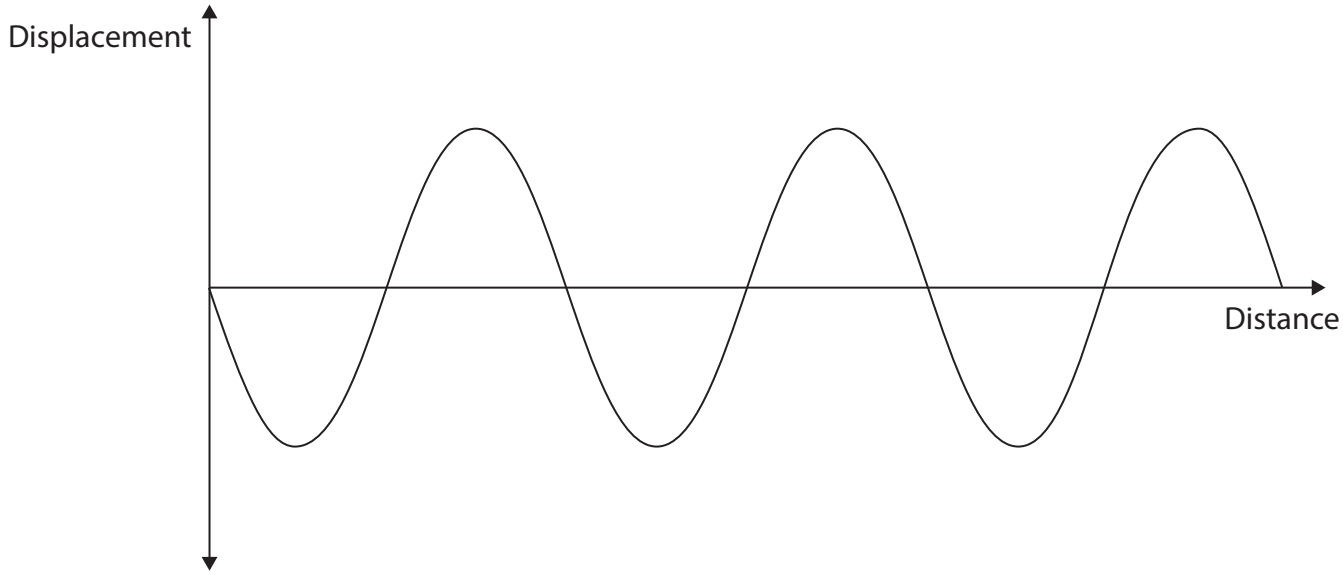


Diagram 1

(i) Add a labelled arrow to diagram 1 to show the amplitude of the microwave.

(1)

(ii) Add a labelled arrow to diagram 1 to show the wavelength of the microwave.

(1)

(b) A teacher demonstrates microwaves using a microwave transmitter and a microwave receiver.

Diagram 2 shows the demonstration viewed from above.

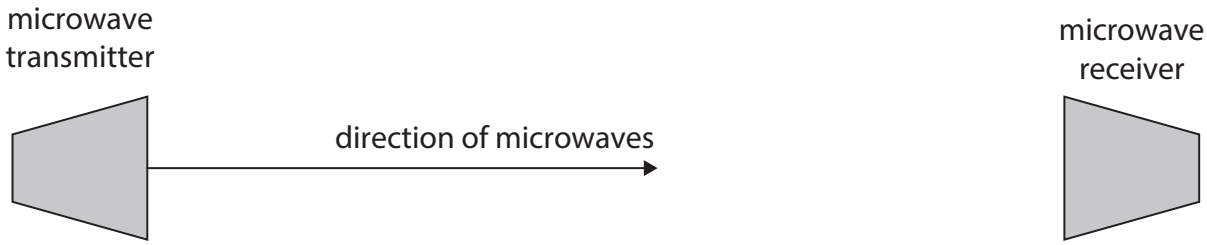


Diagram 2

The table gives some information about the microwaves produced by the transmitter.

Speed of microwaves	3.0×10^8 m/s
Frequency of microwaves	1.0×10^{10} Hz

(i) The transmitter emits microwaves that travel towards the receiver.

State the number of complete waves received by the receiver in one second.

(1)

number = ...

(ii) The teacher positions the receiver so that the distance between the receiver and the transmitter is equal to 15 wavelengths.

Calculate the distance between the receiver and the transmitter.

(4)

distance = ... m

(iii) The teacher changes the position of the receiver and adds a metal sheet to the demonstration, as shown in diagram 3.

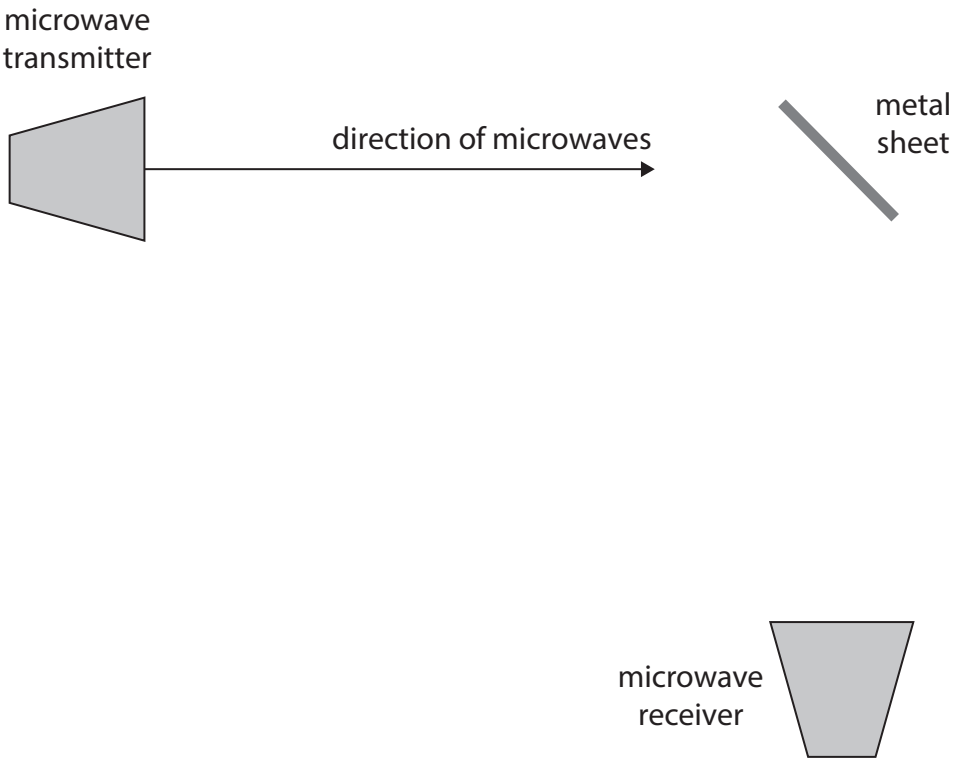


Diagram 3

Microwaves are detected by the receiver.

Suggest why the microwaves are detected.

You should add to diagram 3 to help your answer.

(2)

.....

.....

.....

.....

(Total for Question 4 = 9 marks)

5 This question is about electric current.

(a) Which of these particles flow in an electric current in solid metallic conductors?

(1)

- ☒ **A** negatively charged electrons
- ☒ **B** negatively charged protons
- ☒ **C** positively charged electrons
- ☒ **D** positively charged protons

(b) What is the definition of electric current?

(1)

- ☒ **A** energy transferred per unit charge passed
- ☒ **B** energy transferred per unit resistance
- ☒ **C** rate of energy transfer
- ☒ **D** rate of flow of charge

(c) A student investigates how the current in a series circuit varies as the number of resistors in the circuit changes.

This is the student's method.

Step 1 build a series circuit using a 6V battery, a 12Ω resistor, an ammeter, a switch and connecting wires

Step 2 close the switch and measure the current using the ammeter

Step 3 add another 12Ω resistor into the series circuit and repeat step 2

The student repeats this method for a total of six 12Ω resistors connected in series.

(i) Identify the independent variable, the dependent variable and a control variable in the student's investigation.

(3)

independent variable

.....

dependent variable

.....

control variable

.....

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(ii) Give a reason why the student includes the switch in the circuit.

(1)

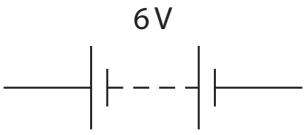
.....

.....

(iii) Draw a suitable circuit diagram showing how the components in the method should be connected to measure the current in a series circuit containing **two** 12 Ω resistors.

The 6 V battery has been drawn for you.

(3)



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

Number of resistors	Current in A
1	0.50
2	0.25
3	0.17
4	0.13
5	0.10
6	0.08

Describe the relationship between the number of resistors and the current in the circuit.

(2)

(v) Discuss whether a bar chart or a line graph is most appropriate for displaying the results of this investigation.

(3)

(Total for Question 5 = 14 marks)

6 This question is about nuclear fusion.

(a) In which of these does nuclear fusion take place naturally?

(1)

- ☒ **A** in nuclear power stations
- ☒ **B** in plants
- ☒ **C** in stars
- ☒ **D** in the human body

(b) Describe the process of nuclear fusion.

(3)

(c) Explain the conditions required for nuclear fusion.

(3)

(Total for Question 6 = 7 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

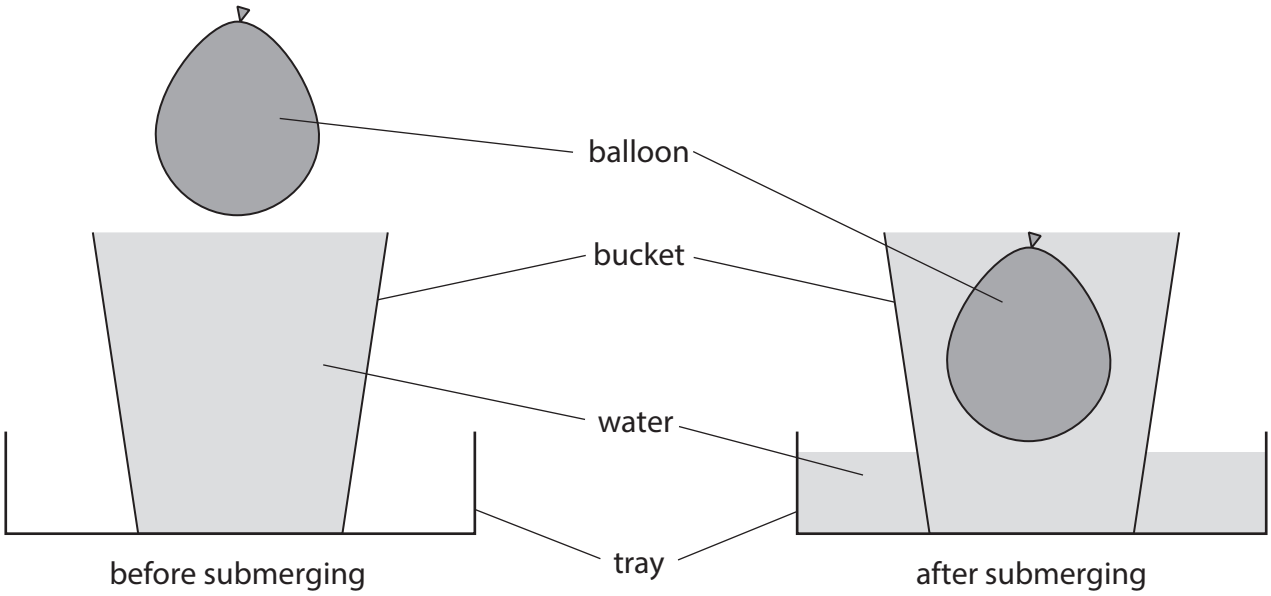
7 A student does an experiment to determine the density of air.

(a) The student completely fills a large bucket with water and places the bucket in a large tray.

The student then inflates a balloon with air and seals the balloon.

The inflated balloon is then pushed into the bucket so that it is completely submerged in the water.

Water is displaced from the bucket and is collected in the tray, as shown by the diagram.



(i) The volume of water collected in the tray is equal to the volume of the inflated balloon.

Describe how the student could accurately measure the volume of water collected in the tray.

(2)

.....

.....

.....

.....

.....

.....

(ii) Give a reason why the measured volume of water in the tray may be different from the volume of the inflated balloon.

(1)

.....

.....

(b) The student removes the inflated balloon from the bucket and dries the balloon.

The student places the inflated balloon on a sensitive balance and measures the mass of the inflated balloon.

The student then bursts the balloon.

Describe how the student should use the burst balloon to determine the mass of air that was inside the inflated balloon.

(2)

.....

.....

.....

.....

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

Volume of water displaced by inflated balloon	4350 cm^3
Mass of air inside balloon	5.42 g

Calculate the density of air using the student's results.

Give your answer to 3 significant figures and give a suitable unit.

(4)

density = ... unit .....

(d) Give two ways of testing the reliability of the density value obtained from the student's results.

(2)

1 .....

.....

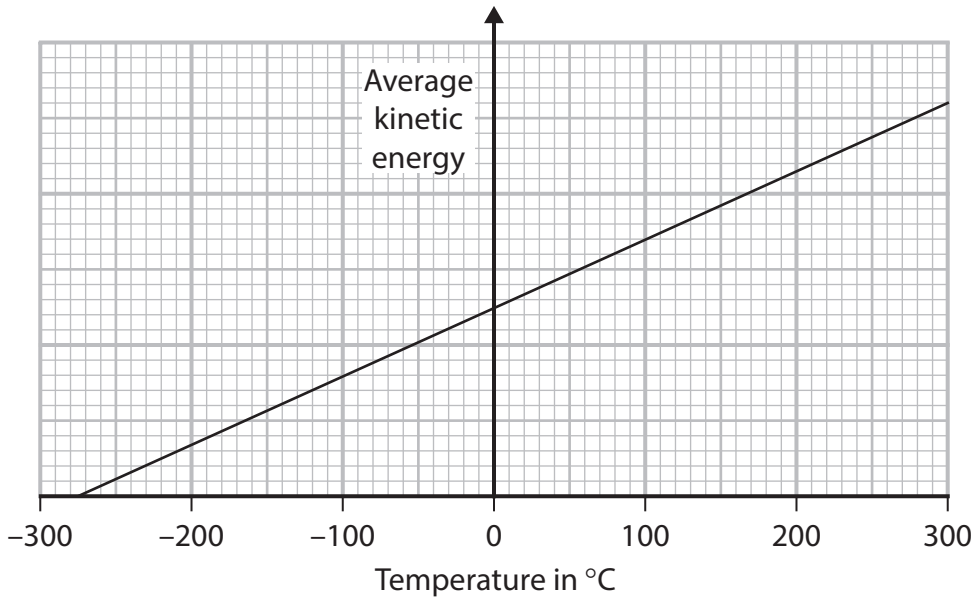
2 .....

.....

(Total for Question 7 = 11 marks)

8 This question is about gases.

(a) The graph shows how the average kinetic energy of a single gas molecule varies with the temperature of the gas, measured in °C.



Use the graph to explain why there is an absolute zero of temperature.

(3)

(b) Diagram 1 shows a sample of gas in a syringe.

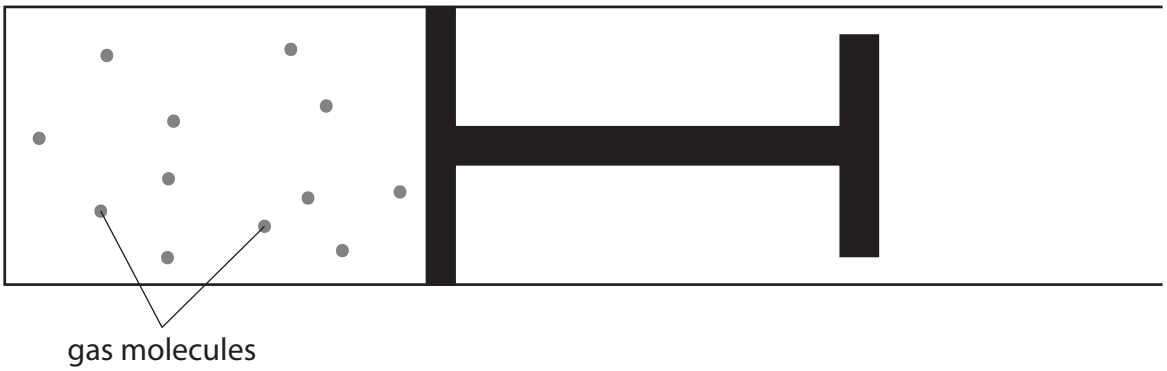


Diagram 1

The volume of the gas is increased so that it is double its original volume, as shown in diagram 2.

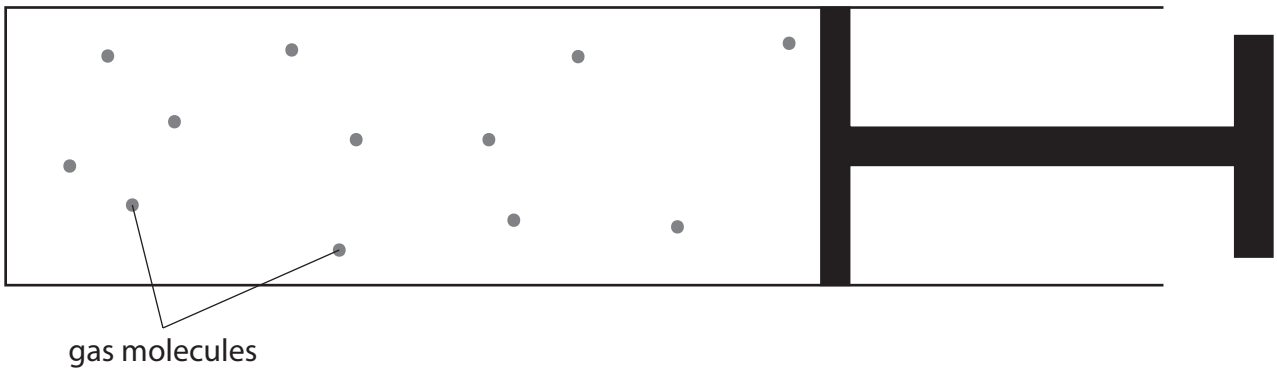


Diagram 2

Explain how the pressure of the gas changes when the volume of the gas is doubled.

Assume the temperature of the gas remains constant.

(4)

(c) Another sample of gas has a temperature of 100 °C and a pressure of 140 kPa.

The gas is cooled and its temperature decreases **by** 65 °C.

The volume of the gas does not change.

Calculate the new pressure of the gas.

(5)

new pressure = ... kPa

(Total for Question 8 = 12 marks)

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

9 This question is about refraction.

(a) Diagram 1 shows the refraction of a ray of blue light as it passes from air through a triangular glass prism.

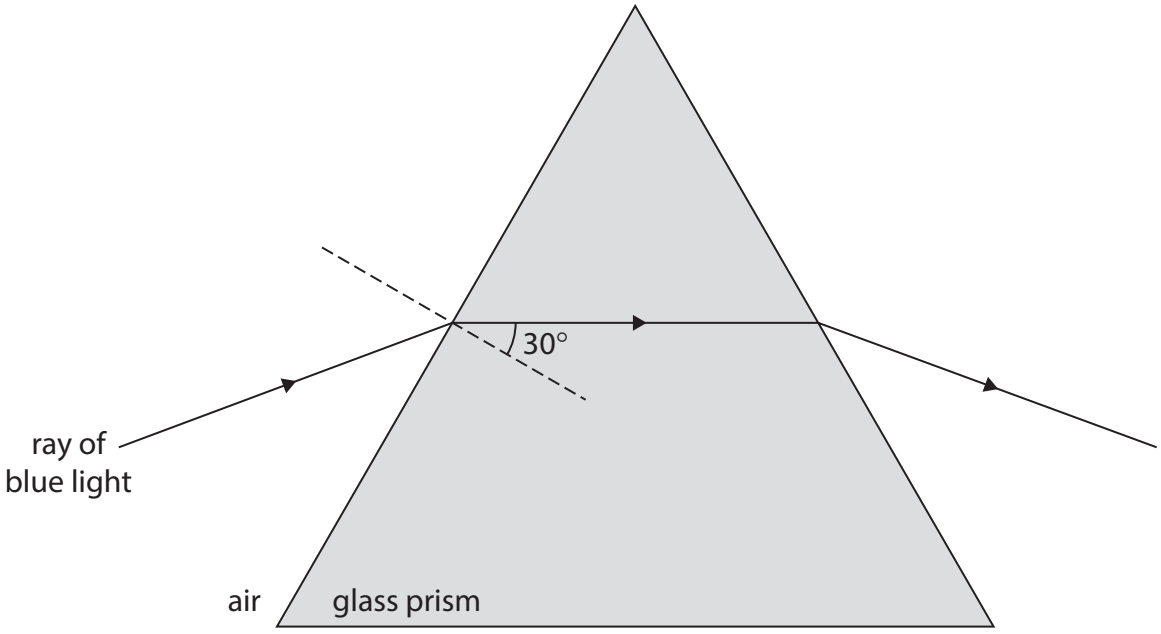


Diagram 1

(i) Use a protractor to determine the angle of incidence at the point where the ray of blue light enters the prism.

(1)

angle of incidence = ... degrees

(ii) Show that the refractive index of the glass the prism is made from is about 1.5

(2)

(iii) The refractive index of red light in glass is lower than the refractive index of blue light in glass.

Complete diagram 2 by continuing the path of the ray of red light as it passes through the glass prism and into the air.

The ray of red light has the same angle of incidence as the original ray of blue light.

The dashed line shows the path of the blue light.

(2)

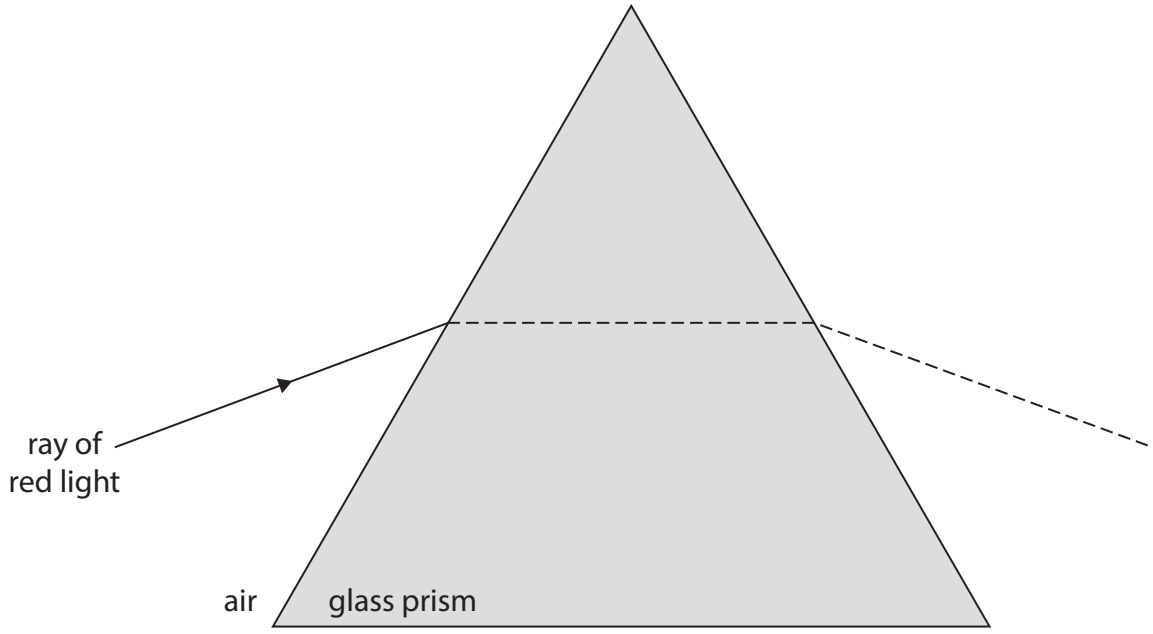
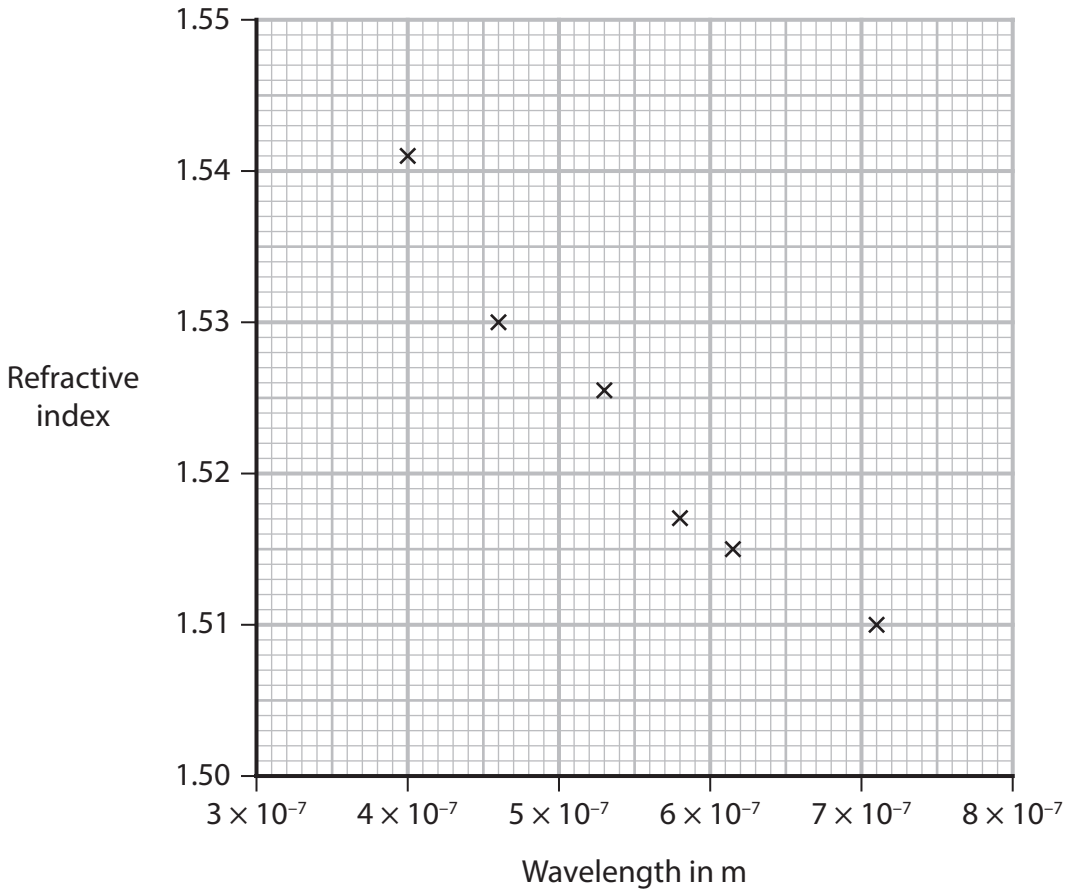


Diagram 2

(b) A student obtains data for the refractive index of glass using different wavelengths of light.

The student plots this graph using the data.



(i) Give a reason why the student does not start the scales on the graph at zero.

(1)

.....

.....

(ii) The student thinks one of the data points is anomalous.

Draw a circle around the anomalous data point.

(1)

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

(1)

(Total for Question 9 = 8 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

10 This question is about beta particles.

(a) What is a beta particle?

(1)

- ☒ **A** high energy electron
- ☒ **B** high energy neutron
- ☒ **C** high frequency electromagnetic wave
- ☒ **D** helium nucleus

(b) A beta particle can be produced during radioactive decay.

When a neutron decays into a proton, a beta particle is produced.

Complete the nuclear equation for this process.

(3)

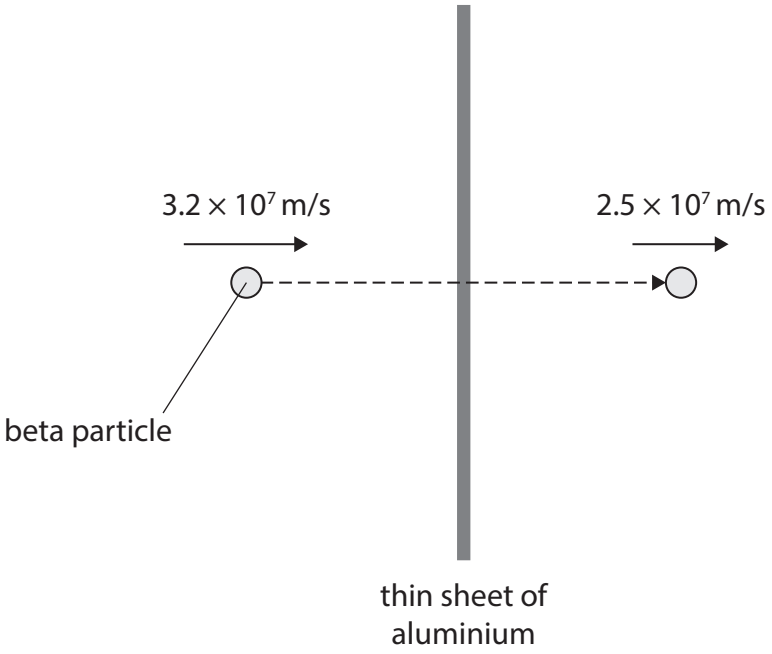
$$\square n \rightarrow \square p + \square \beta$$

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(c) The diagram shows a beta particle slowing down as it travels through a thin sheet of aluminium.



(i) The table gives some statements about the sheet of aluminium after the beta particle has travelled through it.

Place ticks (✓) in the table to show whether each statement is correct or incorrect.

(2)

Statement	Correct	Incorrect
the sheet of aluminium is now radioactive		
the sheet of aluminium has been contaminated by the beta particle		
the sheet of aluminium has been irradiated by the beta particle		

(ii) Just before travelling through the sheet of aluminium, the beta particle has a speed of 3.2×10^7 m/s.

Just after travelling through the sheet of aluminium, the beta particle has a speed of 2.5×10^7 m/s.

The sheet of aluminium has a thickness of 0.60 mm.

Show that the magnitude of the acceleration of the beta particle as it travels through the sheet of aluminium is about 3×10^{17} m/s^2.

(4)

(iii) The beta particle has a mass of 9.1×10^{-31} kg.

Calculate the decrease in the kinetic energy of the beta particle as it travels through the sheet of aluminium.

(3)

decrease in kinetic energy = ... J

(Total for Question 10 = 13 marks)

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

BLANK PAGE

11 Sky diving is a sport that involves jumping out of an aeroplane high above the ground.

(a) Diagram 1 shows a sky diver just after they jump out of an aeroplane.

Diagram 1

(i) The weight of the sky diver is 850 N.

Calculate the mass of the sky diver.

Use the formula

weight = mass × gravitational field strength

(2)

mass = ... kg

(ii) After falling for a short period of time, an upward force of 250 N acts on the sky diver due to air resistance.

Calculate the acceleration of the sky diver when the upward force is 250 N.

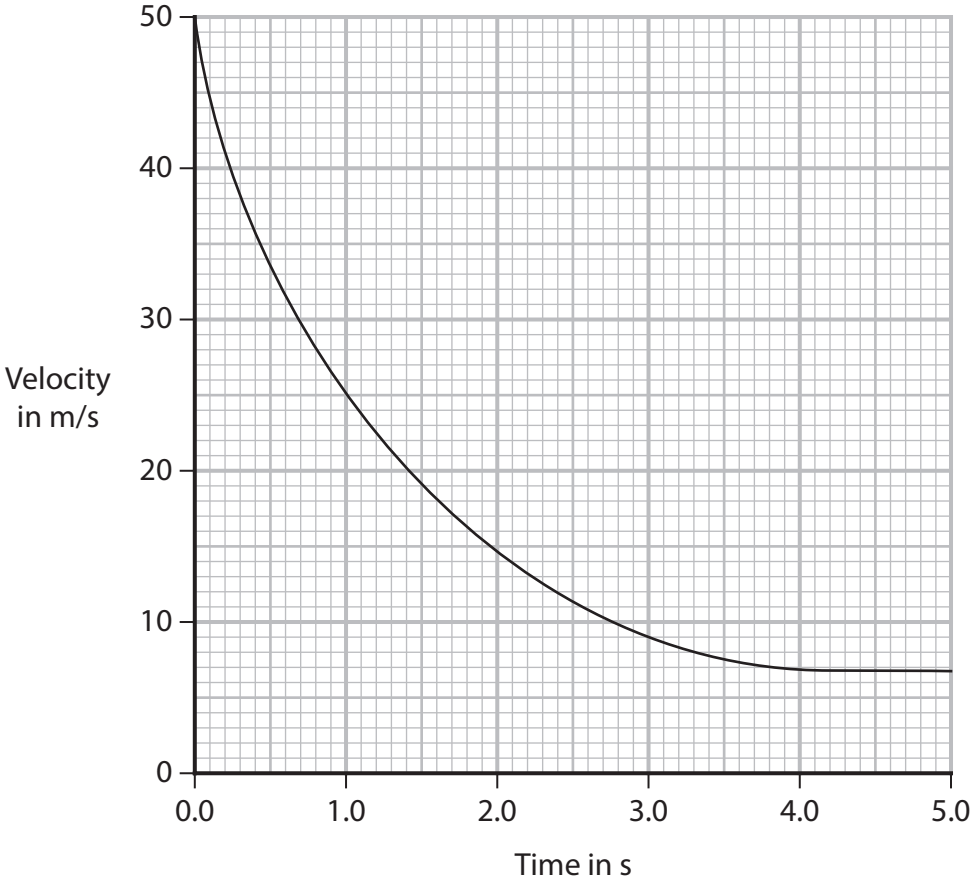
(3)

acceleration = ... m/s^2

(b) Diagram 2 shows the sky diver after they have opened a parachute to decrease their speed so that they land safely on the ground.

Diagram 2

The velocity-time graph shows how the speed of the sky diver changes from the instant the parachute opens.



(i) Explain how the acceleration of the sky diver changes after the parachute opens.

You should refer to the graph in your answer.

(4)

(ii) Use the graph to estimate the distance the sky diver falls in the first 4.0 s after the parachute opens.

(5)

distance = ... m

(Total for Question 11 = 14 marks)

TOTAL FOR PAPER = 110 MARKS

BLANK PAGE

BLANK PAGE

BLANK PAGE

Pearson Edexcel International GCSE (9–1)

Tuesday 2 June 2026

Morning (Time: 2 hours)

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

Physics

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

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

Turn over ▶

P79538A

P:1/1/1/1/

P 7 9 5 3 8 A

Pearson

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