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)

Monday 16 June 2025

Morning (Time: 1 hour 10 minutes)

Paper reference **4SS0/1P**

Science (Single Award)

Physics
PAPER: 1P

You must have:
Calculator, ruler, 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.
- Calculators may be used.

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.

Turn over ▶

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P 7 4 6 6 0 A 0 1 2 4

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FORMULAE

You may find the following formulae useful.

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

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

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

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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 question is about sound.

The photograph shows a place in Australia with a rock formation known as the Three Sisters.

(Source: © Liu Chun Yen / Shutterstock)

(a) A student stands a large distance away from the rock formation.

The student faces the rock formation and makes a loud sound.

A short time later, the student hears the sound again but the sound is quieter.

(i) Why does the student hear the sound a short time later?

(1)

☒ **A** the sound is absorbed by the rocks

☒ **B** the sound is reflected by the rocks

☒ **C** the sound is refracted through the rocks

☒ **D** the sound is transmitted through the rocks

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(ii) Why is the sound quieter?

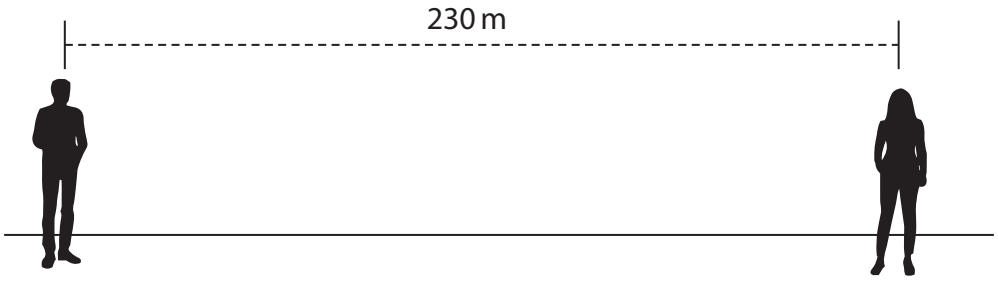
(1)

- ☒ **A** the amplitude is reduced
- ☒ **B** the frequency is reduced
- ☒ **C** the period is reduced
- ☒ **D** the wavelength is reduced

(b) The student makes the same sound in a large open space with no rocks.

The diagram shows the student and a teacher.

The teacher is 230 m away from the student.



(Source: © Chipmunk131 / Shutterstock)

(i) State the formula linking average speed, distance moved and time taken.

(1)

(ii) The time between the student making the sound and the teacher hearing the sound is 0.66 seconds.

Calculate the average speed of the sound.

Give an appropriate unit.

(3)

average speed = ... unit .....

(Total for Question 1 = 6 marks)

2 This question is about the Solar System.

(a) The Sun is a yellow star.

State a possible colour for a star that has a lower surface temperature than the Sun.

(1)

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(b) Describe the stages of evolution in the life cycle of the Sun.

(4)

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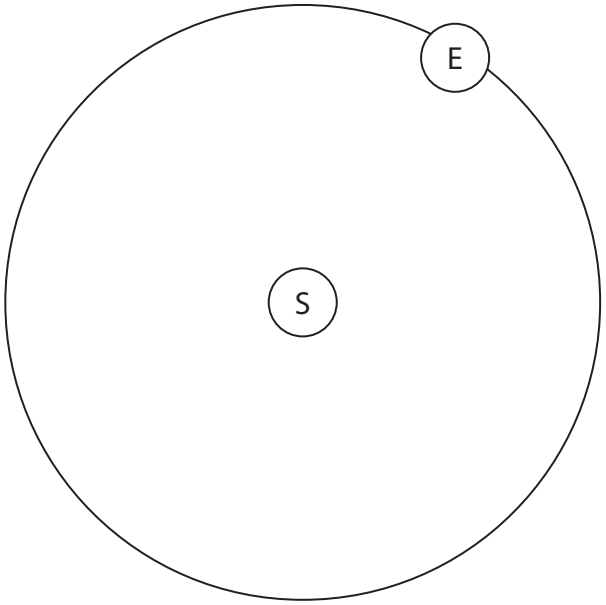
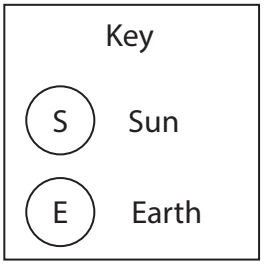
(c) The diagram shows the Earth in its orbit around the Sun.

Draw the orbit of the Moon on the diagram.

(2)





Not to scale

(Total for Question 2 = 7 marks)

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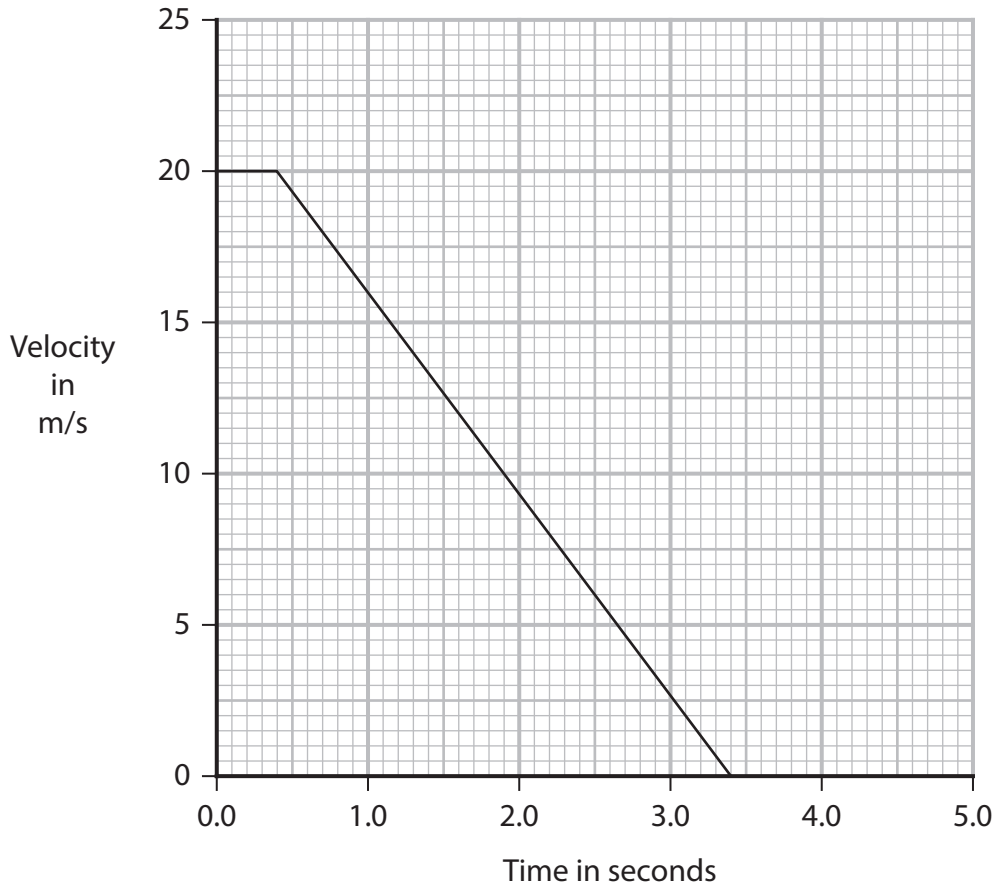
3 A person is driving a car along a dry road. They see an obstruction and apply the brakes.

This is the velocity-time graph for the car.



(a) Which feature of the graph gives the acceleration of the car while the car is braking?

(1)

- ☒ **A** area under the line from 0.0 to 0.4 seconds
- ☒ **B** area under the line from 0.4 to 3.4 seconds
- ☒ **C** gradient of the line from 0.0 to 0.4 seconds
- ☒ **D** gradient of the line from 0.4 to 3.4 seconds

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(b) Determine the braking distance of the car.

(3)

braking distance = ... m

(c) Explain how the graph will be different after 0.4 seconds if the road is wet.

(2)

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(Total for Question 3 = 6 marks)

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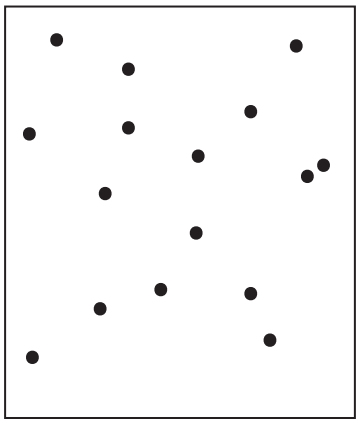
4 The diagram shows gas particles in a sealed container.

The container has a constant volume.

The gas is at a temperature of 50 K.



(a) Calculate the temperature of the gas in °C.

(1)

temperature = ... °C

(b) Explain what happens to the pressure of the gas when its temperature is increased from 50 K to 100 K.

Refer to particles in your answer.

(4)

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(Total for Question 4 = 5 marks)

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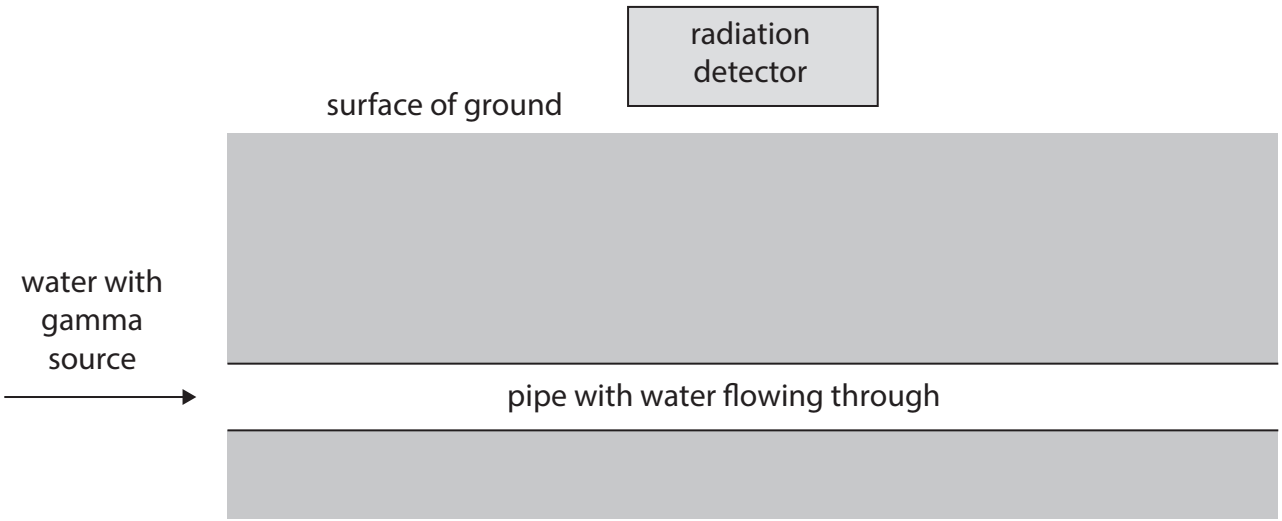
5 Gamma sources can be used to track the flow of liquids.

The diagram shows a gamma source being used to track the flow of water through an underground pipe.



The gamma source is added to water flowing through the pipe.

The detector can detect the gamma radiation on the surface of the ground.

A person moves the detector along the surface of the ground.

(a) (i) Explain why it is better to use a gamma source in the water, rather than a beta source or an alpha source.

(2)

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(ii) Give the name of a suitable detector to detect the gamma radiation.

(1)

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

(2)

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(ii) Suggest why this gamma source should have a short half-life.

(1)

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(c) (i) State the formula linking speed, frequency and wavelength of a wave.

(1)

(ii) The gamma source emits gamma waves with a frequency of 1.8×10^{20} Hz.

Calculate the wavelength of the gamma waves.

Give your answer in standard form.

[speed of gamma waves = 3.0×10^{8} m/s]

(3)

wavelength = ... m

(Total for Question 5 = 10 marks)

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6 A student investigates how the current in a piece of wire varies with the voltage across the wire. The temperature of the wire is constant.

(a) (i) Draw a suitable circuit diagram the student could use for the investigation.

Include this equipment in your diagram.

- cell
- variable resistor
- ammeter
- voltmeter

The piece of wire has been drawn for you.

(3)

piece of wire

(ii) Explain the precautions the student should take to ensure that the temperature of the piece of wire is constant.

(3)

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

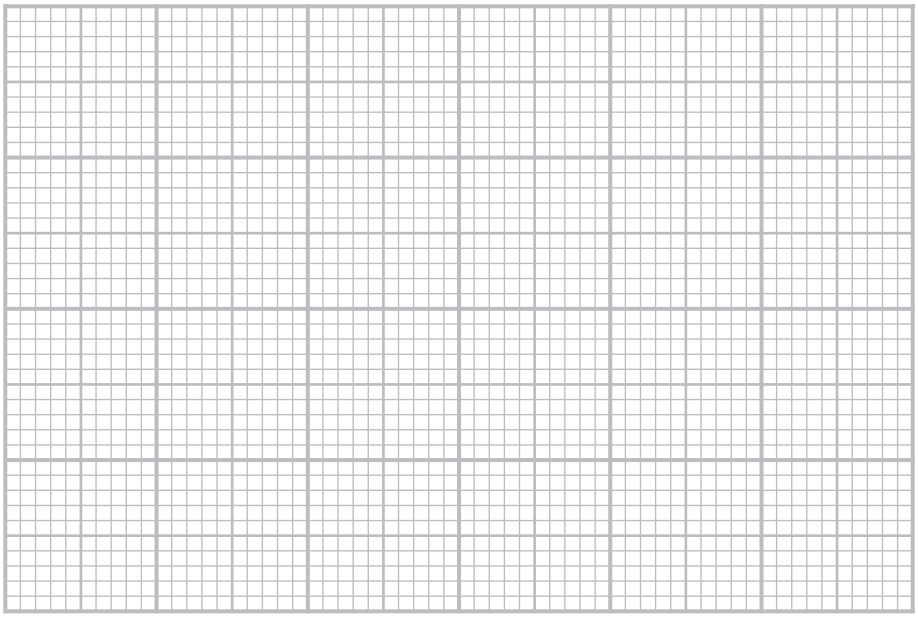
Voltage in V	Current in A
0.0	0.00
2.0	0.20
4.0	0.38
6.0	0.54
8.0	0.66
10.0	0.76

(i) Plot a graph of the student's results.

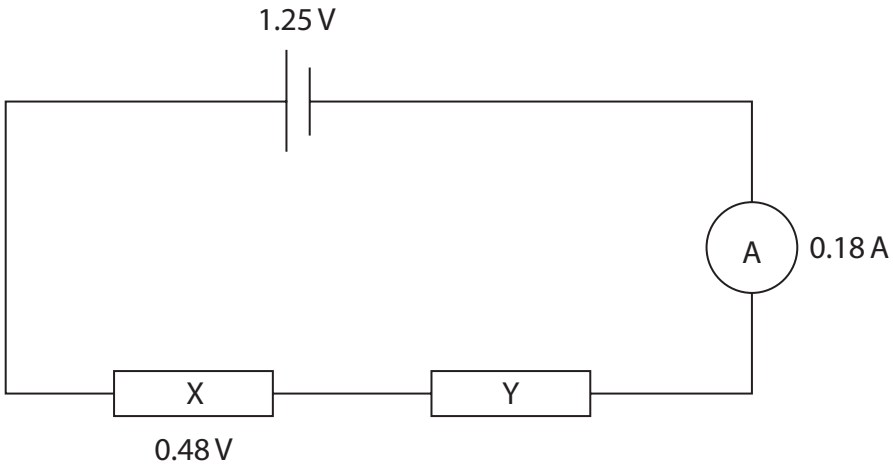
(3)

(ii) Draw a curve of best fit.

(1)



(c) This diagram shows a circuit with two resistors, X and Y.



The current in the circuit is 0.18 A and the voltage across resistor X is 0.48 V.

Calculate the resistance of resistor Y.

(3)

resistance = ... ohms

(Total for Question 6 = 13 marks)

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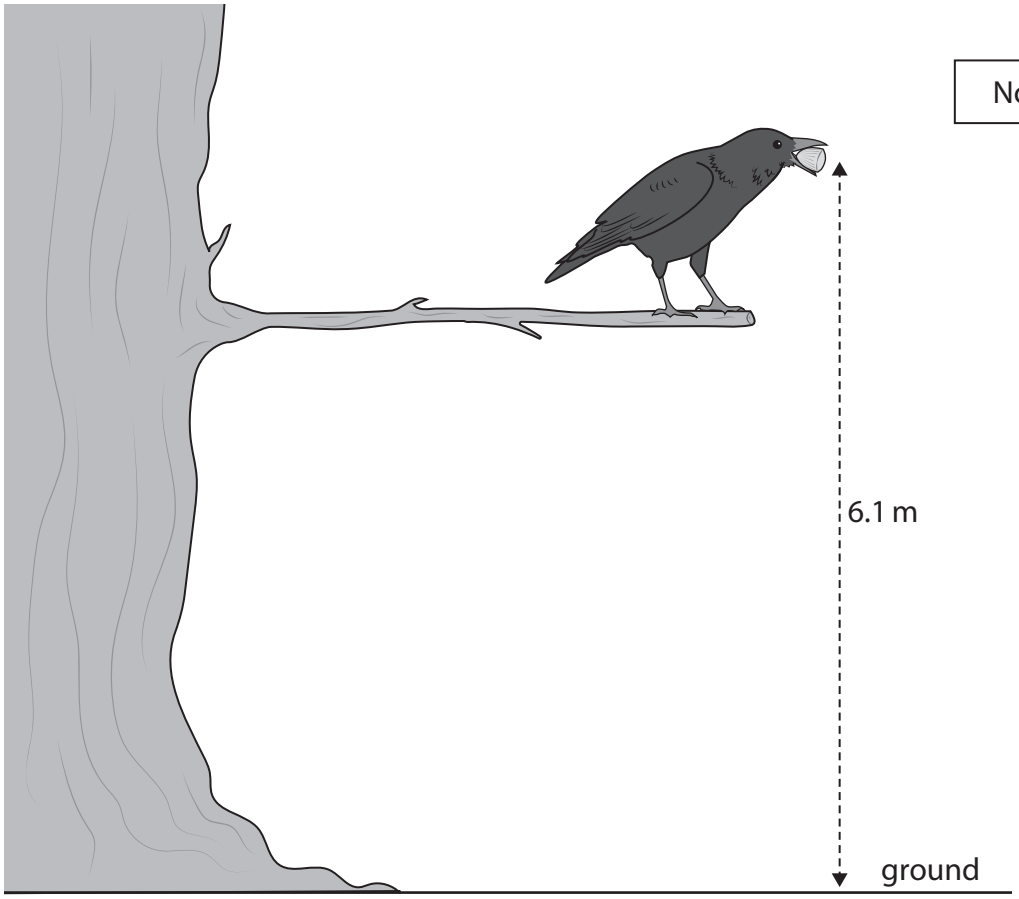
7 A bird tries to break open a nut by dropping it from a tree onto the ground.

The bird drops the nut from a height of 6.1 m.



(a) The nut has a mass of 0.0029 kg.

(i) State the formula linking gravitational potential energy (GPE), mass, gravitational field strength and height.

(1)

(ii) Show that the GPE of the nut is approximately 0.2 J when it is 6.1 m above the ground.

(2)

(iii) State the kinetic energy (KE) of the nut just before it hits the ground.

Assume that the nut is dropped from rest and that there is no air resistance.

(1)

KE = ... J

(iv) Calculate the speed of the nut just before it hits the ground.

Assume that the nut is dropped from rest and that there is no air resistance.

[kinetic energy = ½ × mass × speed^2]

(3)

speed = ... m/s

(b) The energy required for the nut to break is approximately 0.3 J.

Suggest why, at a height of 6.1 m, the bird has to throw the nut rather than just dropping it from rest.

(1)

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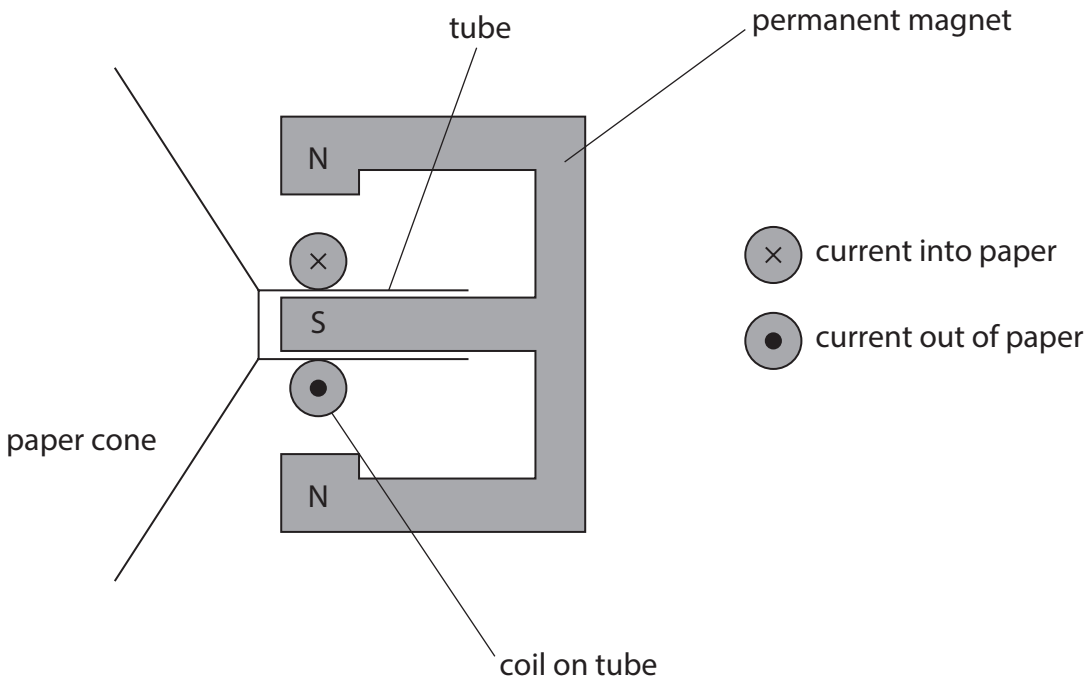
(Total for Question 7 = 8 marks)

8 The diagram shows a cross-section of a loudspeaker.



The tube is attached to the paper cone.

(a) Draw an arrow on the diagram to show the direction of the force exerted on the paper cone from the coil.

(1)

(b) A student wants to produce a sound from the loudspeaker.

Explain why the student should use alternating current (a.c.) rather than direct current (d.c.).

(2)

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(c) Explain how the student could increase the force on the loudspeaker coil.

(2)

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(Total for Question 8 = 5 marks)

TOTAL FOR PAPER = 60 MARKS

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Pearson Edexcel International GCSE (9–1)

Monday 16 June 2025

Morning (Time: 1 hour 10 minutes)

Paper reference **4SS0/1P**

Science (Single Award)

Physics
PAPER: 1P

Equation Booklet

Do not return this Booklet with the question paper.

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1. Forces and Motion	
average speed = $\frac{\text{distance moved}}{\text{time taken}}$	
acceleration = $\frac{\text{change in velocity}}{\text{time taken}}$	$a = \frac{(v-u)}{t}$
force = mass × acceleration	$F = m \times a$
weight = mass × gravitational field strength	$W = m \times g$
2. Electricity	
power = current × voltage	$P = I \times V$
voltage = current × resistance	$V = I \times R$
3. Waves	
wave speed = frequency × wavelength	$v = f \times \lambda$
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 = $\frac{1}{2} \times$ 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	
pressure = $\frac{\text{force}}{\text{area}}$	$p = \frac{F}{A}$

END OF EQUATION LIST