



Rewarding Learning

General Certificate of Secondary Education  
2016

Centre Number

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Candidate Number

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## Double Award Science: Physics

Unit P2

Foundation Tier



\*GSD61\*

[GSD61]

**MONDAY 20 JUNE, MORNING**

### TIME

1 hour 15 minutes.

### INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

**You must answer the questions in the spaces provided. Do not write outside the box, around each page or on blank pages.**

Complete in blue or black ink only. **Do not write with a gel pen.**

Answer **all ten** questions.

### INFORMATION FOR CANDIDATES

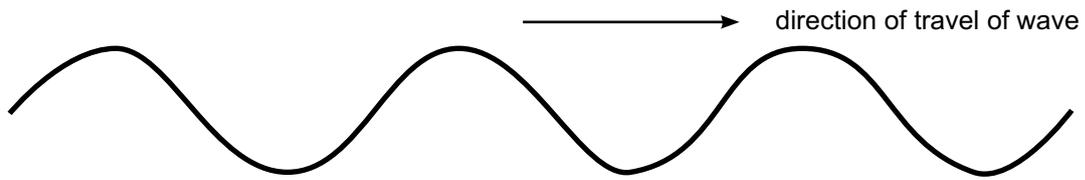
The total mark for this paper is 90.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **9(b)**.



1 A child jumps into a swimming pool and creates a series of waves.



(a) What do the waves transfer as they cross the pool?

\_\_\_\_\_ [1]

(b) Describe the movement of the water particles.

\_\_\_\_\_ [1]

(c) Which **one** of the following words best describes a water wave?  
Circle the correct answer.

Longitudinal                  Transverse                  Ultrasound

[1]



2 Some members of the electromagnetic spectrum are missing from the following list.

Gamma rays	X-rays			Infrared rays		Radio
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(a) Fill in the missing radiations. [3]

(b) Which radiation shown in the list has the longest wavelength?

\_\_\_\_\_ [1]

(c) State **one** danger of infrared radiation and **one** danger of gamma rays.

Infrared: \_\_\_\_\_

Gamma: \_\_\_\_\_ [2]

(d) State **one** use of X-rays.

\_\_\_\_\_ [1]

(e) From the list below, select **three** properties of all electromagnetic waves. Tick (✓) the correct boxes.

Transverse

Cannot travel in a vacuum

Travel in a vacuum

Can all be reflected

Longitudinal

[3]

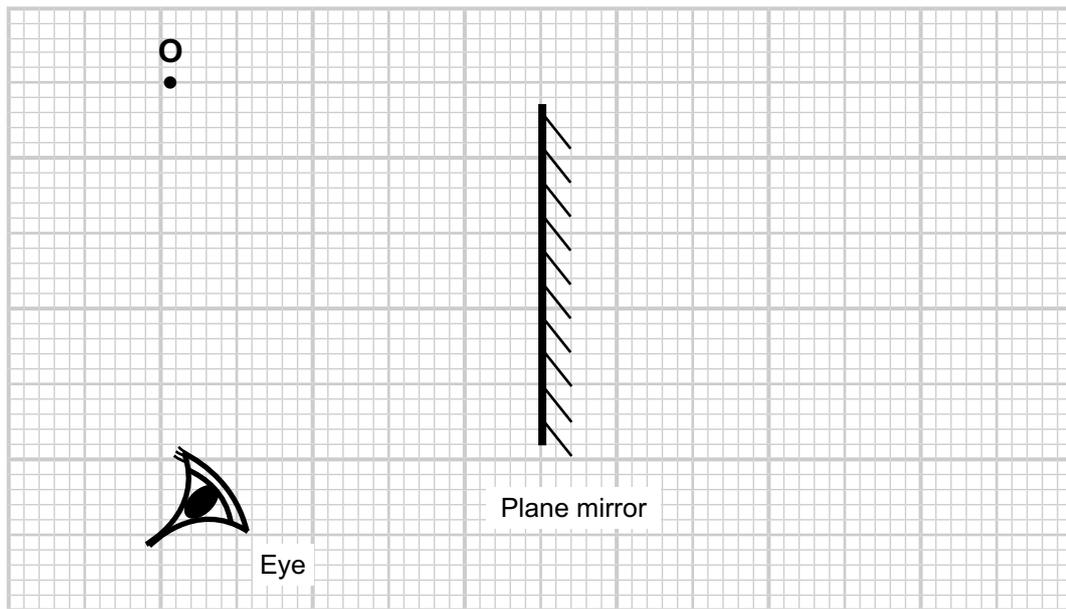
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3 Jamie looks at an image in a plane mirror.



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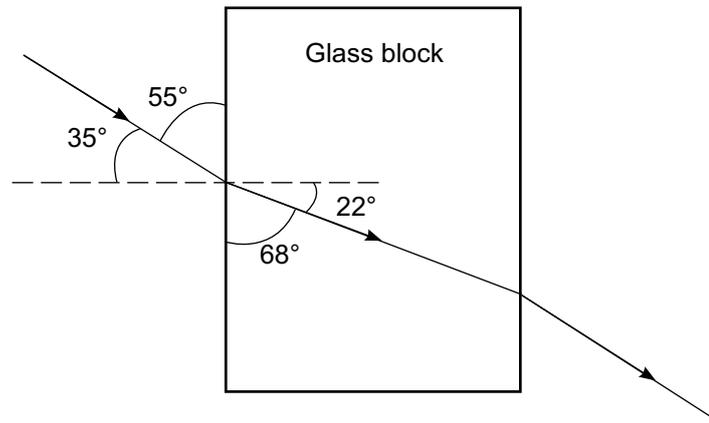
(a) Draw an incident ray and a reflected ray to show how the image of point **O** is viewed by the eye in the mirror. Draw arrows on your rays. [4]

(b) State **three** properties of the image in a plane mirror.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_ [3]



(c) Jamie sends a ray of light through a glass block.



(i) What is the angle of incidence?

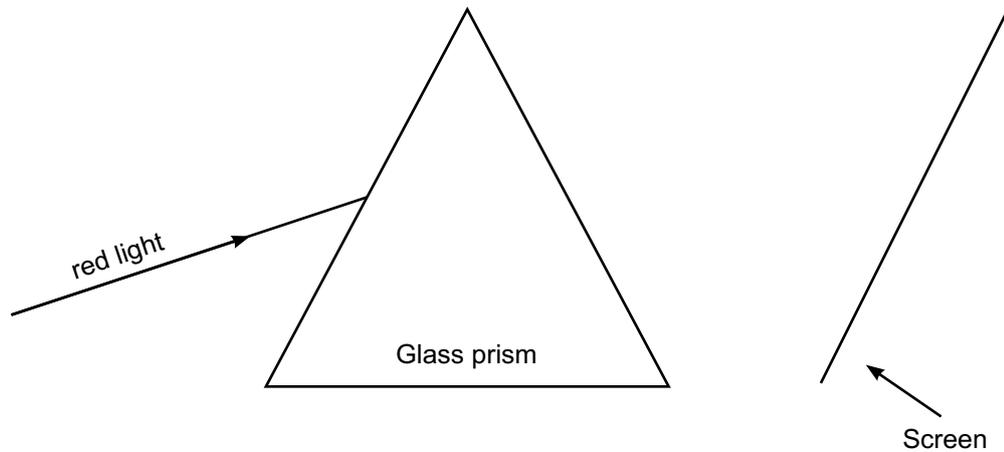
\_\_\_\_\_  $^\circ$  [1]

(ii) What is the angle of refraction of the light ray in the glass block?

\_\_\_\_\_  $^\circ$  [1]



(d) A ray of red light enters a glass prism.



Continue the ray through the glass prism to the screen.

[2]

(e) When white light passes through a glass prism it splits into its component colours.

What is this process called?

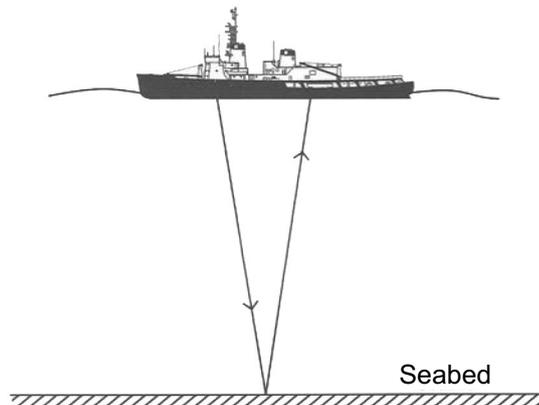
[1]



4 Ultrasound waves are used by fishing trawlers.

- (a) A ship sends out a pulse of ultrasound waves and detects the reflection from the seabed 1.6 s later. The depth of the seabed is 1200 m. Calculate the speed of ultrasound waves in water.

**You are advised to show your working out.**



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Speed = \_\_\_\_\_ m/s [4]

- (b) (i) State an industrial use of ultrasound waves.

\_\_\_\_\_ [1]

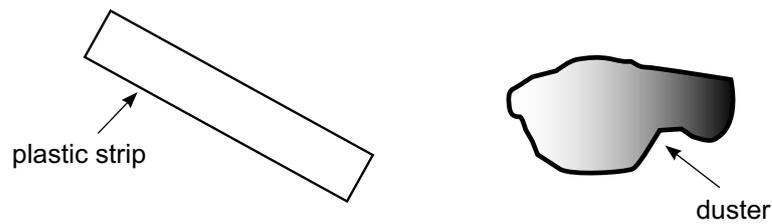
- (ii) State a medical use of ultrasound waves.

\_\_\_\_\_ [1]

[Turn over



- 5 George rubs a plastic strip with a duster and the strip becomes **positively** charged.



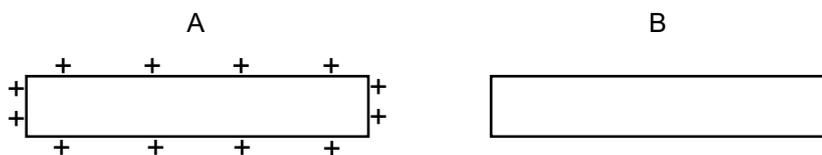
- (a) (i) Choose words from the list to complete the sentence below.

protons          duster          electrons          neutrons          plastic

\_\_\_\_\_ move from the \_\_\_\_\_ to the \_\_\_\_\_

[3]

The positively charged plastic strip, A, is now brought up to, but not touching, a second **uncharged** plastic strip, B.



- (ii) Use + (positive) and – (negative) to show how the charges are arranged on strip B. Insert a charge at each end of B. [2]

- (iii) How would you describe the force, if any, between the two strips? Choose from the statements below by placing a tick (✓) in the correct box.

The strips attract

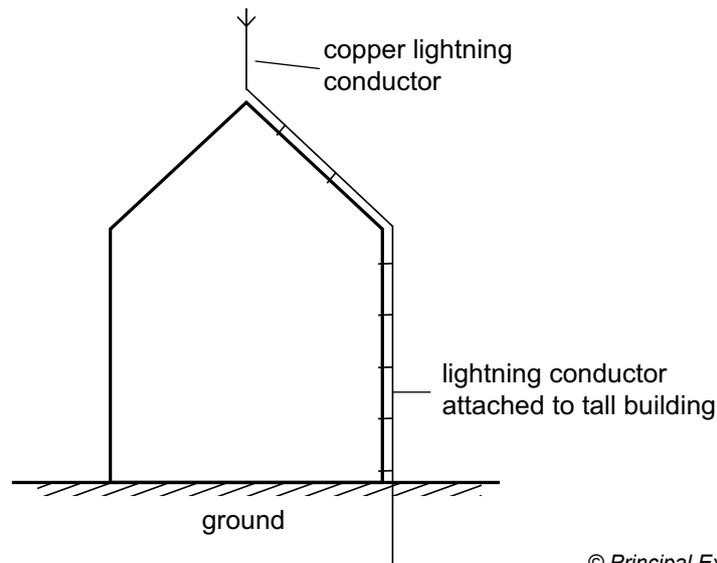
No force is exerted

The strips repel

[1]



Tall buildings such as churches often have a lightning conductor fitted.



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(b) (i) Describe fully what could happen if a lightning conductor was **not** fitted.

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[2]

(ii) Describe how the lightning conductor works if lightning strikes.

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[2]

Current electricity is really the flow of charge.

(c) (i) Write an equation in the box connecting current,  $I$ , charge  $Q$ , and time  $t$ .

[1]

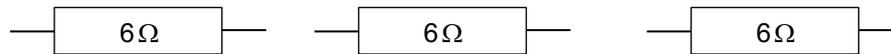
(ii) What unit do we use for the charge,  $Q$ ?

Write the word \_\_\_\_\_ [1]

[Turn over



6 You are given three identical  $6\Omega$  resistors.



(a) In each box below draw an arrangement of resistors to produce the resistance shown in the box. You may use **two or three** resistors in each case.

(i)  $12\Omega$

(ii)  $18\Omega$

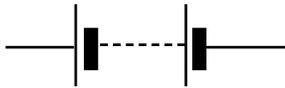
(iii)  $3\Omega$

(iv)  $9\Omega$

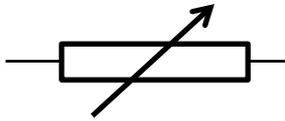
[4]



(b) Electrical symbols are used to draw electric circuits. Identify each of the following symbols.



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_

[3]

A current of 200 mA flows through a bulb of resistance  $4\ \Omega$ .  
Remember  $1\ \text{mA} = 0.001\ \text{A}$ .

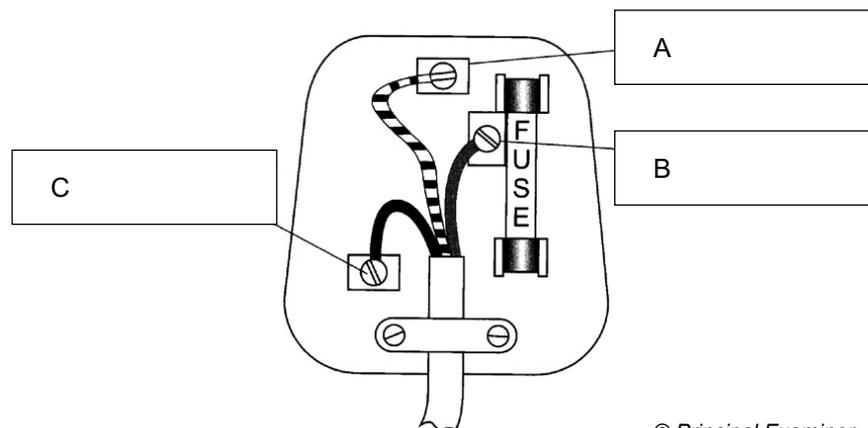
(c) Calculate the voltage across the bulb.

**You are advised to show your working out.**

Voltage = \_\_\_\_\_ V [4]



7 An electric plug is shown.



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(a) (i) In the boxes, A, B and C label the terminals live, neutral or earth. [3]

The plug is attached to an appliance which uses a current of 6 A.

(ii) What current flows in the wire connected to

the live terminal? current = \_\_\_\_\_ A

the neutral terminal? current = \_\_\_\_\_ A

the earth terminal? current = \_\_\_\_\_ A [3]

(b) An appliance rated at 840 W is connected to the mains electricity supply of 240 V.

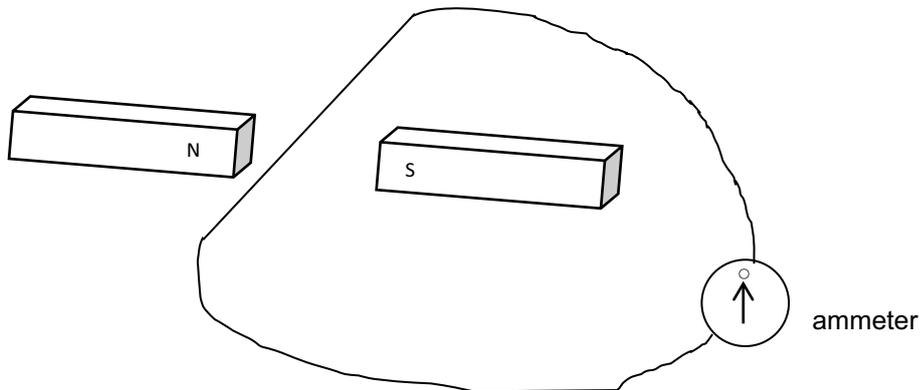
Calculate the current flowing through the appliance.

**You are advised to show your working out.**

Current = \_\_\_\_\_ A [3]



- 8 The arrangement below is set up in a school laboratory. The wire is held stationary between the poles of the magnet.



- (a) (i) Explain why the reading on the ammeter is zero, when the wire is stationary.

\_\_\_\_\_ [1]

- (ii) Describe how to get a deflection while keeping the wire stationary.

\_\_\_\_\_ [1]

Two types of electric current are a.c. and d.c.

- (b) (i) Describe a.c.

\_\_\_\_\_  
\_\_\_\_\_ [2]

- (ii) Name a piece of apparatus which produces a.c.

\_\_\_\_\_ [1]

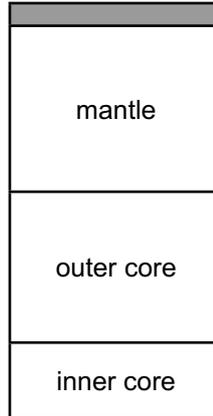
- (iii) What type of current **cannot** be used in a transformer?

\_\_\_\_\_ [1]

[Turn over



9 The diagram shows a cross section of the Earth.



(a) (i) Name a section which is completely liquid.

Answer \_\_\_\_\_ [1]

(ii) Name a section which is part solid and part liquid.

Answer \_\_\_\_\_ [1]

(iii) Name the shaded layer in the diagram above.

Answer \_\_\_\_\_ [1]





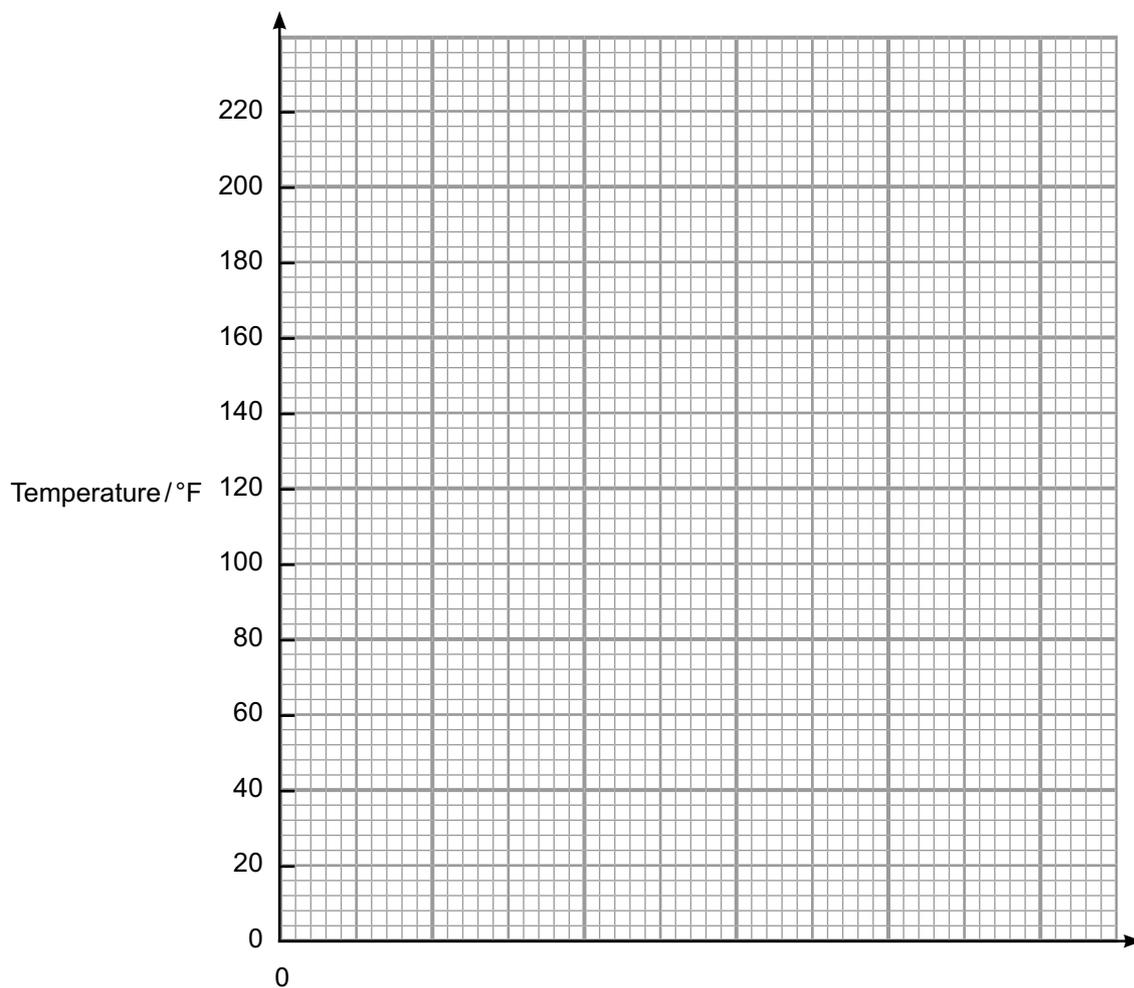
- 10 Temperature is measured in degrees Celsius ( $^{\circ}\text{C}$ ). An older temperature scale is called Fahrenheit ( $^{\circ}\text{F}$ ).

The table below gives temperatures in  $^{\circ}\text{C}$  and the corresponding temperatures in  $^{\circ}\text{F}$ .

Temp/ $^{\circ}\text{C}$	0	20	40	60	80	100
Temp/ $^{\circ}\text{F}$	32	68	104	140	176	212

The two temperature scales are related.

You are asked to plot a graph of temperature in Fahrenheit against temperature in Celsius.



- (i) Choose a suitable scale for the horizontal axis and label it. [2]
- (ii) Plot the points on the grid. [2]
- (iii) Draw the best fit line. [1]

Use your graph to answer the following questions:

- (iv) The intercept on the vertical axis gives the temperature of melting ice. What is this temperature in °C?

Temperature of melting ice \_\_\_\_\_ °C [1]

- (v) A type of alcohol boils at 194 °F. What is this temperature in °C?

\_\_\_\_\_ °C [1]

- (vi) Calculate the gradient of your graph.

Remember to include the unit.

**You are advised to show your working out.**

Gradient = \_\_\_\_\_ [3]

Unit = \_\_\_\_\_ [1]

- (vii) Does your graph show direct proportion? \_\_\_\_\_

Give a reason for your answer.

\_\_\_\_\_ [1]



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For Examiner's use only	
Question Number	Marks
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<b>Total Marks</b>	
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Examiner Number

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