



General Certificate of Secondary Education
2015

Centre Number

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Candidate Number

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Double Award Science: Physics

Unit P2

Higher Tier



[GSD62]

FRIDAY 12 JUNE, AFTERNOON

GSD62

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 boxed area on each page or on blank pages.

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

Answer **all nine** questions.

INFORMATION FOR CANDIDATES

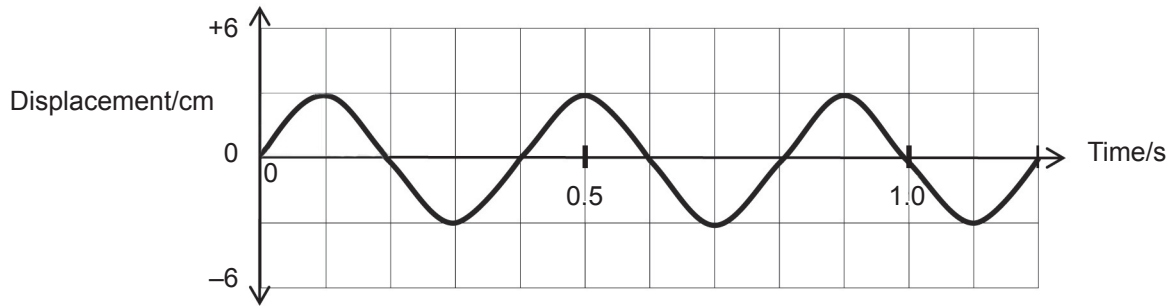
The total mark for this paper is 90.

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 Questions **5** and **9(b)**.



1 The outline of a water wave is given below.



(a) (i) Use the graph to find the amplitude of the wave.

_____ cm [1]

(ii) Use the graph to find the frequency of the wave.

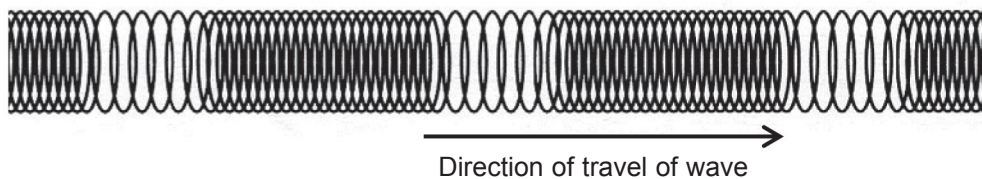
You are advised to show your working out.

Frequency = _____ Hz [3]

(iii) On the same diagram draw a **single wavelength of a new wave** which has twice the amplitude and twice the frequency of the above wave. [2]



(b) The diagram shows how waves can be generated on a slinky.



In what direction do particles of the spring vibrate as waves pass?

_____ [1]

(c) Microwaves travel through space at 3.0×10^8 m/s.
If their frequency is 1.5×10^{10} Hz, what is their wavelength?

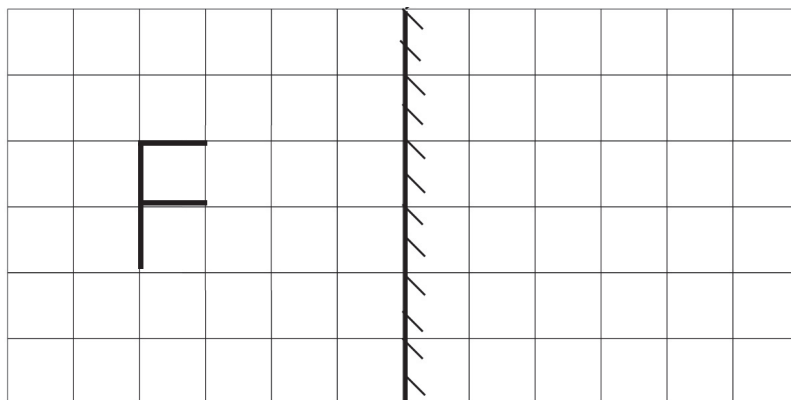
You are advised to show your working out.

Wavelength = _____ m [3]

[Turn over



2 The letter, F, is placed in front of a plane mirror.



(a) (i) Draw the image of the letter F in the mirror.

[3]

The letter F is 0.4 m from the mirror. The mirror is moved 0.1 m to the right.

(ii) How far is the letter F from its image?

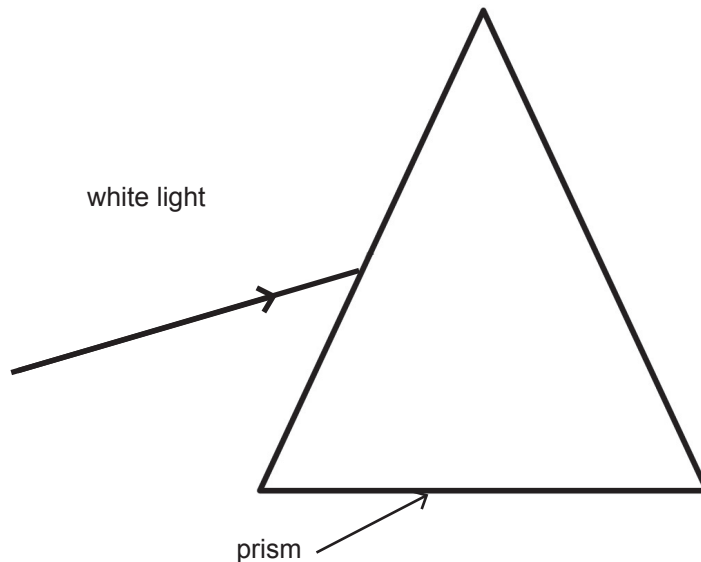
You are advised to show your working out.

Distance = _____ m [2]



White light can be dispersed into its different colours.

(b) (i) Complete the diagram below to show how white light can be dispersed to produce red and violet light. Label the red and violet rays.



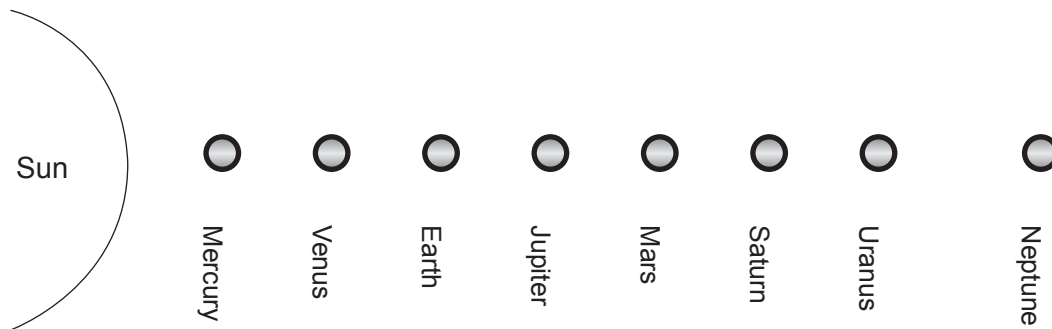
[3]

(ii) Explain why different colours travel in different directions in the prism.

[1]



- 3 The diagram shows an **incorrect** view of the Sun and planets. The diagram is not to scale.



- (a) (i) Two planets are in the wrong positions.

Name these two planets.

_____ and _____

[2]

- (ii) Some planets are referred to as rocky planets and some as gas planets.

Give two examples of each.

Two rocky planets _____ and _____

Two gas planets _____ and _____

[4]

- (iii) Give the names of two bodies other than planets which orbit the Sun.

_____ and _____

[2]

- (iv) What force keeps the planets orbiting the Sun?

[1]



There are two models of the Solar System.

(b) (i) What is the name of the earlier model?

_____ [1]

(ii) What is at the centre of the Solar System in this earlier model?

_____ [1]

(iii) What is the name of the model with the Sun at the centre?

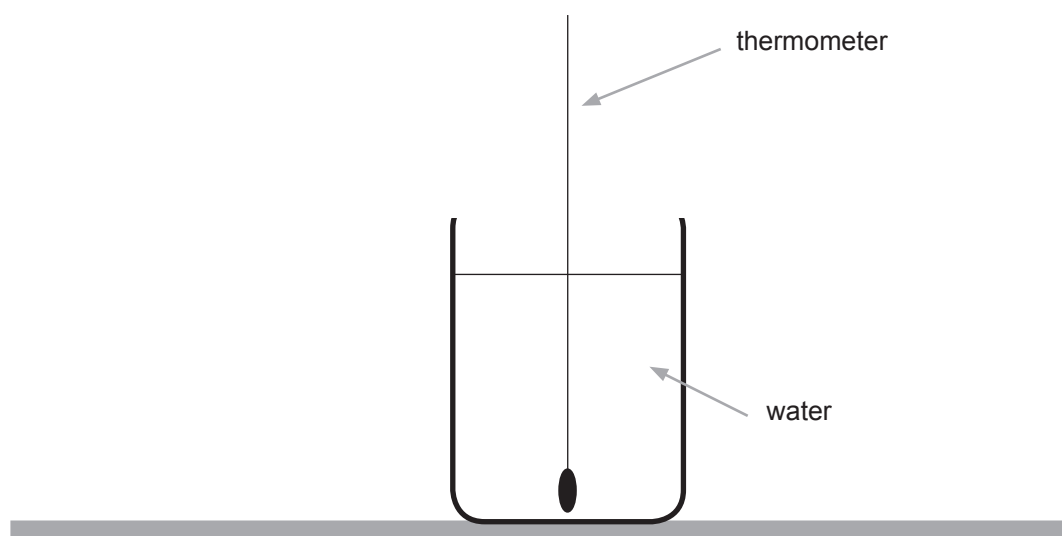
_____ [1]

[Turn over



4 Water is heated to 100 °C and then allowed to cool.

A thermometer allows the temperature of the water to be recorded every 5 minutes.



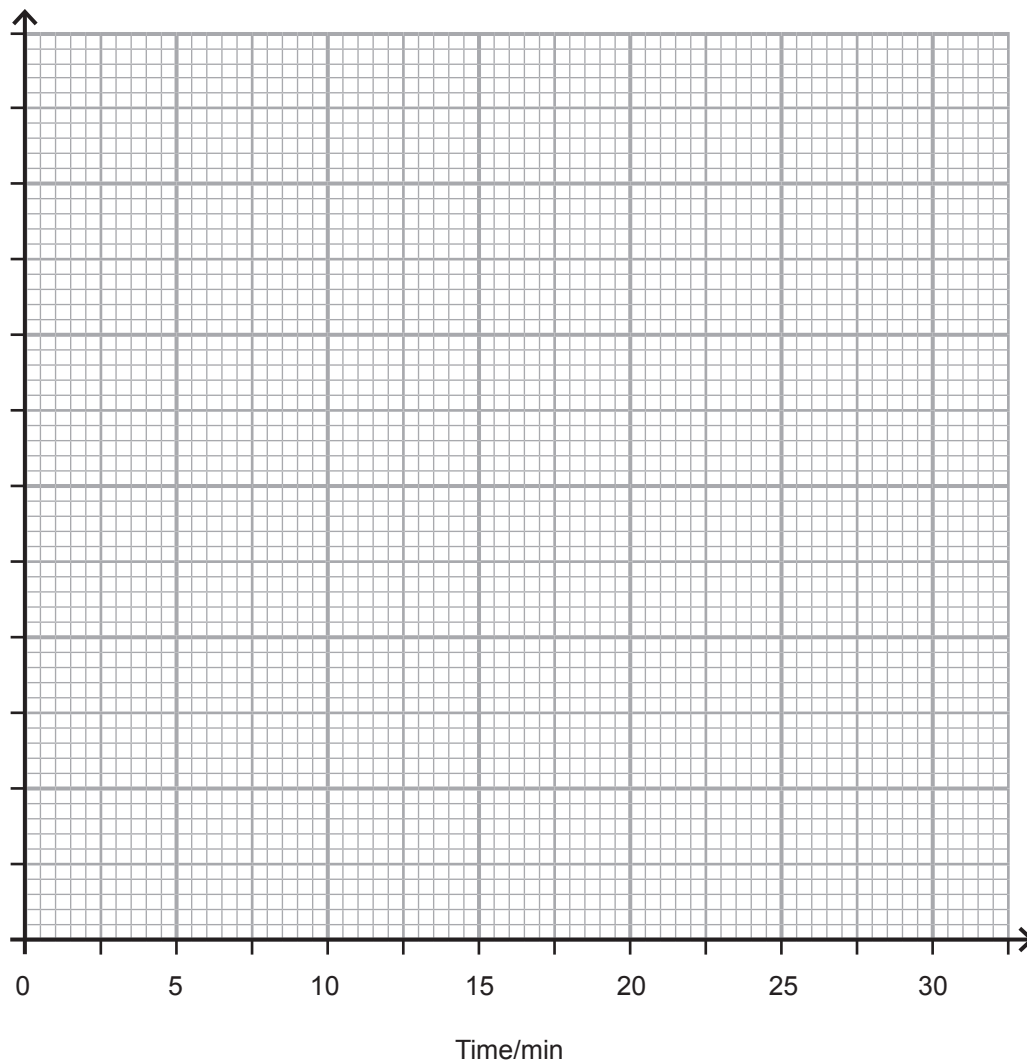
The table below shows the results of the experiment.

Temperature/°C	100	66	45	30	22	18	18
Time/min	0	5	10	15	20	25	30

You are asked to draw a graph of temperature against time for the cooling water.

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





(iv) Why do you think the last two readings of temperature are the same?

_____ [1]

(v) Describe fully how the temperature of the water changes with time.

 _____ [2]

(vi) Use the graph to find the temperature of the water at 12 minutes.

_____ °C [1]

[Turn over





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(Questions continue overleaf)

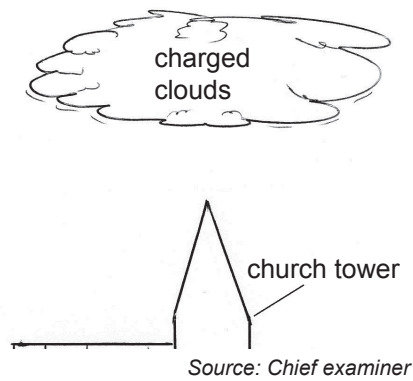
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[Turn over



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6 Charged thunderclouds can cause damage to tall buildings.



(a) (i) How do the clouds become charged?

_____ [1]

(ii) What phenomenon could the charge on the clouds lead to?

_____ [1]

(iii) How can this damage to tall buildings be reduced?

_____ [1]

(b) A current of 20 mA flows through a resistor. How much charge passes in 5 minutes? Remember 1 mA = 0.001A.

You are advised to show your working out.

Charge = _____ C [4]



Samuel wants to find the relationship between the resistance and the area of cross section of a piece of resistance wire.

He measures the resistance of different thicknesses of a metal wire and obtains the following results.

Area of cross section of wire, A/mm^2	0.5	1.0	2.0	3.0	4.0
Resistance of wire, R/Ω	24.0	12.0	6.0	4.0	3.0
Product of resistance and area of cross section/ $\Omega \text{ mm}^2$			12.0		

(c) (i) How would Samuel make this a fair test, assuming he keeps the temperature of the wire constant?

_____ [1]

(ii) Complete the third row of the table above. One entry has been done for you. [1]

(iii) Use the results to state the **general** relationship between area of cross section and resistance.

_____ [1]

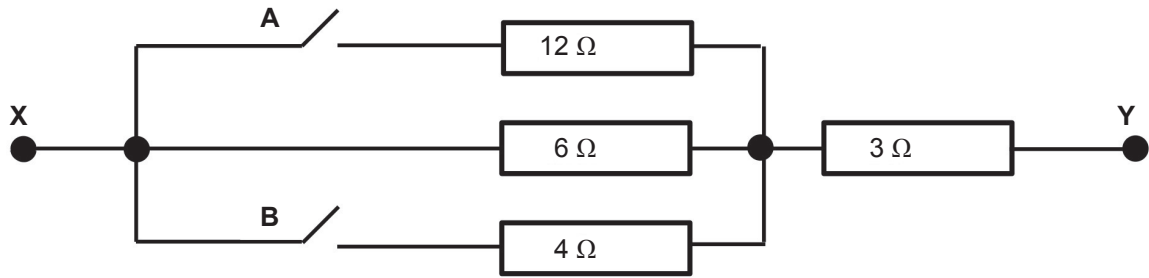
(iv) Calculate the resistance of this wire if its area of cross section is 1.5 mm^2 .

Resistance = _____ Ω [1]

[Turn over



7 Four resistors are connected between X and Y as shown below.



(a) (i) Complete the following table to show the effective resistance between X and Y for the different switch settings.

SWITCH		Resistance between X and Y /Ω
A	B	
Open	Open	
Closed	Open	
Open	Closed	

[3]

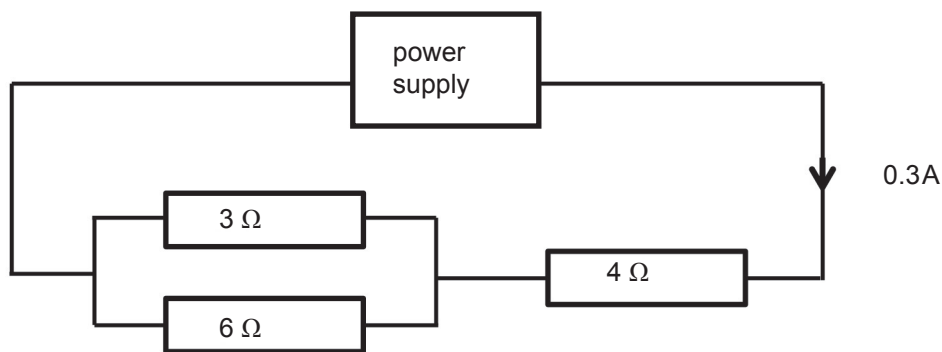
(ii) Calculate the total resistance between X and Y when both switches are closed.

You are advised to show your working out.

Total resistance = _____ Ω [4]



In the following circuit a current of 0.3A flows through the 4 Ω resistor.



(b) (i) What currents flow through the other two resistors?

Current through 3 Ω resistor = _____ A

Current through 6 Ω resistor = _____ A [2]

(ii) Calculate the voltage across the 4 Ω resistor.

You are advised to show your working out.

Voltage across 4 Ω resistor = _____ V [3]

(iii) Calculate the power developed in the 4 Ω resistor.

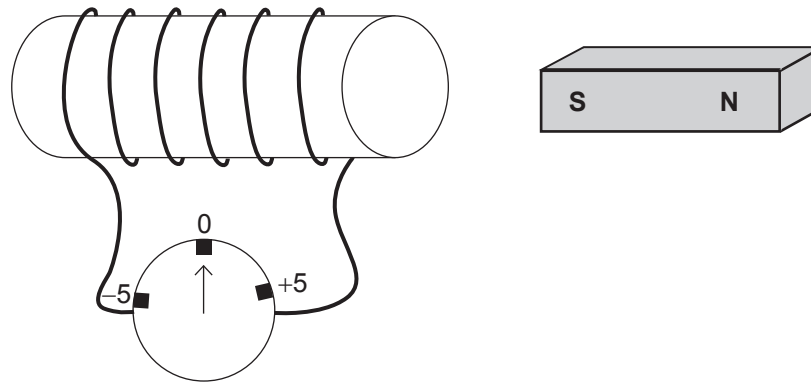
You are advised to show your working out.

Power in the 4 Ω resistor = _____ W [3]

[Turn over



8 A sensitive zero centred ammeter is connected to a coil of wire as shown.



A magnet is moved towards the coil and the ammeter gives a momentary deflection to the left, as shown in the table.

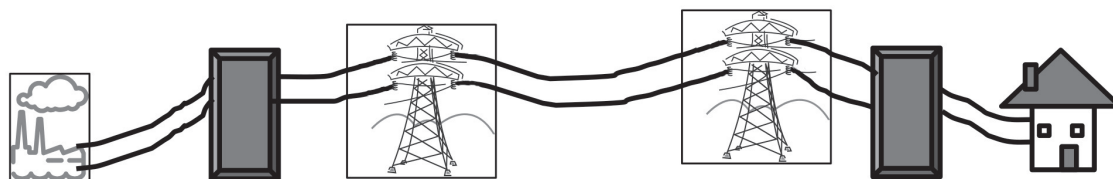
(a) Complete the table.

PROCEDURE	OBSERVATION
S Pole of magnet enters the coil	Momentary deflection to the left
S Pole of magnet now withdraws from the coil	Momentary deflection to the _____
N Pole of magnet enters the coil	Momentary deflection to the _____
N Pole of magnet now withdraws from the coil	Momentary deflection to the _____

[3]



(b) The following diagram shows the main stages in the generation and transmission of electricity.



generator in
power
station

transformer
A

transformer
B

home

(i) In what way does transformer **A** alter the current?

_____ [1]

(ii) What is the function of transformer **B**?

_____ [1]

(iii) Explain, briefly, how heat is generated in the cables when they carry an electric current.

_____ [1]

(c) A transformer for a printer reduces the voltage from 240 V to 36 V. If the primary coil has 1800 turns, how many turns are on the secondary coil?

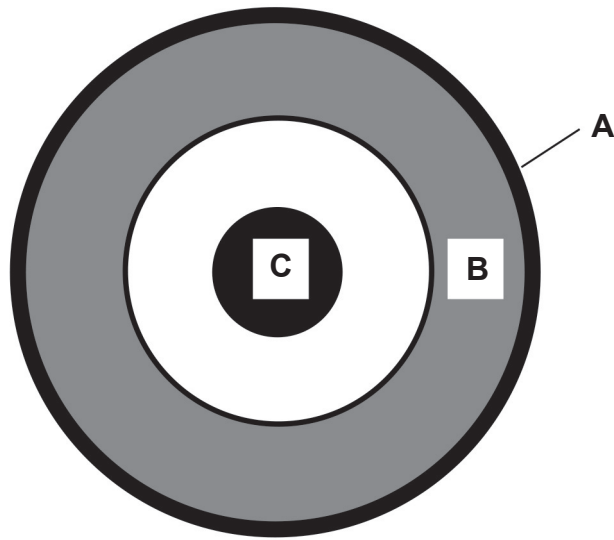
You are advised to show your working out.

Number of turns = _____ [3]

[Turn over



9 The structure of the Earth is drawn below.



(a) Name parts **A**, **B** and **C**.

A _____

B _____

C _____

[3]



(b) Describe and explain the causes of earthquakes and volcanoes.

You will be assessed on your written communication skills including the use of specialist scientific terms.

Earthquakes

Volcanoes

[6]

THIS IS THE END OF THE QUESTION PAPER



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For Examiner's use only	
Question Number	Marks
1	
2	
3	
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7	
8	
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Total Marks	
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Examiner Number

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