



General Certificate of Secondary Education  
2017

Centre Number

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Candidate Number

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## Double Award Science: Physics

Unit P2

Higher Tier



[GSD62]

MONDAY 19 JUNE, MORNING

\*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 black ink only. **Do not write with a gel pen.**

Answer **all eight** 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 **3(b)** and **7**.



1 The box below contains the names of some bodies in our Solar System.

Venus	asteroids	Mars	moon
Saturn	comets	Jupiter	Neptune

(a) (i) Give the name of the planet named **in the box** which is:

farthest from the Sun \_\_\_\_\_

closest to the Sun \_\_\_\_\_ [2]

(ii) **From the box**, give the name of a body which orbits a planet.

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

(iii) Name three planets which are **not** mentioned in the box.

\_\_\_\_\_ [3]

(b) Artificial satellites have many uses.

(i) What do you understand by the word *artificial* in this context?

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

(ii) Give two different uses of such a satellite.

Use 1: \_\_\_\_\_

Use 2: \_\_\_\_\_ [2]



(c) The nebular model is used to describe how a star is formed.



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(i) What is a nebula?

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

(ii) What is the main chemical element found in a nebula?

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

(iii) Name the force involved in the formation of a star.

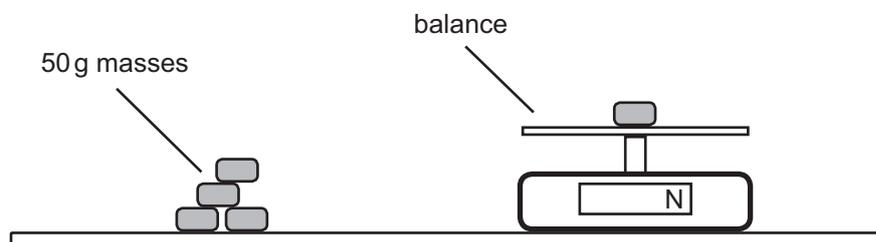
\_\_\_\_\_ [1]

[Turn over



- 2 A student wants to find how the weight of an object in newtons depends on its mass in grams.

She uses 50 gram masses and places them on a balance marked in newtons.



She records her results in a table.

Mass/g	50	100	150	200	250
Weight/N		1	1.5	2.0	2.5

- (i) Fill in the missing entry in the table. [1]

- (ii) Circle the entry which has been inaccurately recorded in the table. [1]

You are asked to plot a graph of weight against mass.

- (iii) Choose a suitable scale for the horizontal axis and label it. [2]

- (iv) Plot the points on the grid opposite. [2]

- (v) Draw the best fit line. [1]

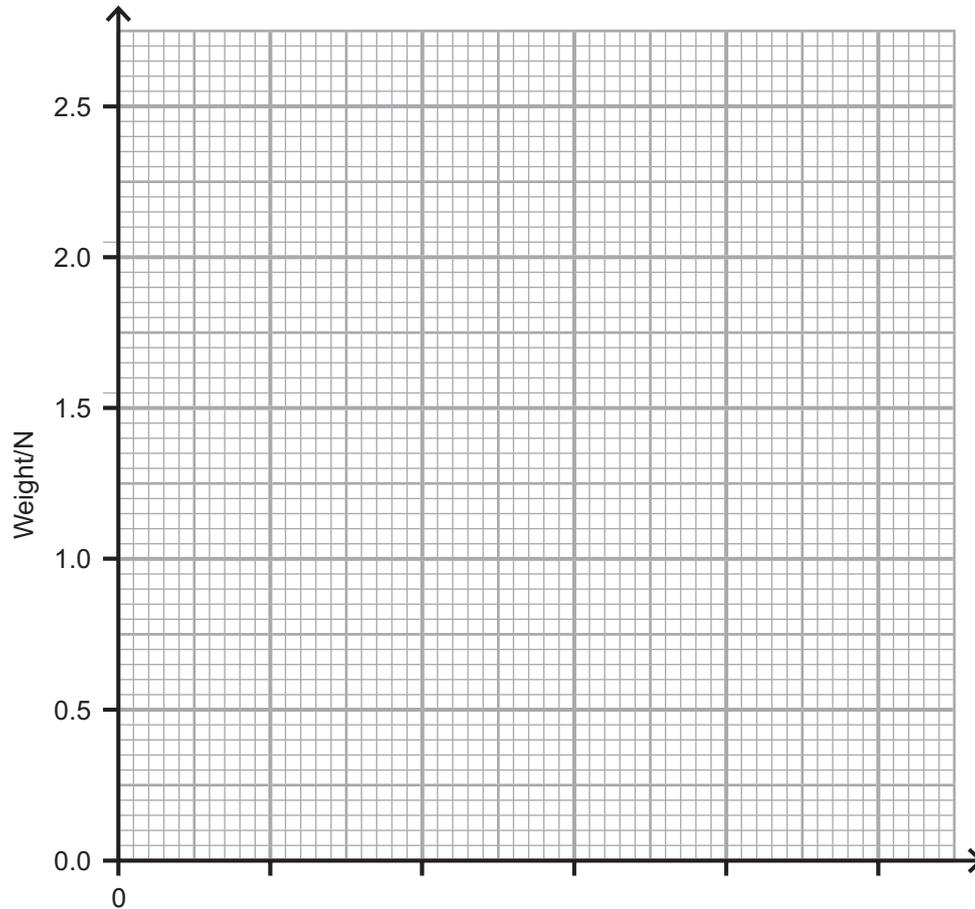
- (vi) Is the weight directly proportional to the mass? \_\_\_\_\_

Give the reasons for your answer.

1. \_\_\_\_\_

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





The weight,  $W$ , and mass,  $M$ , are connected by the equation:

$$W = k M \quad \text{where } k \text{ is a constant} \quad \text{Equation 2.1}$$

(vii) Use your graph to find the value of the constant  $k$  and give its unit.

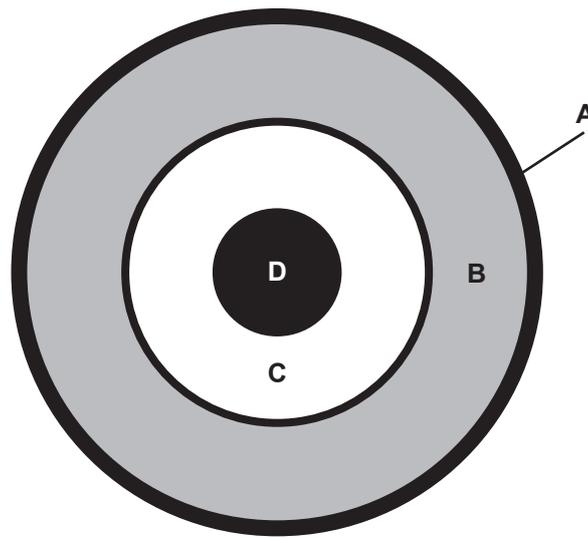
**You are advised to show your working out.**

$k =$  \_\_\_\_\_ [4]

[Turn over



3 The structure of the Earth is drawn below.



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

A \_\_\_\_\_

B \_\_\_\_\_

C \_\_\_\_\_

D \_\_\_\_\_

[4]



(b) Describe (i) how volcanoes are formed and (ii) how earthquakes occur.

**In this question you will be assessed on your written communication skills including the use of specialist scientific terms.**

(i) Volcanoes: \_\_\_\_\_

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(ii) Earthquakes: \_\_\_\_\_

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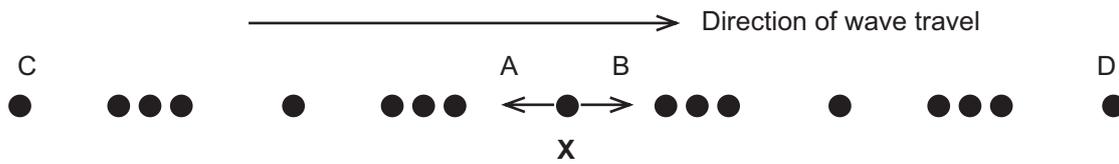
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[6]

[Turn over



- 4 The particles of a wave vibrate parallel to the direction of travel of the wave as shown below.



Particle **X** vibrates from A to B and back again.

- (a) Name this type of wave.

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

The distance AB is 10 cm.

- (b) What is the amplitude of the wave?

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

- (c) Name an example of this type of wave.

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

- (d) (i) The frequency of the wave is 9 Hz. How many times does the particle labelled **X** move from A to B and back again in 2 seconds?

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

Number of times = \_\_\_\_\_ [2]



(ii) The distance CD is 80 cm. What is the wavelength of the wave?

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

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

(e) A radio station broadcasts on 200 kHz. What is their wavelength if the speed of radio waves is  $3.0 \times 10^8$  m/s?

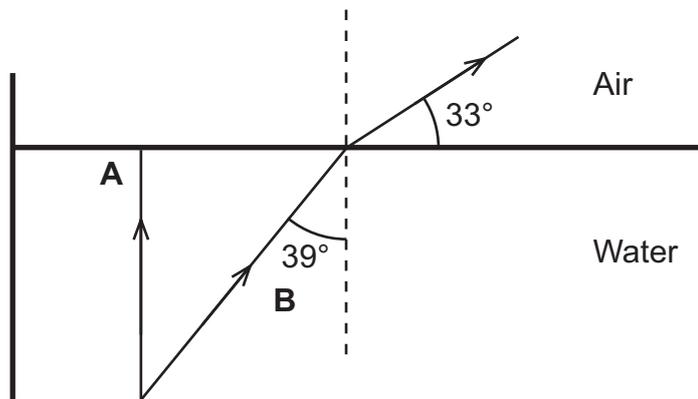
**You are advised to show your working out.**

Wavelength = \_\_\_\_\_ m [4]

[Turn over



- 5 Two rays of light, A and B, travelling in water, are shown in the diagram below. The diagram is not to scale.



- (a) (i) Continue ray **A** into air. [1]

- (ii) What is the value of the angle of incidence of ray **B** in water?

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

- (iii) What is the value of the angle of refraction of ray **B** in air?

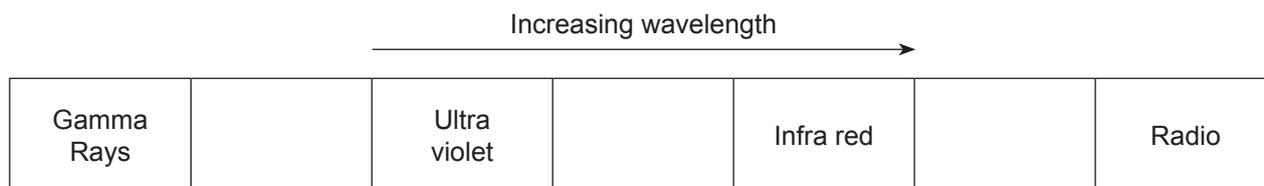
\_\_\_\_\_ [1]

- (iv) Describe how the speed of ray **B** changes when it passes from water to air.

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



- (b) The diagram shows some members of the electromagnetic spectrum in order of increasing wavelength. Some members are missing from the list.



- (i) Fill in the missing radiations. [3]

- (ii) State one property which is unique to all electromagnetic waves.

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

- (iii) State one danger of gamma rays.

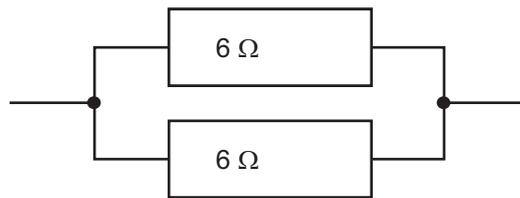
\_\_\_\_\_ [1]

- (iv) State one use of ultraviolet radiation.

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



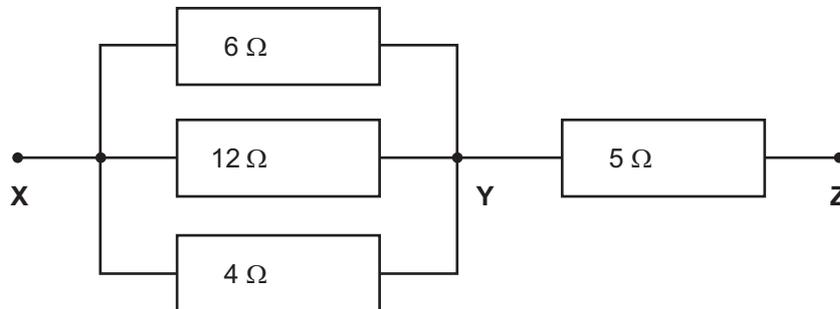
- 6 Two equal resistors are connected in parallel as shown in the diagram below.



- (a) Calculate the total resistance.

Resistance = \_\_\_\_\_  $\Omega$  [1]

Four resistors are connected between the points **X** and **Z**.



- (b) (i) By first finding the resistance between **X** and **Y**, calculate the total resistance between **X** and **Z**.

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

Total resistance between **X** and **Y** = \_\_\_\_\_  $\Omega$

Total resistance between **X** and **Z** = \_\_\_\_\_  $\Omega$  [5]



A current of 0.3A flows through the  $4\ \Omega$  resistor.

(ii) What current flows through the  $12\ \Omega$  resistor?

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

Current through the  $12\ \Omega$  resistor = \_\_\_\_\_ A [4]

(c) (i) Calculate the voltage across a resistor when 0.9A flows through it and the power developed in the resistor is 4.05 W.

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

Voltage = \_\_\_\_\_ V [3]

(ii) Calculate the charge which flows through the resistor in 5 minutes. Include the unit with your answer. Remember the current is 0.9A.

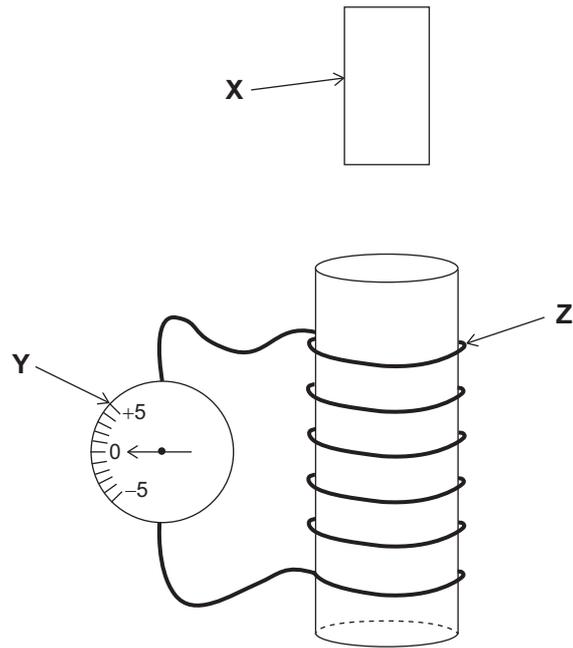
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Charge = \_\_\_\_\_ [5]

[Turn over

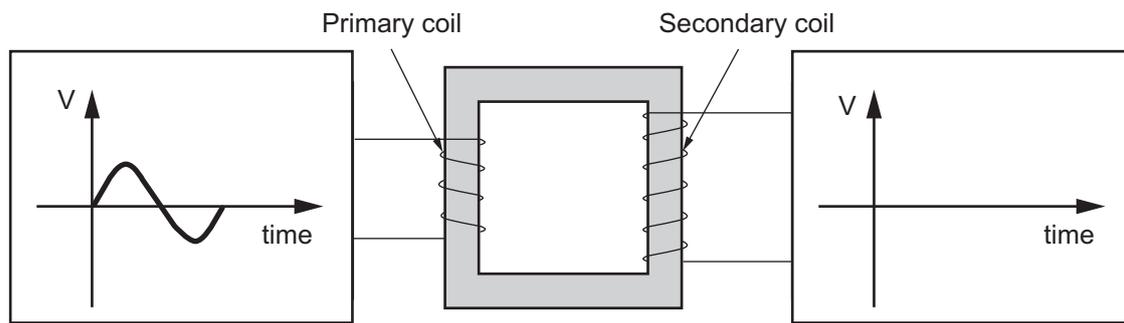


7 The following diagram shows the apparatus which can be used to illustrate the generation of electricity in a school laboratory.





- 8 (a) (i) An a.c. voltage is applied to the primary coil of a transformer. The graph on the left hand side shows how this voltage changes with time.



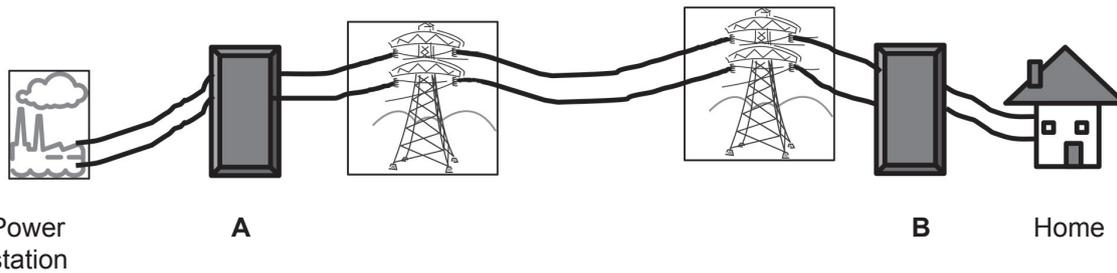
In the box on the right sketch the graph of voltage against time you would expect to obtain from the secondary coil. [2]

- (ii) Name the laboratory apparatus used to display a.c. voltage. [1]

\_\_\_\_\_



Transformers are used in the transmission of electricity from power stations to our homes.



- (b) In the following table state how the current and voltage are changed in transformers **A** and **B**.

	Current	Voltage
Transformer <b>A</b>		
Transformer <b>B</b>		

[4]

- (c) A transformer is used to supply 6 V to a piece of electrical apparatus. The transformer has 800 turns in the primary coil and 20 turns in the secondary coil. What is the input voltage of the transformer?

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

Input voltage = \_\_\_\_\_ V [3]

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Question Number	Marks
1	
2	
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<b>Total Marks</b>	
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Examiner Number

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