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Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2018

Double Award Science: Physics

GSD61

Unit P2

Foundation Tier

[GSD61]

WEDNESDAY 14 NOVEMBER, 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.
Write your answers in the spaces provided in this question paper.
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 the pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in Question **7**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	

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Marks	Re-mark

1 **(a)** Put the waves below into the correct column in the table to show if they are transverse or longitudinal waves.

sound	ultraviolet	ultrasound	microwave

Transverse waves	Longitudinal waves

[4]

(b)

gamma rays	infrared	microwaves
radio waves	ultraviolet	X-rays

The box above contains different regions of the electromagnetic spectrum. Place these different regions in the diagram below in order of increasing wavelength.

Increasing wavelength

			Visible light			

[6]

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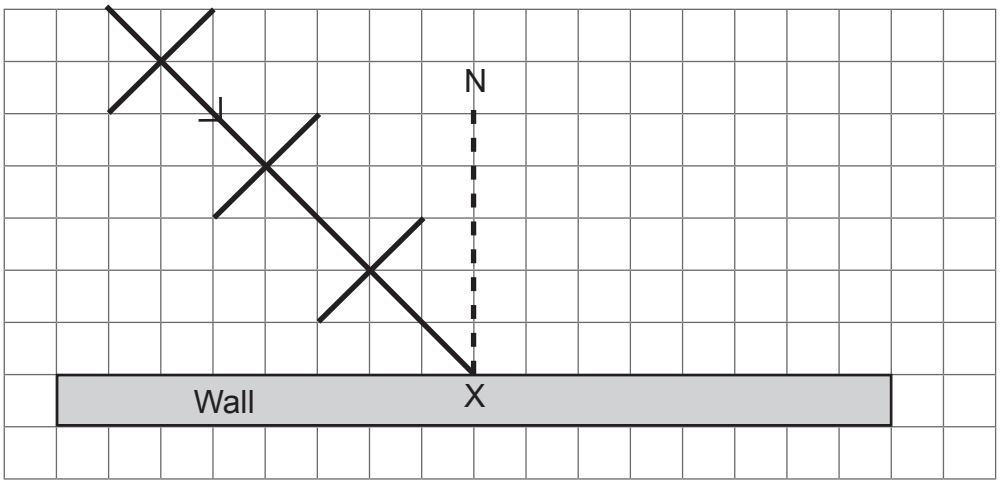
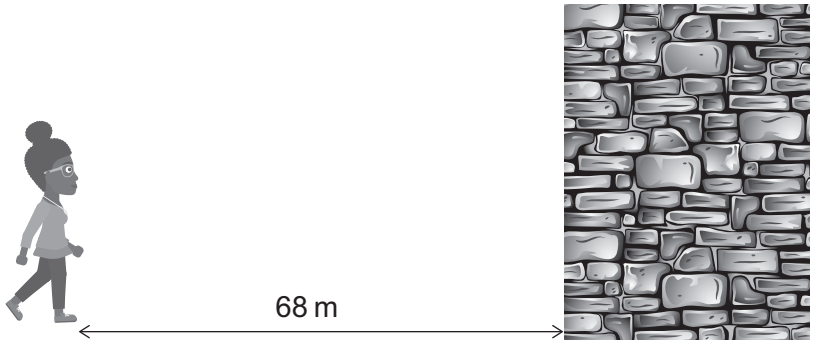
2 **(a)** Water waves hit a wall as shown in the diagram.
The arrow shows the direction of these waves.



Source: Principal Examiner

Beginning at the point X, draw a line with an arrow to show the direction of the reflected waves. On this line draw three reflected waves. [3]

(b) Emma shouts in front of a wall and hears her echo 0.4 seconds later.
The wall is 68 m in front of her.



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Use the information above to calculate the speed of sound in air.

You are advised to show your working out.

Speed of sound = _____ m/s [4]

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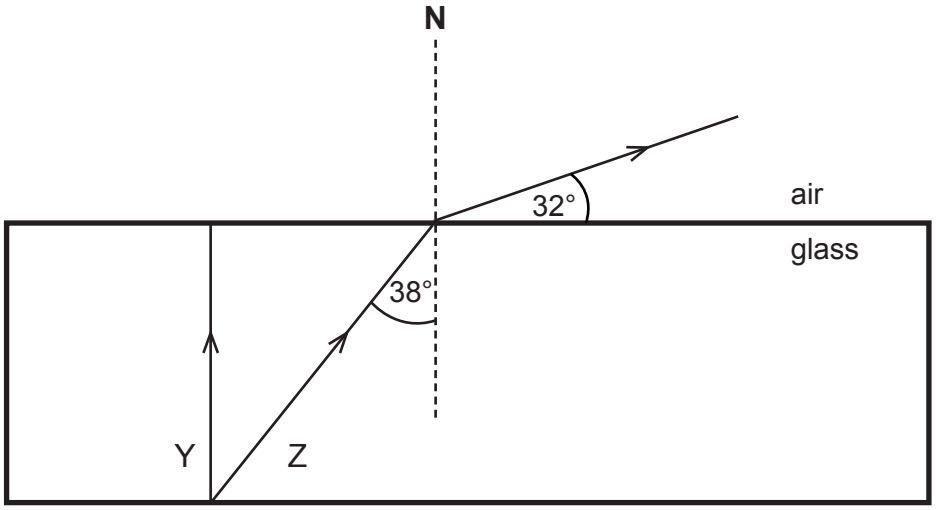
3 Two rays of light, Y and Z, travelling in glass are shown in the diagram below. The diagram is not to scale.



(a) (i) Continue ray Y into the air. [1]

(ii) What is the value of the angle of incidence of ray Z in glass?

_____ ° [1]

(iii) What is the value of the angle of refraction of ray Z in air?

_____ ° [1]

(iv) Describe how the speed of ray Y changes as it leaves the glass.

_____ [1]

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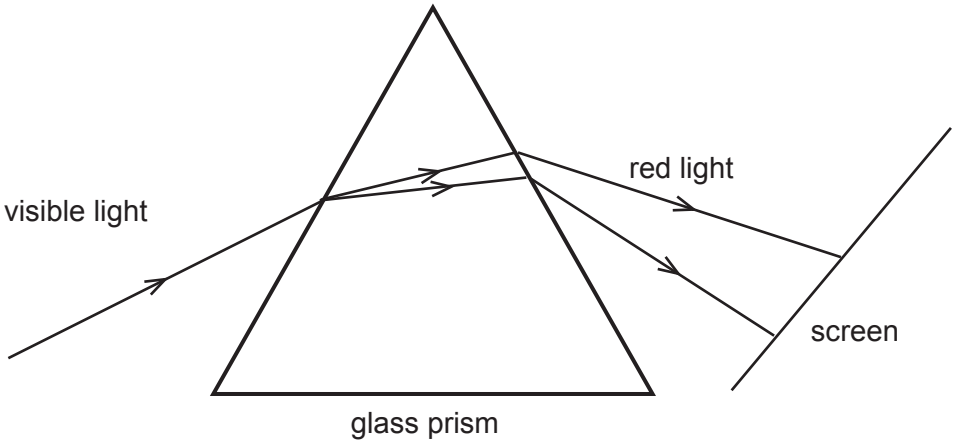
Visible light enters a glass prism.



(b) (i) The visible light is split into different colours. Name this process.

_____ [1]

(ii) Starting with red, list the colours in the order that you would see them on the screen.

Red, _____

_____ [1]

(iii) What is the name of the band of colours that is produced on the screen?

_____ [1]

(iv) Look at the diagram above and explain why different colours are produced.

_____

_____ [1]

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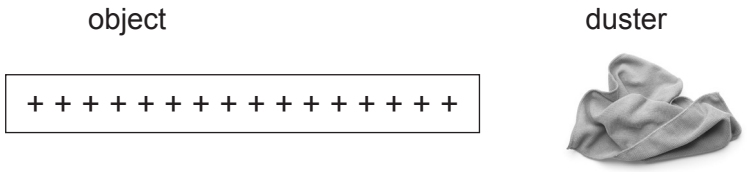
4 In the diagram below the object has been positively charged using a duster.



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(a) (i) Using the diagram above, choose words from the list below to complete the sentence.

object positive electrons friction protons negative

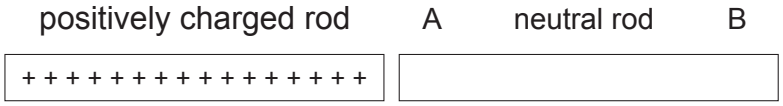
The duster has a _____ charge because it has rubbed the _____ and _____ have been rubbed onto the duster because of _____. [4]

(ii) Is the object in the diagram above a conductor or an insulator?

_____ [1]

The diagram below shows a positively charged rod and a neutral rod.

(b) The rods are brought close together. Show the charge at end A and end B of the neutral rod.



[2]

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(c) A charge of 13 coulombs flows through a circuit in 10 seconds.

Calculate the current flowing.

You are advised to show your working out.

Current = _____ A [3]

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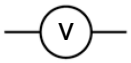
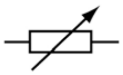
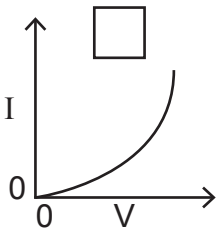
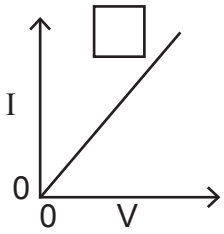
5 **(a)** In the table below some circuit components and their names have been left out. Complete the five missing sections.

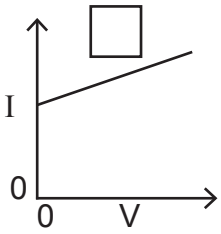
Name of component		Resistor		Fuse	
Circuit symbol					

[5]

(b) **(i)** Which of the following shows the I-V graph for a material which obeys Ohm's Law?
Tick (✓) the correct box.







[1]

(ii) During an investigation of Ohm's Law the temperature must

remain constant. increase. decrease.

[1]

Circle the correct response.

(iii) A pupil is given a resistor of 4 Ω. She connects a battery across the resistor and finds that a current of 0.75 A flows through it.

Calculate the battery voltage.

You are advised to show your working out.

Voltage = _____V [3]

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(c) The diagrams below show two circuits a pupil sets up in class.

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Marks	Re-mark

Diagram 1

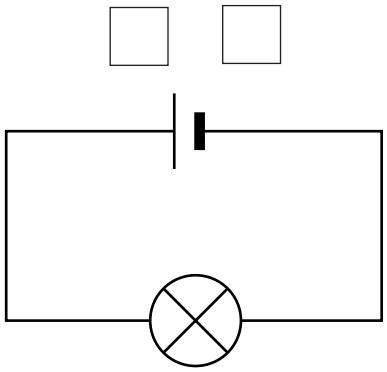
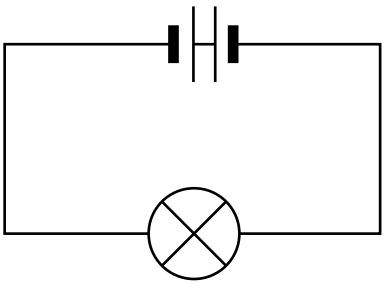


Diagram 2



(i) On Diagram 1 insert the polarity of each side of the cell in the boxes above it. [1]

(ii) Diagram 2 uses two cells each of voltage 1.5 V. What is the total voltage in Diagram 2?

Voltage =_____V [1]

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6 **(a)** A student plays a computer games console for 30 minutes. The power rating on the games console is 200 W.

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(i) Calculate the energy used by the games console.

You are advised to show your working out.

Energy = _____ J [4]

(ii) The controller on the games console has a power rating of 2.5 W and uses a 5 V battery.

Calculate the current travelling through the controller.

You are advised to show your working out.

Current = _____ A [3]

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(b) When electricity is used in the home the electricity company will charge for each kilowatt-hour (kWh) used by the customer.

(i) Explain what is meant by a kilowatt-hour (kWh).

_____

_____

_____ [3]

(ii) The electricity company charges 15 p for each kWh. By first finding the number of kWh, calculate how much it would cost to run a 3 kW electric heater for 2 hours.

You are advised to show your working out.

Number of kWh = _____

Total cost = _____ p [4]

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7 Describe how a star is formed.

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Your answer should include:

- the force involved;
- the main element involved at the start; and
- a full description of the process.

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

[6]

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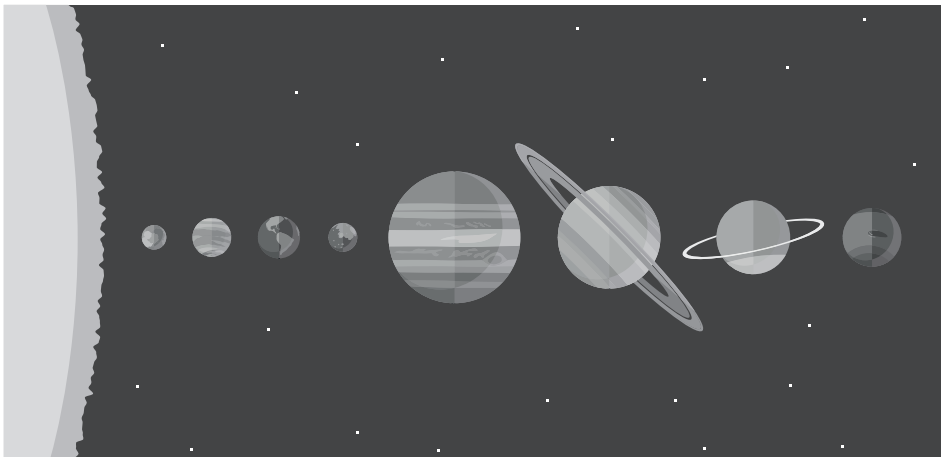
8 The following diagram shows the planets in our Solar System.



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(a) (i) State the name of the giant gas planet closest to the Sun.

_____ [1]

(ii) Name the planets closest to and furthest from the Sun.

Closest : _____ [1]

Furthest : _____ [1]

(iii) Name the attractive force that keeps the planets in orbit around the Sun.

_____ [1]

(iv) Apart from the planets, name two other heavenly bodies which orbit the Sun.

1. _____

2. _____ [2]

There are two models which describe what makes up our Solar System. They are called the heliocentric and geocentric models.

(b) (i) Which model is accepted as fact in modern times?

_____ [1]

(ii) Which model has the Earth at the centre of the Solar System?

_____ [1]

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Objects that orbit the Earth are called satellites.

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(c) (i) What is an **artificial** satellite?

_____ [1]

(ii) State two uses of artificial satellites.

1. _____

2. _____ [2]

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9 A skydiver jumps from a plane and falls through the air for 35 seconds.

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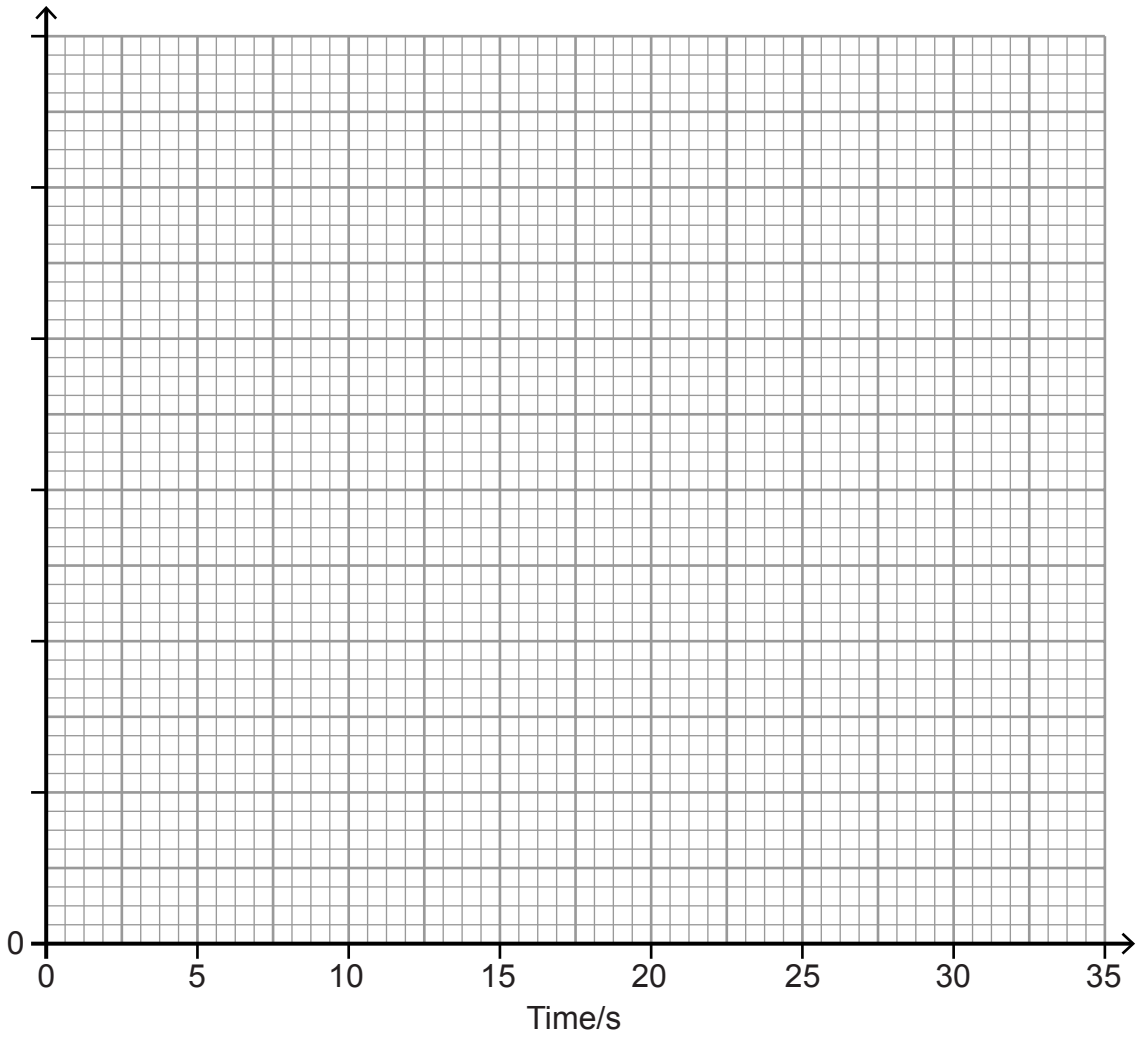
She measures her velocity every 5 seconds using a device on her arm and the values are recorded in the table below.

Time/s	0	5	10	15	20	25	30	35
Velocity/ m/s	0	10	20	30	40	50	50	50

(i) On the graph below choose a scale for the vertical axis and label it. [2]

(ii) Plot points of velocity against time. [2]



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(iii) Draw the graph. [2]

(iv) Use your graph to state the time interval when there is direct proportion between velocity and time.

From _____ s to _____ s [1]

(v) Give two reasons why this part of the graph shows direct proportion.

1. _____

2. _____ [2]

(vi) Find the gradient of the graph during the first 25 seconds and give its unit.

You are advised to show your working out.

Gradient = _____

Unit = _____ [3]

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