Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2018

# Double Award Science: Physics

*GSD62*

## Unit P2

## Higher Tier

## [GSD62]

## 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 eight** 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 Questions **2** and **8**.

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

| Examiner Only | |
|---|---|
| Marks | Re-mark |
| | |

**1** **(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]

**(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]

| Examiner Only | |
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| Marks | Re-mark |
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**2** Describe how a star is formed.

| Examiner Only | |
|---|---|
| Marks | Re-mark |
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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]

| Examiner Only | |
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| Marks | Re-mark |
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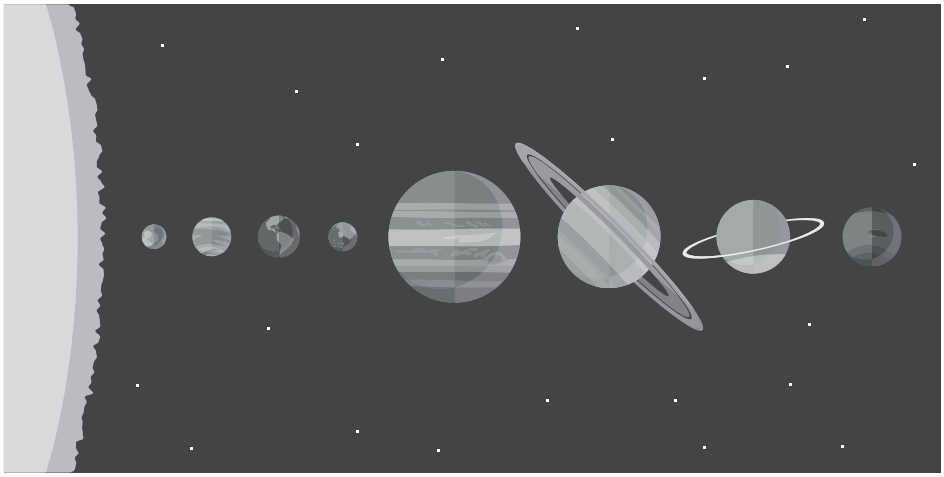
**3** The following diagram shows the planets in our Solar System.



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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]

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]

Objects that orbit the Earth are called satellites.

| Examiner Only | |
|---|---|
| Marks | Re-mark |
| | |

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

_____ [1]

**(ii)** State a use of artificial satellites.

_____ [1]

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

| Examiner Only | |
|---|---|
| Marks | Re-mark |
| | |

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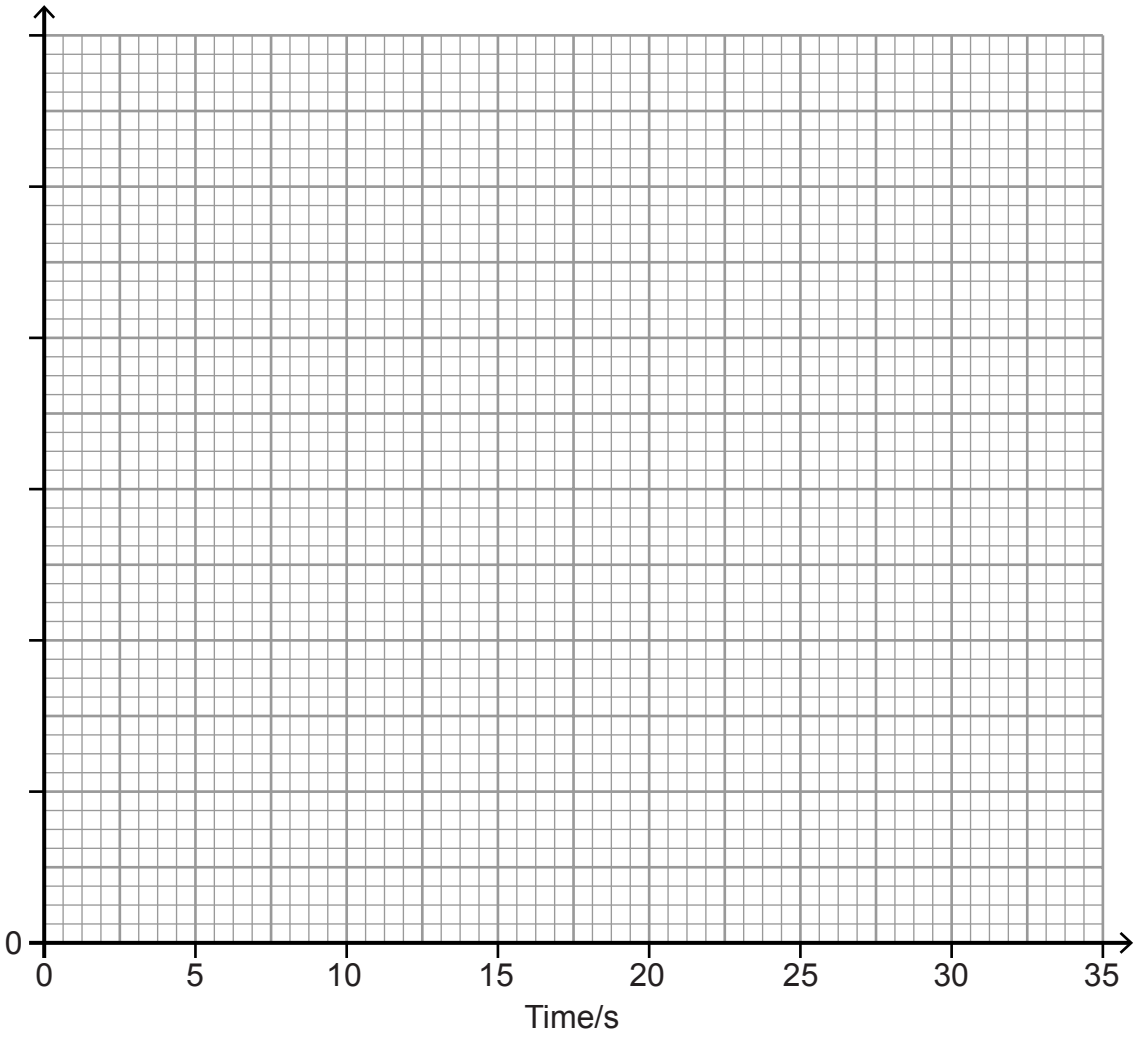
She measures her velocity every 5 seconds using a device on her arm and the values are recorded in the table below.

| 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]



**(iii)** Draw the graph. [2]

**(iv)** Use your graph to state the time interval where there is direct proportion between the 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 = _____

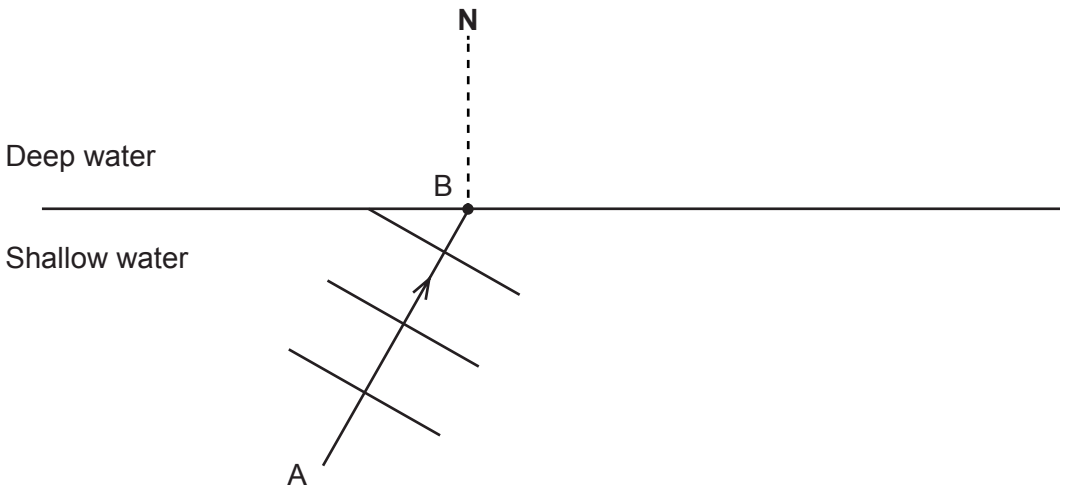
Unit = _____ [3]

| Examiner Only | |
|---|---|
| Marks | Re-mark |
| | |

| Examiner Only | |
|---|---|
| Marks | Re-mark |
| | |

**5** Water waves travel from a region of shallow water to a region of deep water.

The arrow AB shows the direction of travel of the waves. When the waves enter the deep water **they change direction**.




**(a) (i)** Beginning at point B, draw an arrow to show the direction the waves will travel in the deep water. [1]

**(ii)** On the arrow draw three wavefronts in the deep water. [3]

**(iii)** What name do we give to this change of direction?

_____ [1]

**(b)** A radio wave travels at $3 \times 10^8$ m/s and has a wavelength of 1500 m. Calculate its frequency. Include the unit with your answer.

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

Frequency = _____ [5]

| Examiner Only | |
|---|---|
| Marks | Re-mark |
| | |

**(c)** Reflections of waves are often used to calculate distances. These include sonar, radar, and ultrasound.

Which of these is used in the examples below?

**(i)** Locating an aircraft. _____

**(ii)** Scanning an unborn child. _____

**(iii)** Finding the depth of the seabed. _____ [3]

**(d)** A girl is looking in a mirror and notices that her image has certain properties. One property is that the image is as far behind the mirror as the girl is in front.

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List three other properties of the image in a plane mirror.

1. _____

2. _____

3. _____ [3]

| Examiner Only | |
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| Marks | Re-mark |
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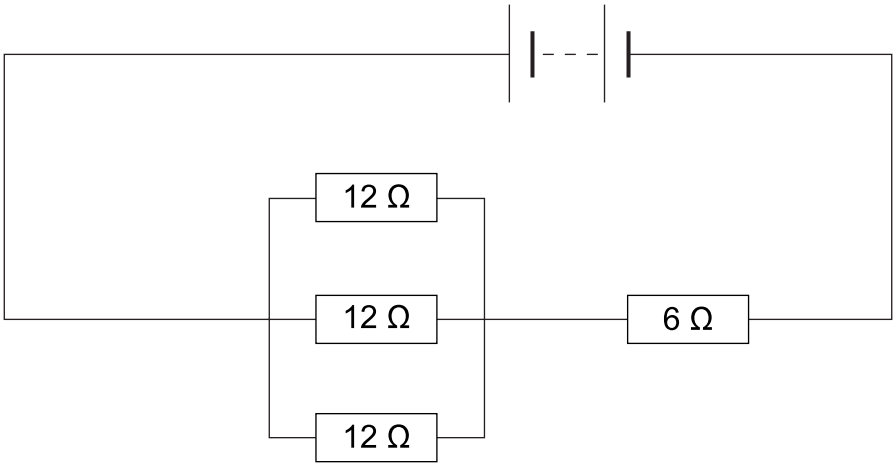
**6** In the following circuit a current of 1.5A flows through the 6 Ω resistor.




**(i)** Calculate the total charge which passes through the 6 Ω resistor in 3 **minutes**.
Include the unit with your answer.

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

Charge = _____ [5]

**(ii)** State the current through each of the 12 Ω resistors.

Current = _____ A [1]

**(iii)** The voltage across the central 12 Ω resistor is 6 V.

By first finding the voltage across the 6 Ω resistor, calculate the battery voltage.

Remember the current through the 6 Ω resistor is 1.5 A.

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

Battery voltage = _____ [4]

**(iv)** Calculate the total resistance of all the resistors in the circuit.

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

Resistance = _____ Ω [4]

| Examiner Only | |
|---|---|
| Marks | Re-mark |
| | |

| Examiner Only | |
|---|---|
| Marks | Re-mark |
| | |

**7** Current can be supplied in the form of a.c. or d.c.

**(a) (i)** What do the letters a.c. and d.c. stand for?

a.c. _____

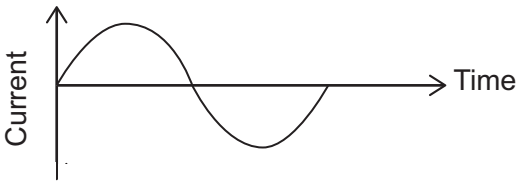
d.c. _____ [2]

**(ii)** Give an example of an a.c. source and d.c. source.

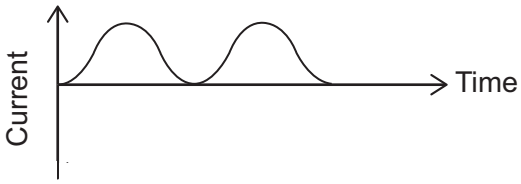
a.c. _____

d.c. _____ [2]

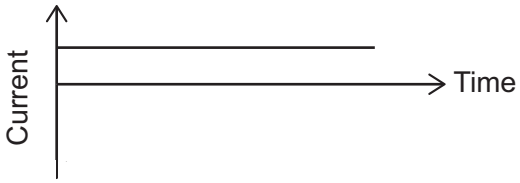
**(b)** Look at the following graphs and insert a.c. or d.c. in the box below each.




**(i)** ☐




**(ii)** ☐




**(iii)** ☐

[3]

**(c)** a.c. is produced by an a.c. generator.

**(i)** Give the names of the two main components in an a.c. generator.

_____ and _____ [2]

**(ii)** What name do we give to the process of producing the a.c.?

_____ [1]

Transformers are used in the transmission of electricity. The transformer at the user end is included for safety reasons.

**(d)** **(i)** What does the transformer do at the user end to make the electrical supply safer?

_____ [1]

**(ii)** A voltage of 1500 V is needed in a laboratory. The input voltage of a transformer is 250 V and the number of turns in the primary coil is 400.

Calculate the number of turns in the secondary coil.

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

Number of turns = _____ [3]

| Examiner Only | |
|---|---|
| Marks | Re-mark |
| | |

**8** Describe and explain how volcanoes and earthquakes occur.

| Examiner Only | |
|---|---|
| Marks | Re-mark |
| | |

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

Volcanoes

Earthquakes

[6]

THIS IS THE END OF THE QUESTION PAPER