Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2022

Double Award Science: Physics

Unit P2

Foundation Tier

[GDW61]

GDW61

THURSDAY 23 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 boxed area on each page or on blank pages.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all seven** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.
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 **5**.

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20GDW6101

1 **(a)** The following question is about waves.

What do all waves transfer as they move from one point to another?

_____

Complete the sentences below by choosing words from the box.

longitudinal	**converge**	**parallel**
perpendicular	**transverse**	**vibrate**

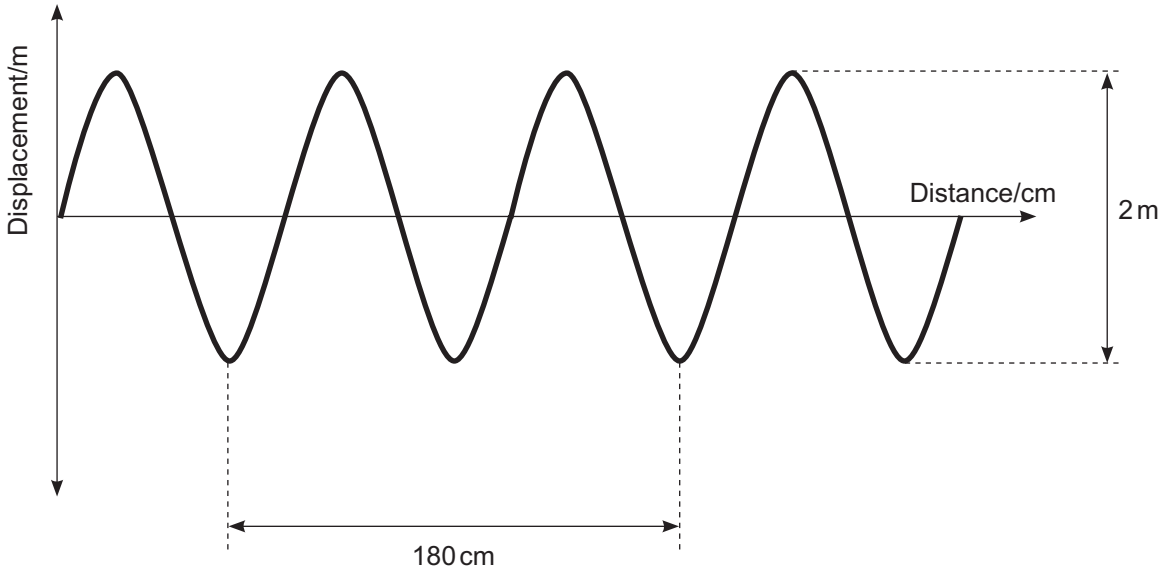
A water wave is an example of a _____ wave.

In a water wave the particles _____ in a direction

_____ to the wave direction.

[4]

(b) The diagram shows a wave. Use the information from the diagram to calculate its amplitude and wavelength.



Amplitude = _____ m

Wavelength = _____ cm

[2]

(c) If the frequency of a wave is 50 Hz, how many complete waves would pass a fixed point in two seconds?

_____ [1]

(d) A boy shouts through a megaphone.

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The sound of the boy's voice has a frequency of 100 Hz and its wavelength is 3.4 m.

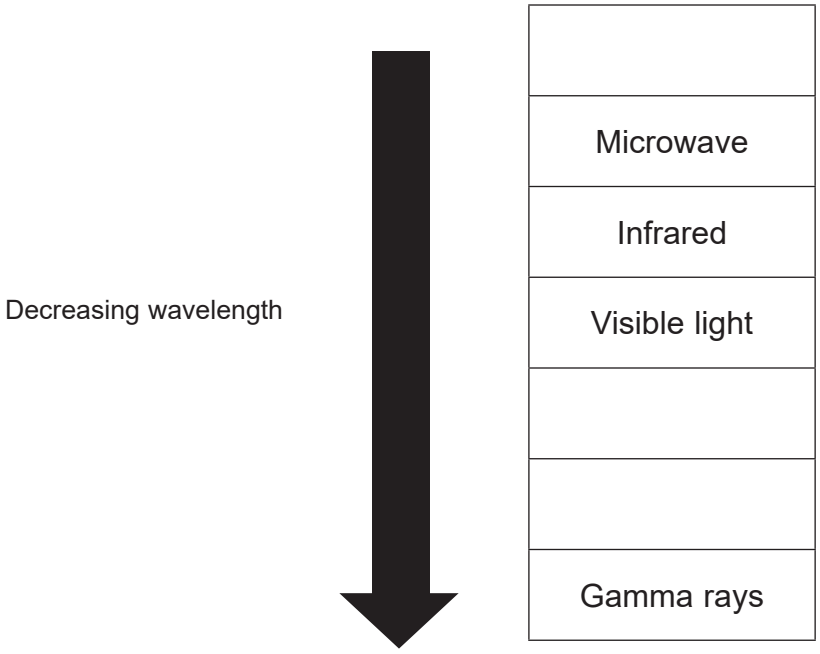
Use the information above to calculate the velocity of the sound.

You are advised to show your working out.

Velocity = _____ m/s [3]

[Turn over

2 The diagram below shows some of the regions of the electromagnetic spectrum. They are arranged in order of decreasing wavelength.



(a) **(i)** Complete the table by inserting the missing regions of the electromagnetic spectrum. [3]

Overexposure to different regions of the electromagnetic spectrum can be dangerous to the human body in different ways.

(ii) Draw a straight line between the points below to link the wave with its danger.

Wave	**Danger**
Microwave •	• Can heat internal body tissues
Infrared •	• Can damage your eyes
Intense visible light •	• Can be felt as heat and burn your skin
Gamma ray •	• Can damage cells and cause cancer

[4]

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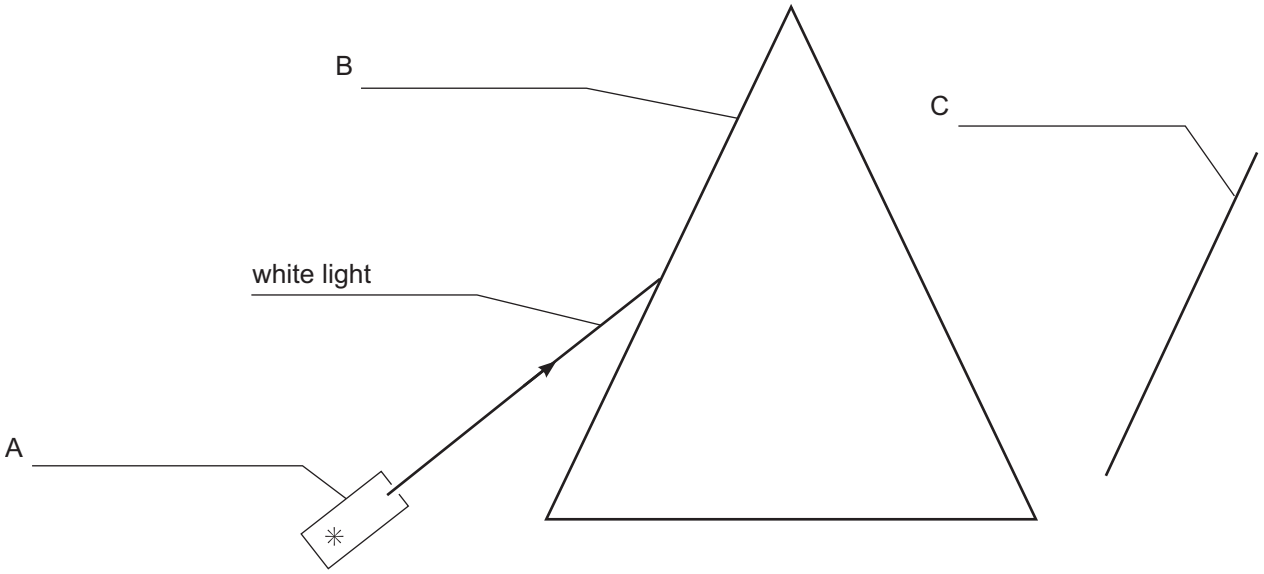
(iii) Complete the sentence below.

All regions of the electromagnetic spectrum travel at the

same _____ in a _____ . [2]

(b) **(i)** The diagram below shows an arrangement used to produce a visible spectrum.

On the diagram below, name A, B and C.



[3]

(ii) Complete the sentence below to describe how the spectrum is produced.

The spectrum is produced because different _____ travel at

different _____ in the glass. [2]

[Turn over

3 The focal length of a converging lens can be found using a distant object and a screen.
The instructions below explain how to find the focal length in a classroom, but they are not in the correct order.
Step 5 has been completed for you.

	Place an illuminated object more than 10 metres from the lens.
	Measure the distance from the centre of the lens to the screen.
	Stop moving the lens when a clear image is formed.
	Starting close to the screen, slowly move the lens away from the screen.
5	Record the focal length.

(a) Put a number, **1**, **2**, **3** or **4** in each box to show the order in which the steps should be carried out. [4]

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(Questions continue overleaf)

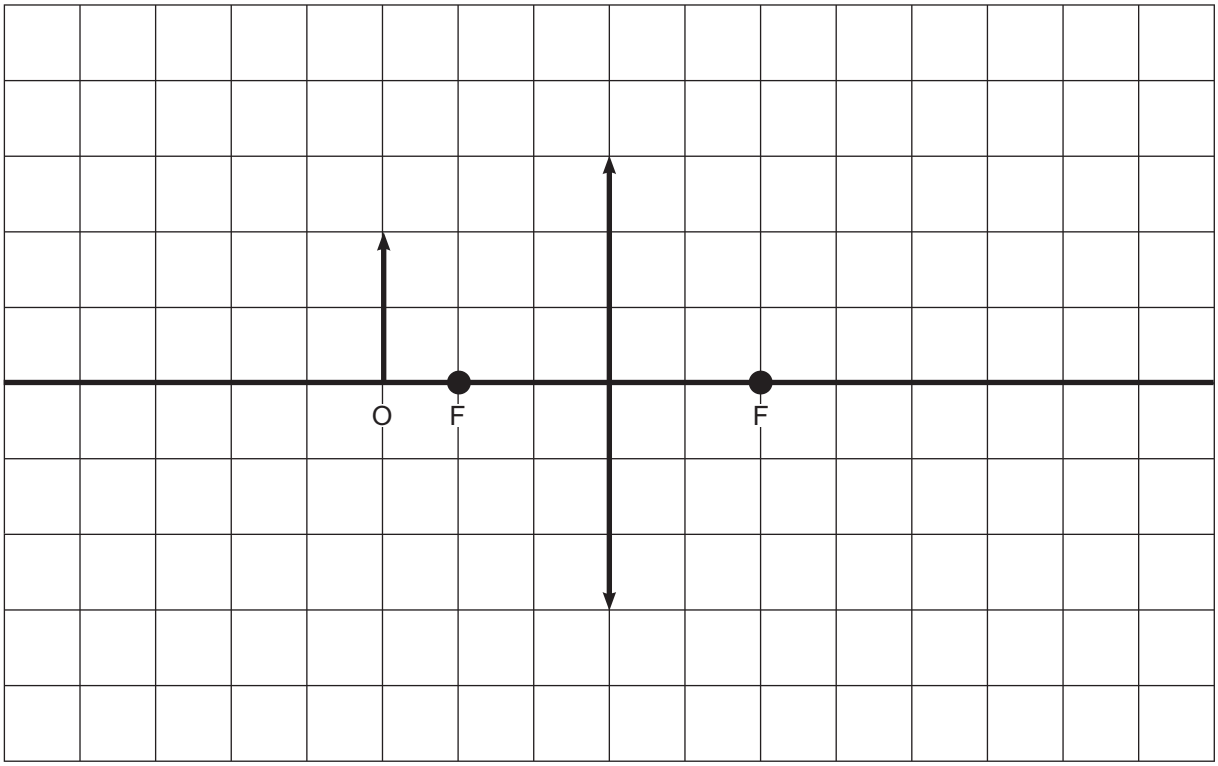
(b) (i) The diagram below shows an object O placed 3 cm from a converging lens of focal length 2 cm.

Each point F represents a principal focus.

Complete the diagram to show how the image of O is formed.

Include the following:

- two rays from the top of the object through the lens;
- arrows to show the direction of the rays;
- the image produced. [4]



(ii) The image produced can be described using two of the words below.

Place ticks (✓) in the correct boxes.

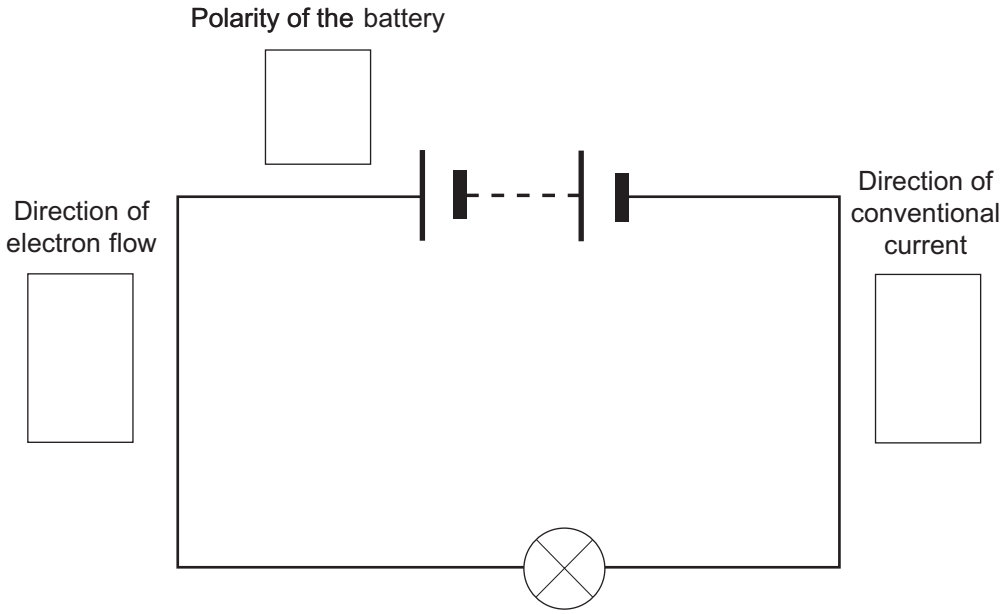
- ☐ Real
- ☐ Upright
- ☐ Smaller
- ☐ Inverted [2]

4 **(a)** State, in terms of particles, why conductors are better than insulators at conducting electricity.

_____

_____ [1]

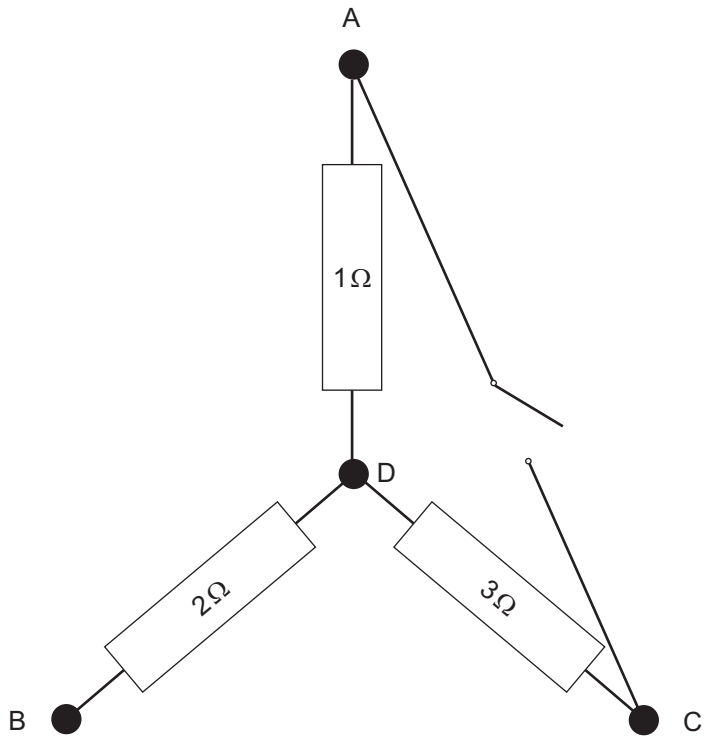
The circuit below shows a bulb connected to a battery.



(b) Complete the diagram above to include:

- a + or – to show the polarity of the battery;
- an arrow in the box to show the direction of electron flow;
- an arrow in the box to show the direction of conventional current. [3]

Three resistors are connected as shown below.



(c) (i) State the resistance between A and B.

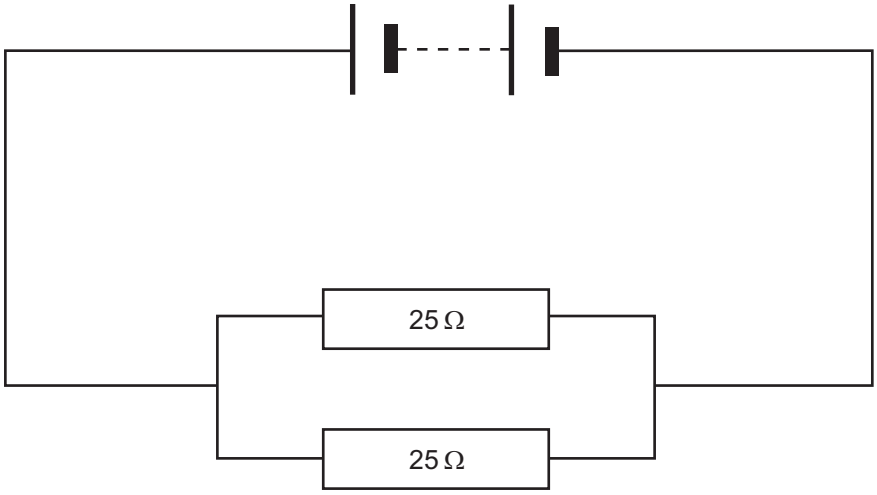
Resistance = _____ Ω

State the resistance between A and C when the switch is closed.

Resistance = _____ Ω [2]

[Turn over

Two equal resistors of 25 Ω are connected as shown below.

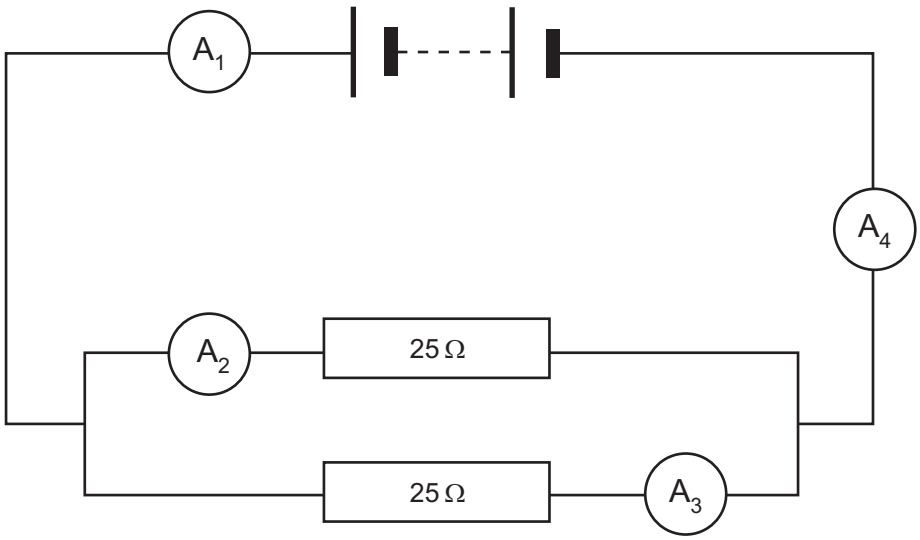


(ii) Calculate the total resistance of the circuit above.

Resistance = _____ Ω [1]

Ammeters are placed in the circuit.

The current in ammeter A_1 is 0.6 A.



(iii) State the readings on the other three ammeters.

A_2 = _____ A

A_3 = _____ A

A_4 = _____ A [3]

A washing machine of resistance 20 Ω is connected to a 230 V supply.

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(d) Use the information above to calculate the current flowing through the washing machine.

You are advised to show your working out.

Current = _____ A [3]

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5 You are asked to describe the formation of a star.

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

Your answer should include the following:

- the materials used to form the star;

_____

_____

_____

- the force involved and what this force does;

_____

_____

_____

- the name of the nuclear reaction;

_____

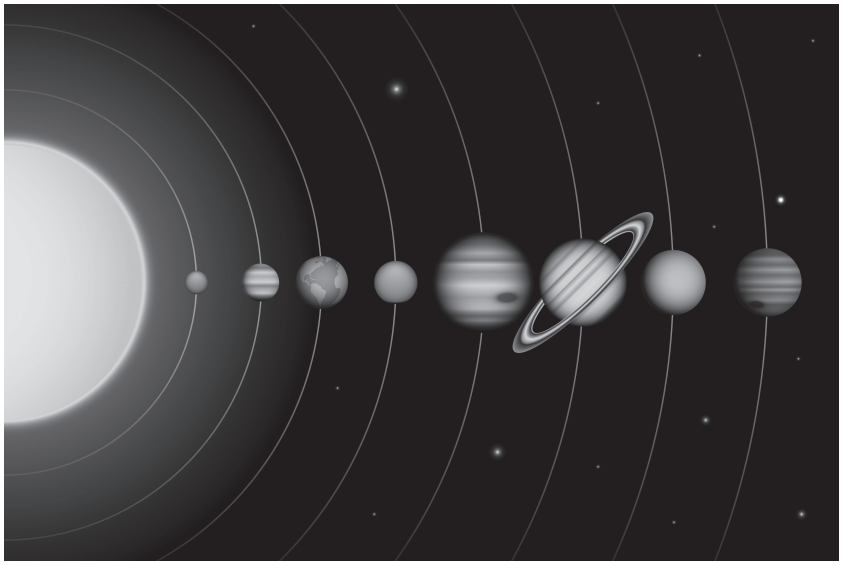
_____

- the name of the new element produced in this process.

_____

_____ [6]

6 The diagram shows the planets in our Solar System.



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(a) State the name of:

the planet closest to the Sun;

_____

the planet furthest from the Sun;

_____

the **gas** planet closest to the Sun;

_____

the **rocky** planet furthest from the Sun.

_____ [4]

(b) Give the names of two objects other than planets that orbit the Sun.

_____

State why objects such as these remain in orbit.

_____ [3]

(c) Objects that orbit the Earth are called satellites.

What is an artificial satellite?

_____

State a major use of artificial satellites.

_____ [2]

7 **(a)** Some appliances use direct current (d.c.) and some use alternating current (a.c.).

(i) State what is meant by direct current (d.c.).

_____ [1]

(ii) State fully what is meant by alternating current (a.c.).

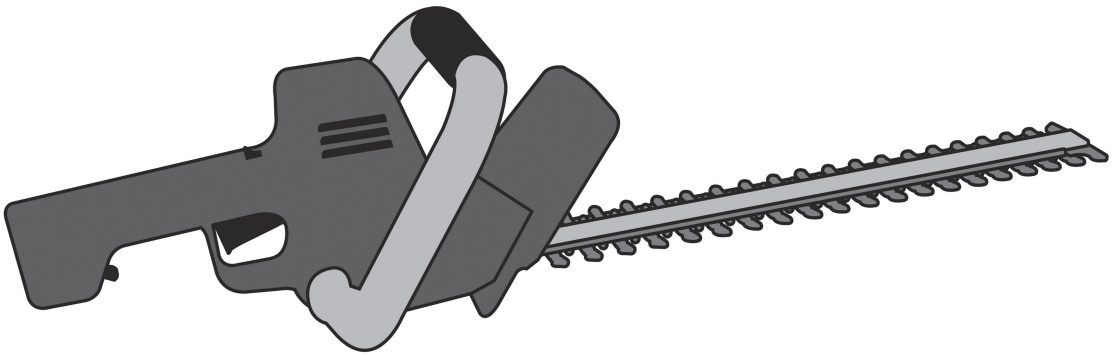
_____

_____

Give a source of alternating current in the home.

_____ [3]

A gardener spent 30 minutes cutting a hedge using a battery-powered hedge trimmer.



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(b) The hedge trimmer has a power of 72 W.

Calculate the energy used by the hedge trimmer for the 30 minutes it takes the gardener to cut the hedge.

You are advised to show your working out.

Energy = _____ J [4]

THIS IS THE END OF THE QUESTION PAPER

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Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
Total Marks	

Examiner Number

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