



Rewarding Learning

General Certificate of Secondary Education
2023

Centre Number

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Candidate Number

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Double Award Science: Physics

Unit P2



Higher Tier

[GDW62]

GDW62

FRIDAY 16 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 nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 80.

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 **2**.



- 1 (a) When electricity flows through a resistor it produces a certain form of energy.

Name the form of energy produced.

_____ energy

Name the two particles involved in producing this energy.

_____ and _____

How do these particles produce this form of energy?

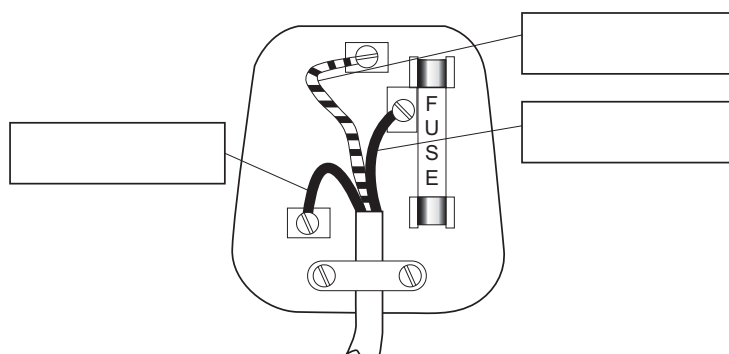
_____ [4]

- (b) A kettle has a power of 2.76 kW. The kettle is connected to a mains voltage supply of 230 V. Calculate the current flowing through the kettle.

You are advised to show your working out.

Current = _____ A [4]

- (c) Label the diagram of a plug by putting the name for each wire in the correct box.



What could cause the fuse to melt?

_____ [4]



2 White light can be split into different colours in a school science laboratory.

The statements below refer to this experiment.

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

Complete the sections below:

- the name of the process;

- the piece of apparatus used to split the light;

- the names of the colours produced in order beginning with **violet**;

- state why the colours are refracted by different amounts;

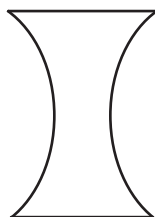
- state which colour is refracted the least and explain why.

[6]

[Turn over



3 Lenses are used to produce images.



(a) Which type of lens is shown above?

[1]

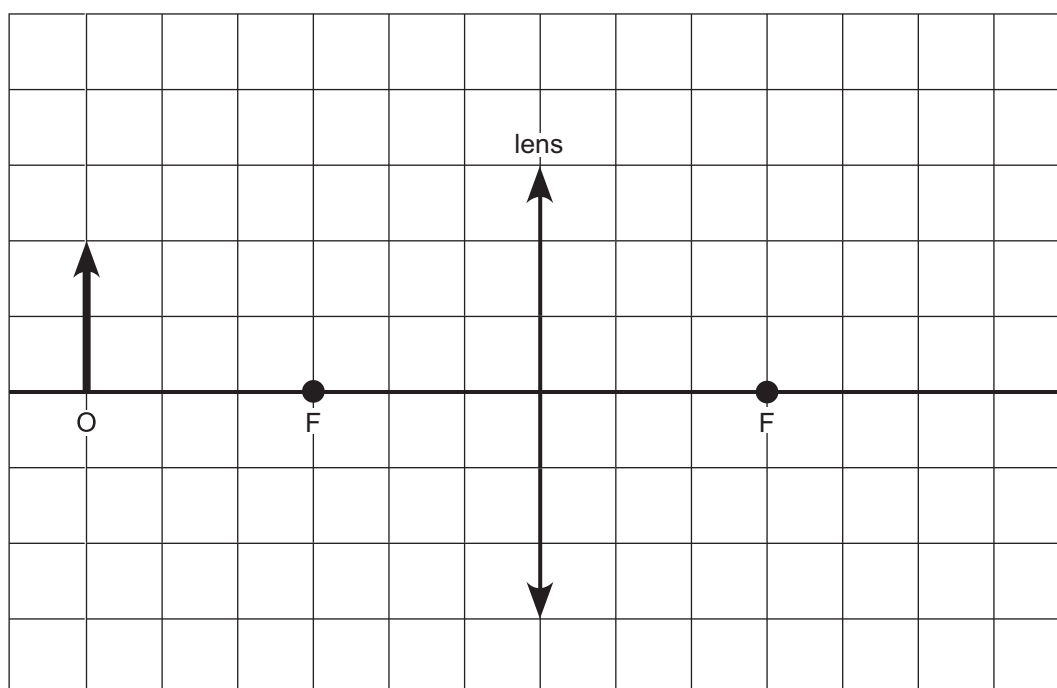
(b) (i) The diagram below shows an object O placed 6 cm from a lens of focal length 3 cm.

Points F represent the focal points.

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

Include the following:

- **two rays** from the top of the object passing through the lens;
- arrows to show the directions of these rays;
- the image produced.



[4]



(ii) Select the **two** correct words from the list below that describe the image produced.

Place ticks (✓) in the boxes beside the correct words.

Virtual

☐

Upright

☐

Diminished

☐

Real

☐

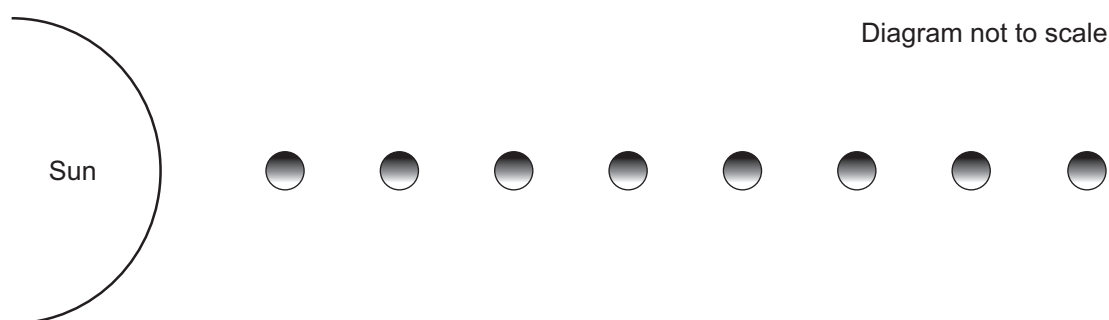
Inverted

☐

[2]



- 4 There are eight planets in our Solar System, as shown below.



Source: Principal Examiner

- (a) On the diagram, draw a large box around all the rocky planets. [1]

- (b) List the gas planets, in order, starting with the one closest to the Sun.

[3]

- (c) Describe briefly how a star is formed.

[3]



(d) State the name of the two main elements found in the Sun.

_____ and _____

How do physicists know that these are the main elements found in the Sun?

Name the process that produces energy in the Sun.

_____ [4]

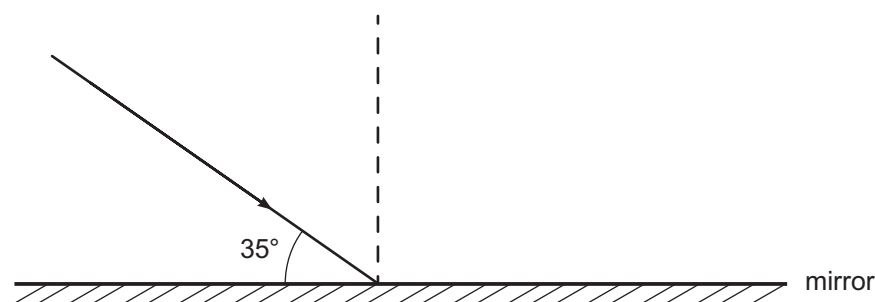


- 5 A pupil places an object in front of a plane mirror. The image is as far behind the mirror as the object is in front.

(a) State two other properties of the image in the mirror.

1. _____
2. _____ [2]

A ray of light is incident on a plane mirror as shown. The diagram is incomplete.

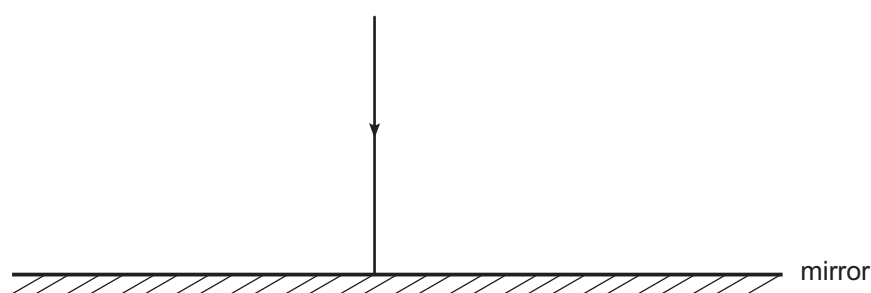


(b) Draw the reflected ray and mark its direction by placing an arrow on the ray.

What is the angle of reflection of the reflected ray?

Angle of reflection = _____ °

The direction of the incident ray is then changed as shown.



What is the new angle of reflection?

Angle of reflection = _____ ° [3]



- (c) A school carries out a fire alarm test. The frequency of the alarm sound is 1.7×10^3 Hz and the wavelength of the sound wave is 20 cm.

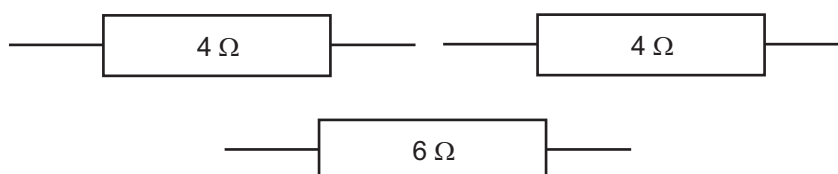
Use this information to calculate the velocity of the sound wave in m/s.

You are advised to show your working out.

Velocity = _____ m/s [4]



6 A pupil has been given three resistors.



- (a) Using **some or all** of the resistors above, draw arrangements to provide the total resistance stated in each box.

Do not include any components other than the resistors and connecting wires.

Total resistance = $8\ \Omega$

Total resistance = $2\ \Omega$

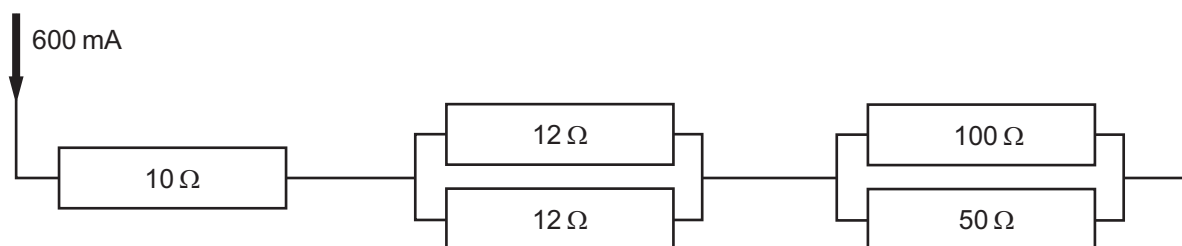
Total resistance = $2.4\ \Omega$

Total resistance = $6.4\ \Omega$

[4]



(b) A current of 600 mA flows through the $10\ \Omega$ resistor in the circuit below.



Complete the table to show the currents flowing through the other resistors.

Resistor	Current flowing/mA
$10\ \Omega$	600
$12\ \Omega$	
$50\ \Omega$	
$100\ \Omega$	

[3]

(c) Calculate the voltage across the $10\ \Omega$ resistor when a current of 600 mA flows through it.

You are advised to show your working out.

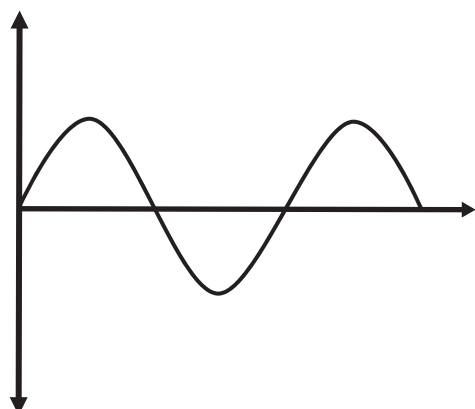
Voltage = _____ V [4]

[Turn over]



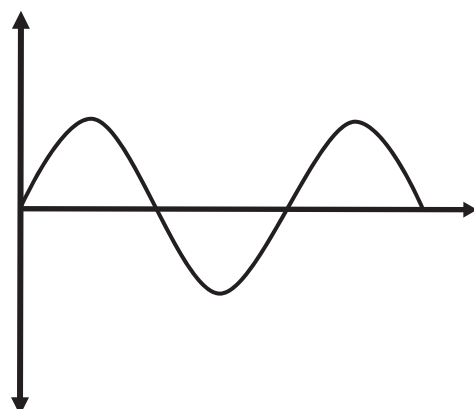
7 The graphs below represent a wave.

Displacement/m



Graph 1

Displacement/m



Graph 2

Graph 1 shows the displacement against distance for a wave. What **two** pieces of information can we obtain from this graph when numbers are included on the axes?

Place ticks (✓) in the boxes beside the correct words.

Wavelength

☐

Frequency

☐

Velocity

☐

Amplitude

☐

Graph 2 shows the displacement against time for a wave. What **two** pieces of information can we obtain from this graph when numbers are included on the axes?

Place ticks (✓) in the boxes beside the correct words.

Wavelength

☐

Frequency

☐

Velocity

☐

Amplitude

☐

[4]



8 Stars that are the same size as our Sun have five stages in their life cycle.

- (a) Write the name of each stage in the boxes below.
One stage has been completed for you.

First stage

Last stage



[4]

All stars experience a stage called the main sequence.

- (b) Explain, in terms of forces, why stars are stable during this main sequence period.

Remember to include the direction of any forces you mention in your answer.

[5]



A more massive star can experience an explosion with the brightness of 10 billion suns.

In this explosion the outer layers of the star are ejected.

(c) What is the name of this explosion?

_____ [1]

After this explosion, a massive star may collapse.

This causes it to become something different.

(d) State two things the massive star could become.

1. _____

2. _____

[2]

(e) CMBR is evidence that supports the Big Bang model.

Complete the sentence below by inserting the words that describe another piece of evidence that supports the Big Bang model.

When we look at light from other galaxies it is shifted to the

_____ end of the spectrum, this can be

explained by space _____ .

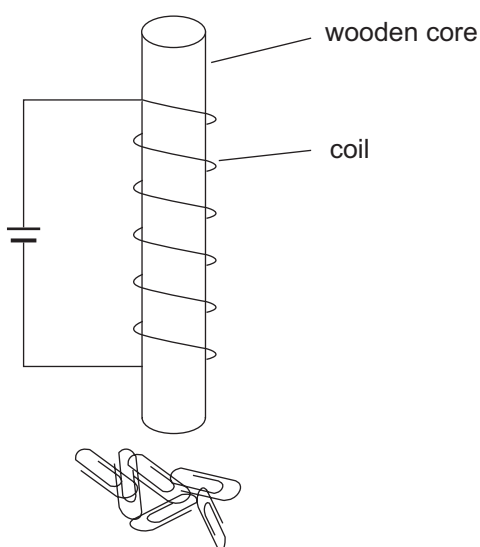
[2]

[Turn over]



9 An electromagnet is used to lift paper clips.

It is made using a wooden core, a power supply and a coil of wire.



Source: Principal Examiner

(a) State three ways to change the electromagnet so that it could lift more paperclips.

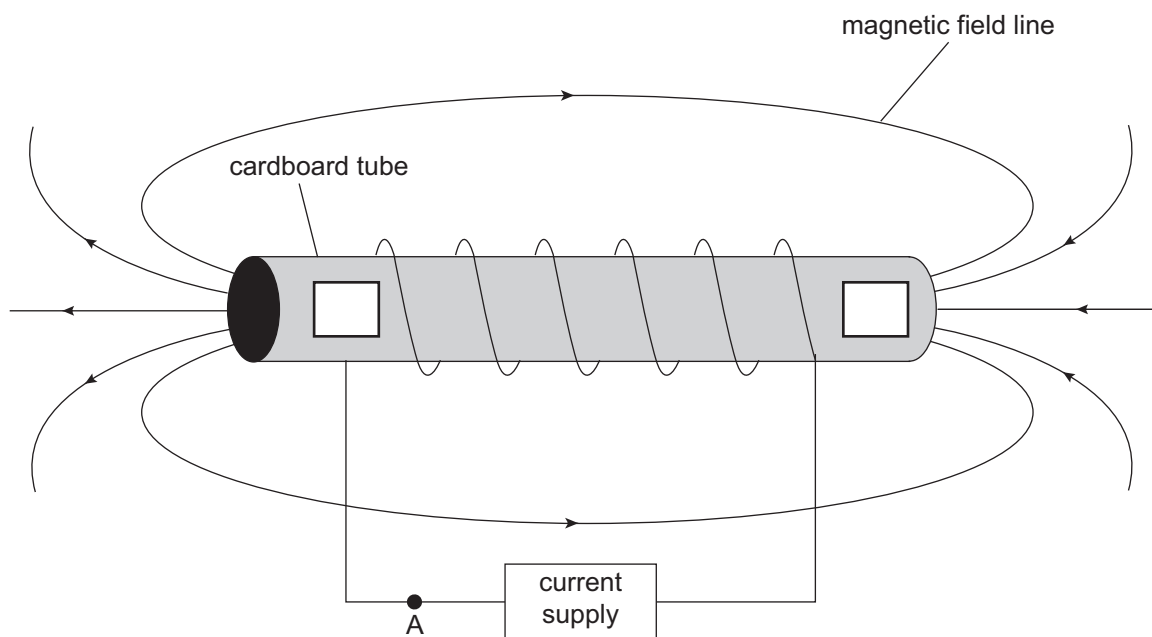
1. _____
2. _____
3. _____ [3]



(b) The diagram below shows a current-carrying coil wrapped around a cardboard tube. Some of the magnetic field lines are shown.

On the diagram:

- insert an N and an S in the correct boxes to show the north and south poles;
- show the direction of current flow on the circuit using an arrow at point **A**.
- show the direction of the magnetic field **inside** the grey cardboard tube using an arrow.



Source: Principal Examiner

[3]



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

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