



Rewarding Learning

General Certificate of Secondary Education
2024

Centre Number

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Candidate Number

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Double Award Science: Physics

Unit P2



Higher Tier

[GDW62]

GDW62

TUESDAY 18 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 eight** 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 Complete the sentences below that describe the Big Bang.

The Big Bang was a massive explosion that marked the beginning of the _____.

According to current measurements the Big Bang occurred fourteen _____ years ago.

The main evidence for the Big Bang is that _____ from other galaxies is shifted to the _____ end of the visible spectrum.

This can be explained by space _____.

[5]



2 The electromagnetic spectrum consists of seven different regions.

Describe the main features of the electromagnetic spectrum.

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 name of the electromagnetic wave with the longest wavelength;

the name of the electromagnetic wave with the shortest wavelength;

the name of the electromagnetic wave that is emitted by hot objects;

the names of the **three** electromagnetic waves that can cause cancer.

[6]

[Turn over



3 (a) Electricity companies bill customers for each unit of electricity used.

Each unit is equal to one kilowatt-hour.

Complete the statements below by placing a tick (✓) in the correct box.

A kilowatt-hour is a measurement of

☐

power.

☐

energy.

☐

time.

A kilowatt-hour is when

☐

a 1000 W appliance is used for 60 seconds.

☐

a 1000 W appliance is used for 3600 seconds.

☐

a 100 W appliance is used for 360 seconds.

[2]



- (b) A dog owner uses an electric shower to wash a dog. The shower has a power rating of 8000 W and it takes 15 minutes to shower the dog.

By first finding how many units are used, calculate the cost, in pence, of showering the dog.

Each unit of electricity costs 30p.

You are advised to show your working out.

Number of units used = _____

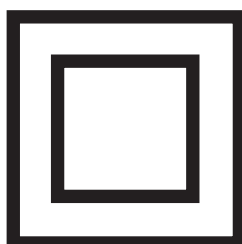
Cost of showering the dog = _____ p [5]



- (c) (i) Describe **fully** how a fuse helps to protect appliances from potential damage if a fault develops.

[3]

If the symbol below is shown on an appliance, it means it is double insulated.



- (ii) Complete the statement below by placing a tick (✓) in the correct box.

The cable connecting a double insulated appliance to the plug contains

- ☐ one earth wire.
- ☐ no earth wire.
- ☐ two earth wires.

State how a double insulated appliance protects the user if a fault develops.

[2]





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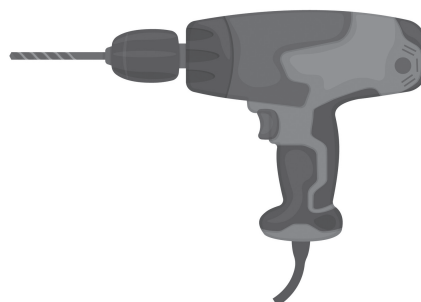
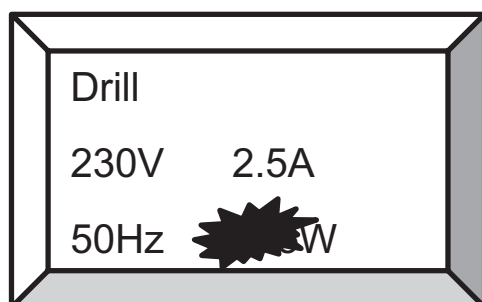
[Turn over



24GDW6207

- 4 (a) An information plate provides data about an electric appliance.

The information plate below is from an electric drill.



Source: © Getty Images

- (i) Information about the power of the drill is missing.

Use the data on the information plate to calculate the power of the drill.

You are advised to show your working out.

Power = _____ W [3]

- (ii) A workman wants to know the electrical resistance of the drill.

Use the data on the information plate to calculate the electrical resistance of the drill.

You are advised to show your working out.

Electrical resistance = _____ Ω [3]



(iii) The workman uses the drill for 30 seconds.

Use the data on the information plate to calculate how much charge passes through the drill during the 30 seconds.

Include the unit in your answer.

You are advised to show your working out.

Charge = _____ [4]

(b) The workman uses a different drill later that same day.

It has a power of 1000 W and is used for 2 minutes.

Calculate the energy used by this drill during the 2 minutes.

You are advised to show your working out.

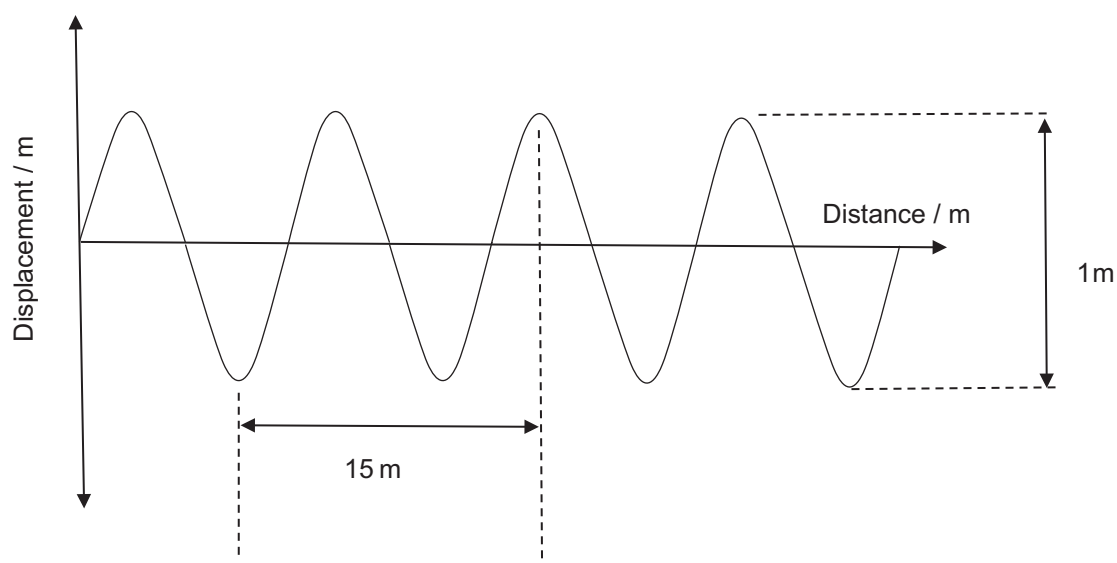
Energy = _____ J [4]

[Turn over]



5 (a) Some measurements are taken from a water wave and a graph is plotted.

(i) Use the graph below to calculate the amplitude and wavelength of the water wave.



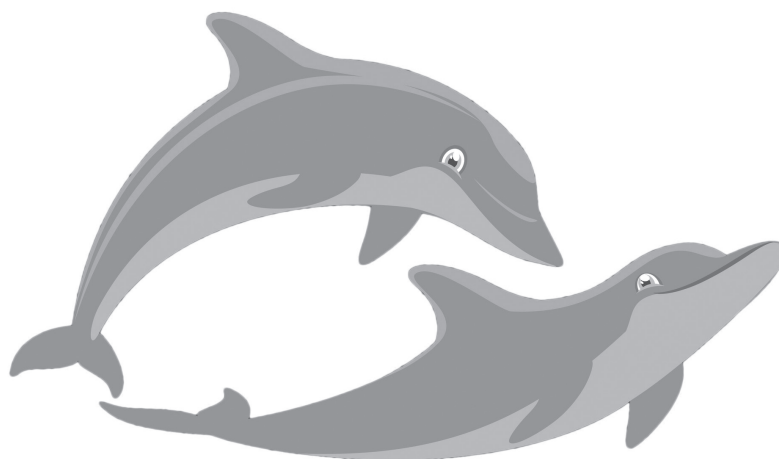
Amplitude = _____ m

Wavelength = _____ m [2]

(ii) Describe **fully** the motion of the particles in a water wave.

[3]





Source: © Getty Images

(b) Dolphins use ultrasound to communicate under water.

The ultrasound wave produced by a dolphin travels at a velocity of 1500 m/s and has a frequency of 1.25×10^5 Hz.

Use this information to calculate the wavelength of the ultrasound in the water.

You are advised to show your working out.

Wavelength = _____ m [3]

[Turn over



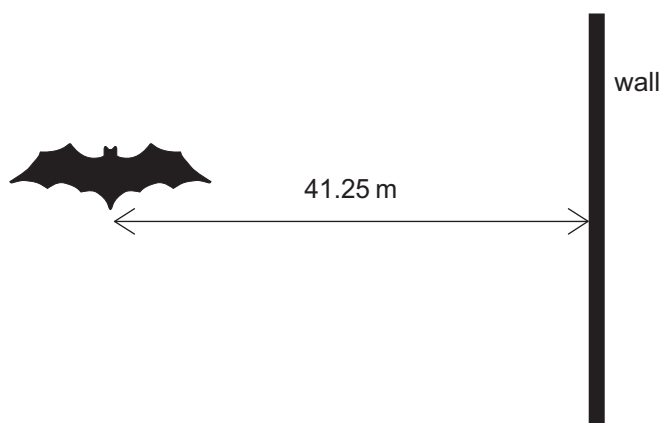
(c) Bats use ultrasound to navigate and avoid flying into objects.

(i) State the minimum frequency of ultrasound.

Frequency = _____ Hz [1]

(ii) A bat emits an ultrasound pulse. The **total** time taken for the ultrasound to travel to the wall and return to the bat is 0.25 seconds.

The distance between the bat and the wall is 41.25 m as shown below.



Source: © Getty Images

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

You are advised to show your working out.

Speed of ultrasound = _____ m/s [4]





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24GDW6213

6 (a) Lenses are used to produce images.

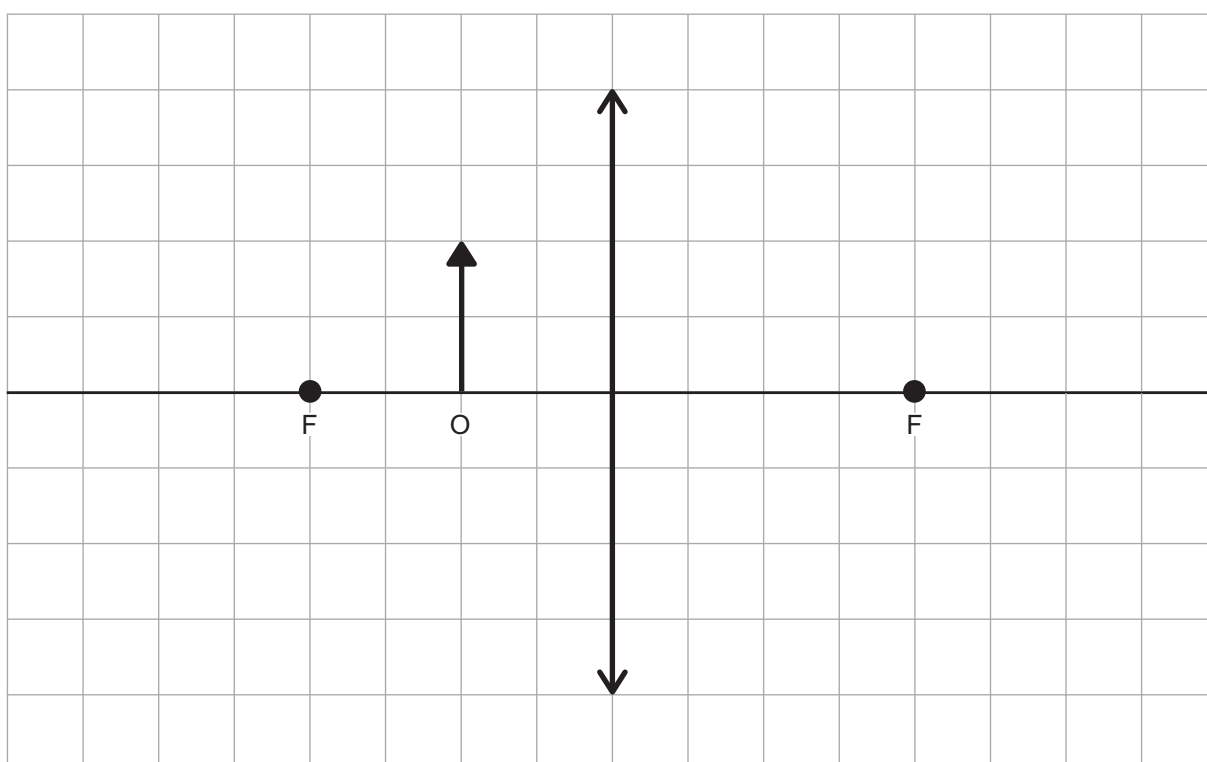
- (i) The diagram shows an object O placed 2 cm from a lens of focal length 4 cm.

Points F represent the focal points.

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

Include the following:

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



[5]



(ii) Which use of the lens is illustrated by your ray diagram?

Place a tick (✓) in the correct box.

☐

Camera

☐

Magnifying glass

☐

Projector

[1]

(iii) The image produced can be described using one of the words below.

Place a tick (✓) in the correct box.

☐

Diminished

☐

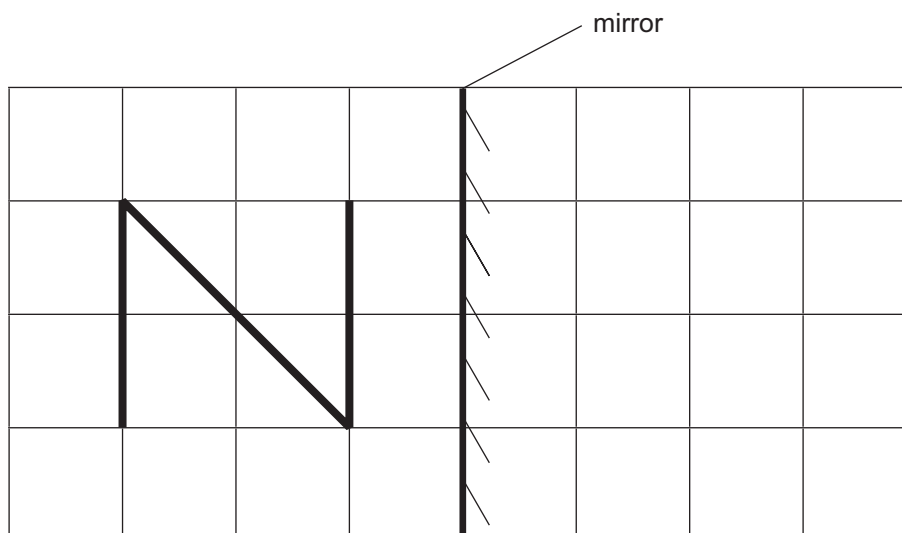
Real

☐

Virtual

[1]

(b) A letter **N** is placed in front of a mirror as shown below.
Use the grid to draw the image of the letter N in the mirror.

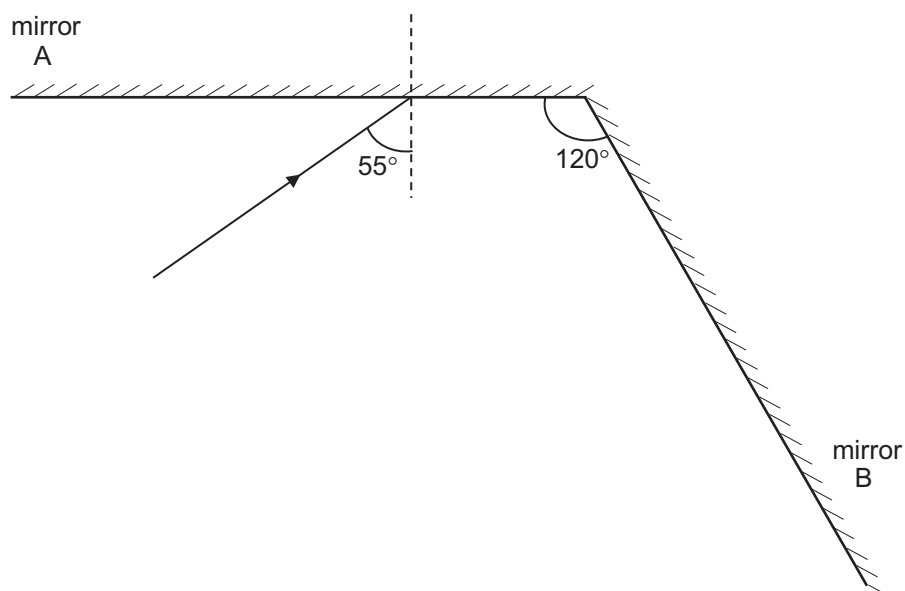


[2]

[Turn over]



- (c) Two mirrors, A and B, are arranged at 120° as shown below. A ray of light is incident on mirror A.



- (i) Continue the ray to show how it is reflected in mirror A **and** mirror B. [2]

- (ii) The angle of incidence at mirror A is 55° .

Calculate the angle of reflection at mirror B.

You are advised to show your working out.

Angle of reflection at mirror B = _____ $^\circ$ [2]





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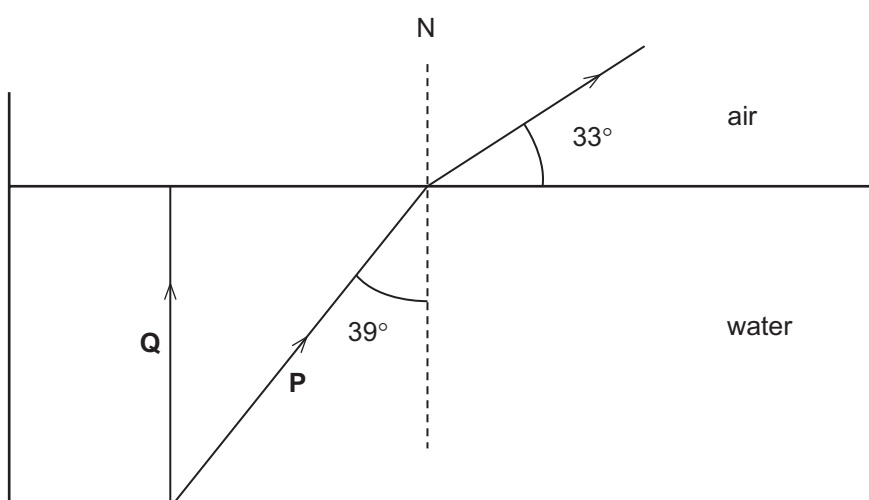
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24GDW6217

- 7 (a) Two rays of light, **P** and **Q**, are travelling through water.

The diagram below shows what happens to ray **P** as it leaves the water.



- (i) Complete the diagram for ray **Q** as it leaves the water and travels into the air.

What is the angle of incidence of ray **Q** in the water?

_____ $^\circ$ [2]

- (ii) What is the angle of refraction of ray **P** in the air?

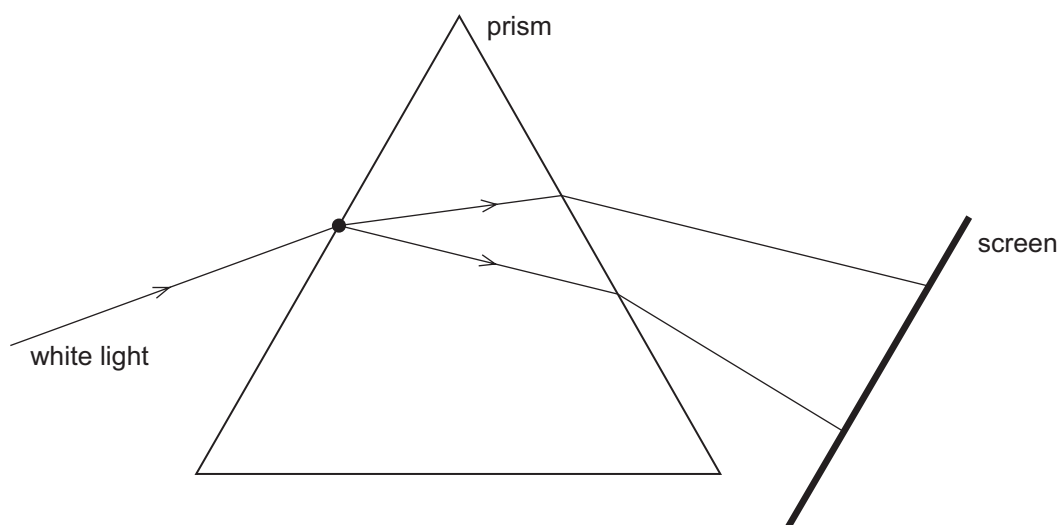
_____ $^\circ$

State how the speed of ray **P** changes as it travels from water into air.

_____ [2]



(b) The diagram below shows what happens to white light as it passes through a glass prism.



What is the name given to the range of colours produced on the screen?

What is the name of the process of splitting up white light using a prism?

Explain why the white light splits up into different colours in the prism.

State which colour is refracted the most and why.

[5]

[Turn over



- 8 (a) There are a number of differences between the life cycle of a star similar in size to our Sun and the life cycle of a more massive star.

State the name of the stage in the life cycle of a more massive star just before it explodes.

State the name of the explosion that happens in the life cycle of the more massive star.

How many times brighter than the brightness of our Sun is this explosion?

Name the **two** final objects that a massive star can turn into after it explodes.

_____ or _____ [5]

- (b) Complete the following sentences that describe stars.

All naturally occurring elements apart from _____ are formed by nuclear _____ in stars.

The main elements that stars are composed of are hydrogen and

_____ . [3]

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Question Number	Marks
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Examiner Number

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