AQA GCSE Physics | 8463

SPECIFICATION POINT 4.6.1.3

Reflection of waves (physics only)

Past-paper questions

Tier	**Higher**
Question groups	**16**
Available paper years	**2008–2024**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.6.1.3 Reflection of waves (physics only)

Question 01

January 2008 | PHY3H | Original Q2 | Legacy

2 When sound waves reach a material, some of the energy of the sound is reflected and some is transmitted through the material.

(a) Complete the sentence.

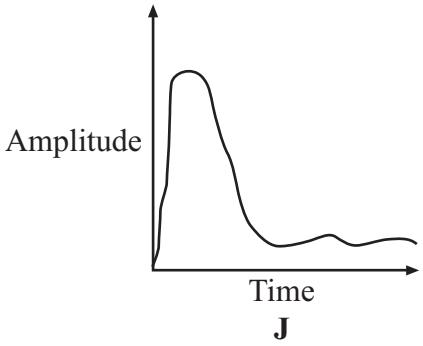
Sound waves are caused by ..... .

(1 mark)

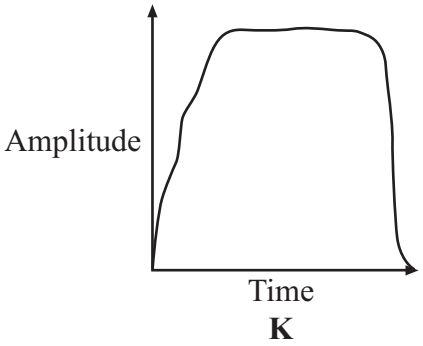
(b) The graphs **J**, **K**, **L** and **M** represent the sound energy reflected from a surface.

The graphs are all drawn to the same scale.

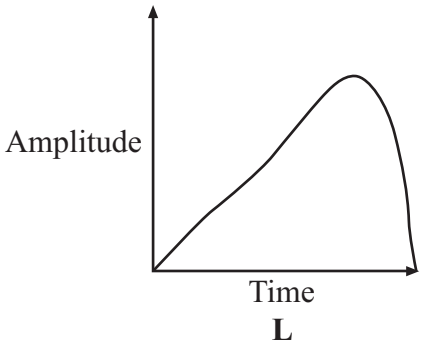
Which graph shows the greatest total sound energy output from the surface?



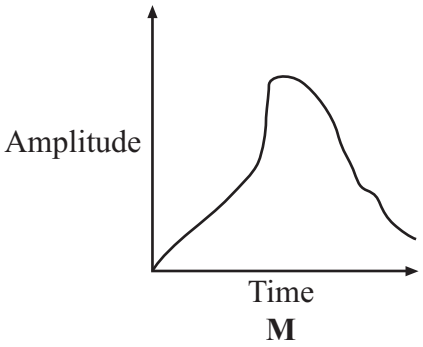
J



K



L



M

Graph .....

(1 mark)

Question 2 continues on the next page

4.6.1.3 Reflection of waves (physics only)

Question 01 · continued

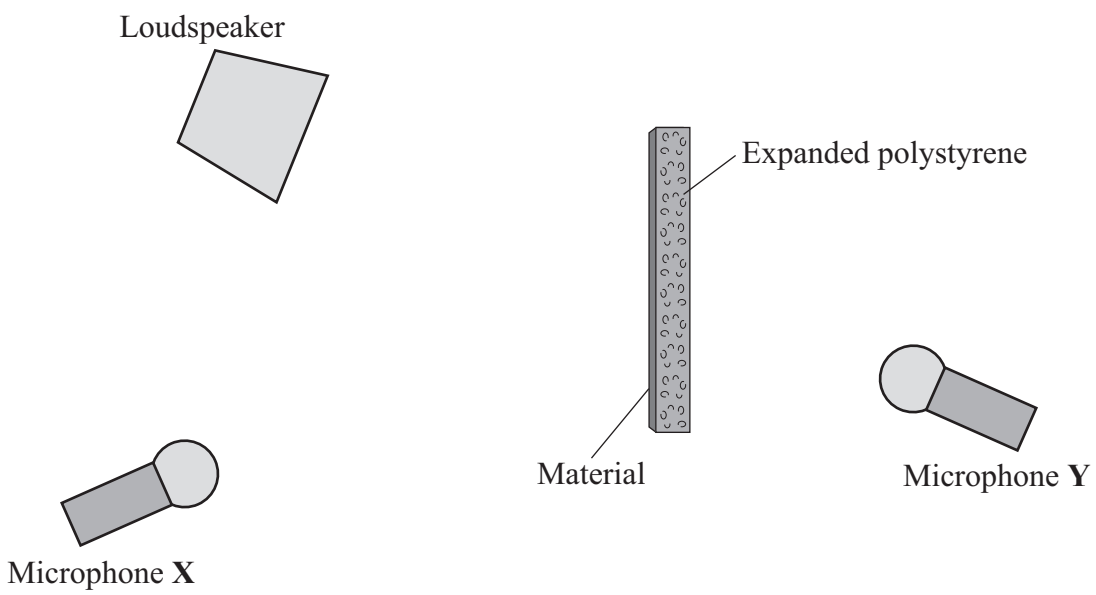
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(c) The proportion of the sound energy which is reflected or transmitted or absorbed depends on the material which receives the sound.

A student investigates different materials.

The diagram shows how a student sets up her equipment.

(i) Using a pencil and ruler to draw on the diagram, show how microphone **X** receives reflected sound.



(2 marks)

(ii) The student tests four materials. Each sheet of material is 1 mm thick. This has been glued onto a block of expanded polystyrene.

Why does the student use the same size of expanded polystyrene block and the same sound level for each test?

.....

.....

(1 mark)

4.6.1.3 Reflection of waves (physics only)

Question 01 · continued

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(iii) The table shows the readings for the sound level transmitted to microphone **Y**.

Sound level from loudspeaker in arbitrary units	Surface material	Sound level transmitted to microphone Y in arbitrary units
60	paper	39
60	plaster	18
60	cloth	31
60	wood	15

[A] Which surface material transmits the smallest proportion of the sound?

.....

(1 mark)

[B] What proportion is this?

.....

(1 mark)

(d) People living in a flat have very noisy neighbours who are always playing loud music.

Suggest **one** practical idea to reduce the amount of noise transmitted into the flat through the walls and explain how your idea will work.

.....

.....

.....

.....

.....

.....

(2 marks)

9

4.6.1.3 Reflection of waves (physics only)

Question 02

January 2009 | PHY1H | Original Q5 | Legacy

5 (a) Microwaves are one type of electromagnetic wave.

5 (a) (i) Which type of electromagnetic wave has a lower frequency than microwaves?

.....

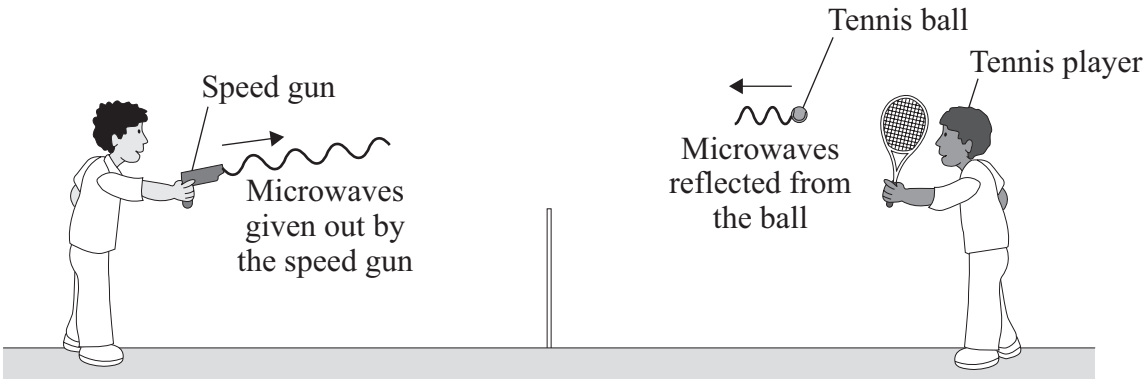
(1 mark)

5 (a) (ii) What do all types of electromagnetic wave transfer from one place to another?

.....

(1 mark)

5 (b) The picture shows a tennis coach using a speed gun to measure how fast the player serves the ball.



5 (b) (i) The microwaves transmitted by the speed gun have a frequency of 24 000 000 000 Hz and travel through the air at 300 000 000 m/s.

Use the equation in the box to calculate the wavelength of the microwaves emitted from the speed gun.

wave speed = frequency × wavelength

Show clearly how you work out your answer.

.....

.....

Wavelength = ... m

(2 marks)

4.6.1.3 Reflection of waves (physics only)

Question 02 · continued

for mark

5 (b) (ii) Some of the microwaves transmitted by the speed gun are absorbed by the ball.

What effect will the absorbed microwaves have on the ball?

.....

.....

(1 mark)

5 (b) (iii) Some of the microwaves transmitted by the speed gun are reflected from the moving ball back towards the speed gun.

Describe how the wavelength and frequency of the microwaves change as they are reflected from the moving ball.

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.....

(2 marks)

Question 5 continues on the next page

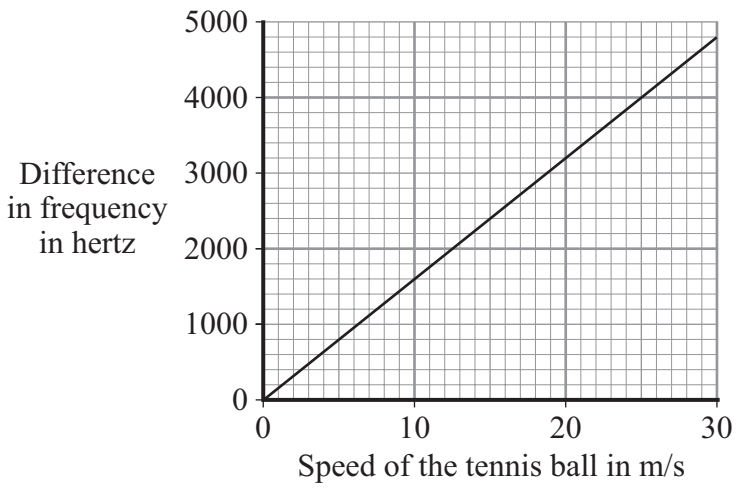
4.6.1.3 Reflection of waves (physics only)

Question 02 · continued

for mark

5 (c) The difference in frequency between the transmitted and reflected waves is detected by the speed gun. This data is processed by a computer chip inside the speed gun, and then displayed as a speed.

5 (c) (i) The graph shows that the difference in frequency between the transmitted and reflected waves is directly proportional to the speed of the moving ball.



Why has a line graph been used to display the data?

.....

.....

(1 mark)

5 (c) (ii) Is it better to transfer the data to the computer as an analogue signal or as a digital signal?

.....

Give a reason for your answer.

.....

.....

(1 mark)

4.6.1.3 Reflection of waves (physics only)

Question 02 · continued

for mark

5 (c) (iii) What is the difference between an analogue signal and a digital signal?

You may draw a labelled diagram to help you with your answer.

.....

.....

.....

.....

(2 marks)

11

4.6.1.3 Reflection of waves (physics only)

Question 03

June 2009 | PHY1BP | Original Q7 | Legacy

QUESTION SEVEN

Some types of electromagnetic radiation from space are absorbed by the Earth's atmosphere.

	Short wavelength radio	Short wavelength microwaves	Infra red	Visible light	Ultraviolet	X-rays	Gamma rays
Percentage absorbed by atmosphere	0	95	96	5	98	100	100

Different objects or events in the universe emit different types of electromagnetic radiation.

	Gamma ray bursts	Nebulae	Pulsars	Stars	Universe background radiation
Radiation emitted	gamma rays	infra red	radio	all types	short wavelength microwaves

The planets and moons of the solar system reflect light from the Sun.

7A Early civilisations observed the sky with the naked eye.

Which objects did they see?

1 moons, nebulae and pulsars

2 gamma ray bursts, moons and planets

3 nebulae and pulsars

4 moons, planets and stars

7B Telescopes that could detect electromagnetic waves of the lowest frequency were built in the 20th century. These telescopes are on the surface of the Earth.

From the information in the tables, which of the following, which could not have been observed before, could then be easily observed from the Earth's surface?

1 pulsars

2 gamma ray bursts

3 nebulae

4 stars

4.6.1.3 Reflection of waves (physics only)

Question 03 · continued

7C In 1989, the background radiation from the universe was mapped from a telescope in space.

Why was this **not** done with telescopes based on Earth?

1 Because only 2% of ultraviolet radiation penetrates Earth's atmosphere.

2 Because only 4% of infra red radiation penetrates Earth's atmosphere.

3 Because only 5% of short wavelength microwave radiation penetrates Earth's atmosphere.

4 Because only 95% of visible radiation penetrates Earth's atmosphere.

7D The first table suggests that, with the exception of . . .

1 radio, the percentage of radiation absorbed by the atmosphere, increases with increasing wavelength.

2 radio, the percentage of radiation absorbed by the atmosphere, decreases with increasing wavelength.

3 visible light, the percentage of radiation absorbed by the atmosphere, increases with increasing wavelength.

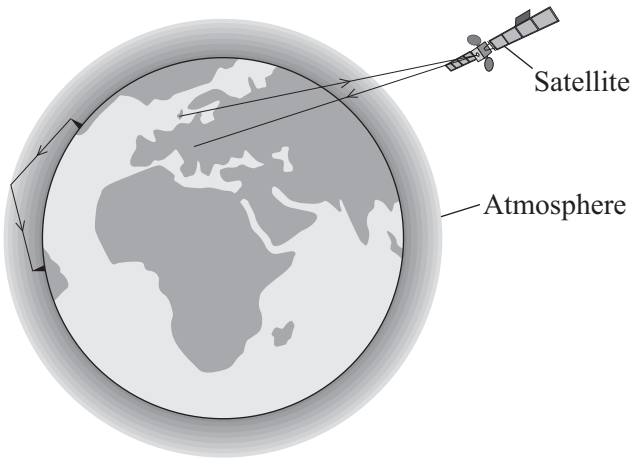
4 visible light, the percentage of radiation absorbed by the atmosphere, decreases with increasing wavelength.

4.6.1.3 Reflection of waves (physics only)

Question 04

January 2010 | PHY1H | Original Q3 | Legacy

3 (a) Electromagnetic waves have many uses. The diagram shows two ways of sending information using electromagnetic waves.



3 (a) (i) What type of wave is used to send information to and from satellites?

.....

(1 mark)

3 (a) (ii) What property of this type of wave makes it suitable for satellite communications?

.....

(1 mark)

3 (b) The diagram shows two types of signal that can be used to send information. One of the signals is an analogue signal. The other is a digital signal.



Describe the differences between an analogue signal and a digital signal.

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.....

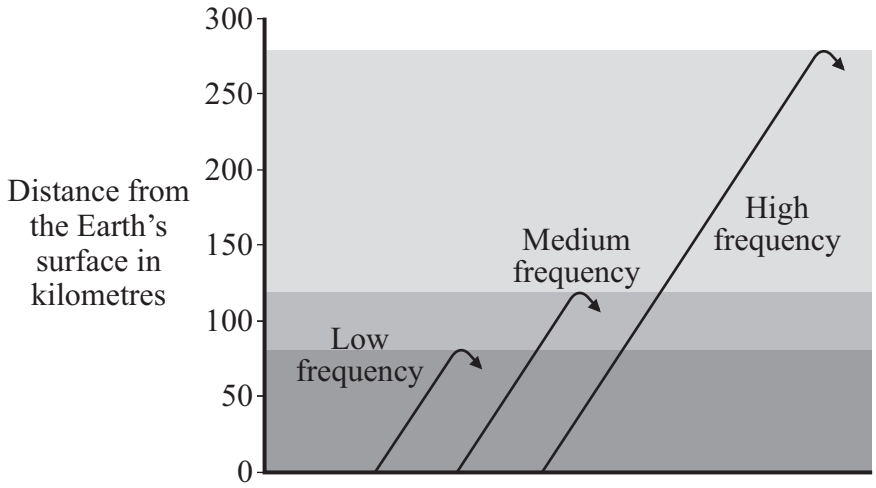
(2 marks)

4.6.1.3 Reflection of waves (physics only)

Question 04 · continued

for mark

3 (c) Different frequency radio waves travel different distances through the atmosphere before being reflected.



Use the information in the diagram to describe the connection between the frequency of a radio wave and the distance the radio wave travels through the atmosphere before it is reflected.

.....

.....

(1 mark)

3 (d) Electromagnetic waves travel at a speed of 300 000 000 m/s.

A radio station transmits waves with a wavelength of 20 metres.

Use the equation in the box to calculate the frequency, in kilohertz (kHz), of these waves.

wave speed = frequency × wavelength

Show clearly how you work out your answer.

.....

.....

.....

Frequency = ... kHz

(2 marks)

7

4.6.1.3 Reflection of waves (physics only)

Question 05

January 2011 | PHY1H | Original Q1 | Legacy

1 Small sailing boats can be fitted with a passive radar device. The device increases the chance that the small boat will be seen on the radar screen of a large ship.
The radar transmitter on the large ship emits microwaves.

1 (a) Microwaves and radio waves are both part of the electromagnetic spectrum.

How are microwaves different from radio waves?

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.....

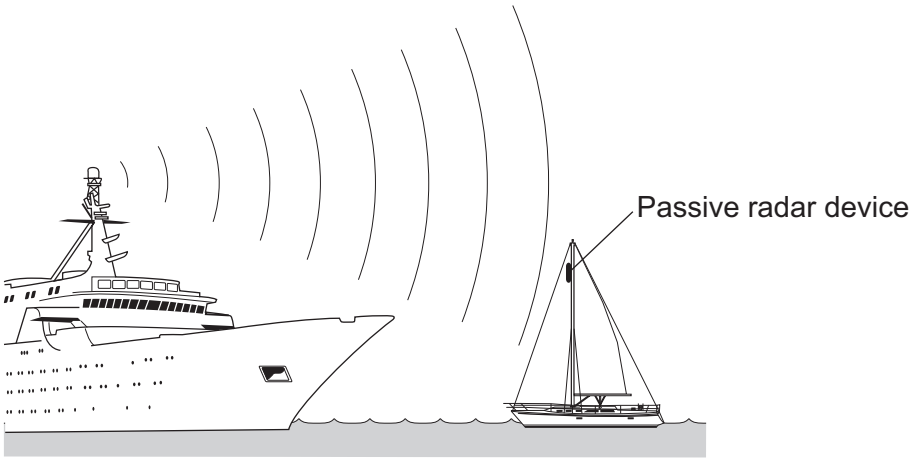
(1 mark)

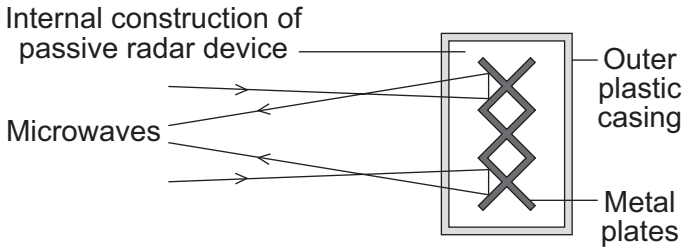
1 (b) How fast do microwaves travel through the air or a vacuum compared to radio waves?

.....

(1 mark)

1 (c) The diagrams show the position of a passive radar device on a small boat and the internal construction of one type of passive radar device.





4.6.1.3 Reflection of waves (physics only)

Question 05 · continued

Microwaves can be absorbed, reflected or transmitted by different materials and types of surface.

Explain what happens to the microwaves from the ship's transmitter when they reach the passive radar device.

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.....

(2 marks)

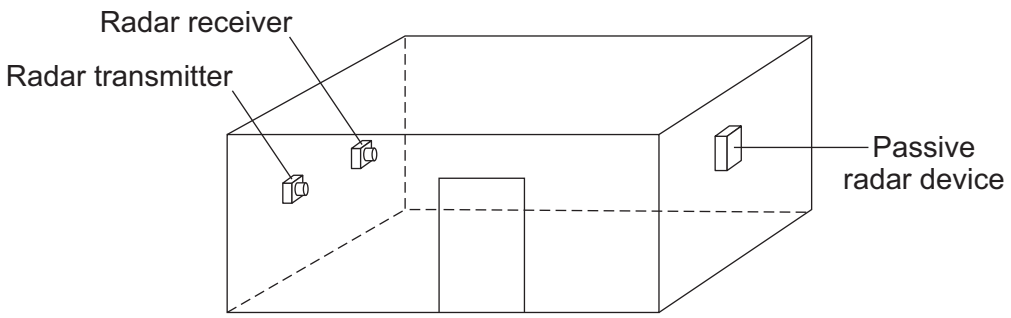
Question 1 continues on the next page

4.6.1.3 Reflection of waves (physics only)

Question 05 · continued

1 (d) Each type of passive radar device has an RCS value. The larger the RCS value, the easier it is for a small boat fitted with the device to be detected.

An independent group of scientists measured the RCS values of 4 different types of device. The RCS value for each device was measured in the same room using the same equipment.



1 (d) (i) Why are the walls of the room covered in a material that absorbs the waves emitted by the radar transmitter?

.....

.....

(1 mark)

1 (d) (ii) Why is it important to use the same room and the same equipment?

.....

.....

(1 mark)

1 (d) (iii) Why is it important that the measurements are made by an independent group of scientists?

.....

.....

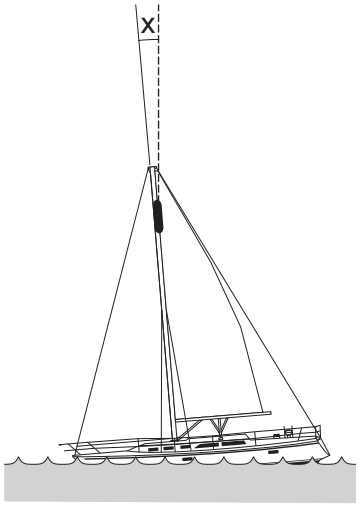
(1 mark)

4.6.1.3 Reflection of waves (physics only)

Question 05 · continued

1 (e) The movement of a small boat causes the mast and device to lean over, therefore the RCS values were measured at different angles.

The table gives the RCS values obtained by the scientists.



Device	Angle X			
	0°	5°	10°	15°
A	1.4	1.6	1.7	1.8
B	4.7	2.6	2.3	1.9
C	9.3	3.3	1.9	1.1
D	4.5	4.8	5.0	4.6

1 (e) (i) Describe how the RCS values for **device A** are different to the RCS values for **device B**.

.....

.....

.....

.....

(2 marks)

1 (e) (ii) The scientists recommended that a passive radar device fitted to a small boat should have:

- the largest possible RCS value
- an RCS value consistently above 2.0

Which **one** of the devices, **A**, **B**, **C** or **D**, would you recommend that someone fits to their boat?

.....

Give a reason for your answer.

.....

.....

(1 mark)

10

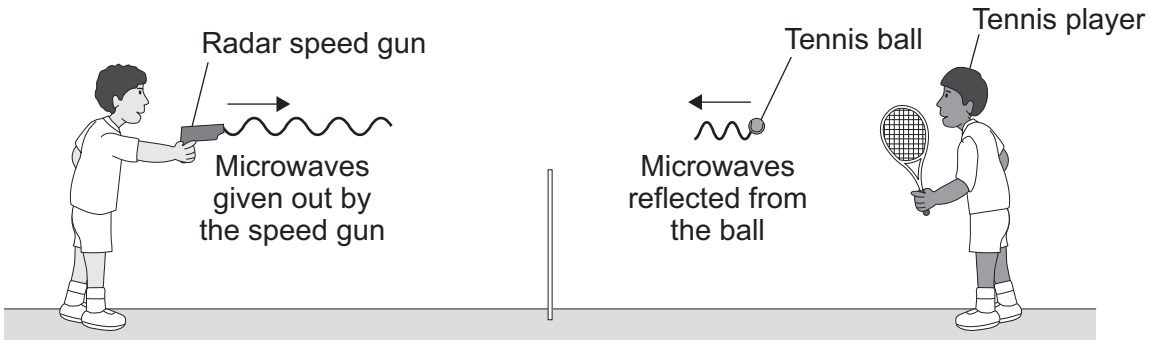
4.6.1.3 Reflection of waves (physics only)

Question 06

March 2011 | PHY1BP | Original Q3 | Legacy

QUESTION THREE

The picture shows a radar speed gun being used to measure how fast a tennis player hits the ball.



Some of the microwaves from the radar speed gun are absorbed by the ball and some are reflected by the ball.

3A What effect will the absorbed microwaves have on the ball?

1 The temperature of the ball will increase slightly.

2 The ball will go faster.

3 The temperature of the ball will decrease slightly.

4 The ball will go slower.

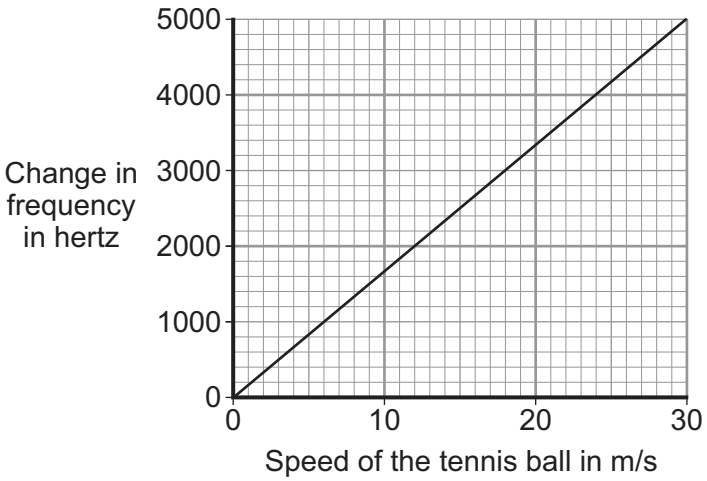
3B Which row in the table describes how the frequency and wavelength of the reflected microwaves are different from the microwaves given out by the speed gun?

	Frequency of reflected waves	Wavelength of reflected waves
1	higher	longer
2	lower	shorter
3	higher	shorter
4	lower	longer

4.6.1.3 Reflection of waves (physics only)

Question 06 · continued

The graph shows how the change in frequency of the microwaves depends on the speed of the ball.



3C The data has been drawn as a line graph because . . .

1 frequency and speed are both categoric variables.

2 frequency and speed are both continuous variables.

3 frequency is a categoric variable and speed is a continuous variable.

4 frequency is a continuous variable and speed is a categoric variable.

3D The speed gun measures the change in frequency as 3000 Hz.

What is the speed of the ball?

1 18 m/s

2 20 m/s

3 21 m/s

4 22 m/s

4.6.1.3 Reflection of waves (physics only)

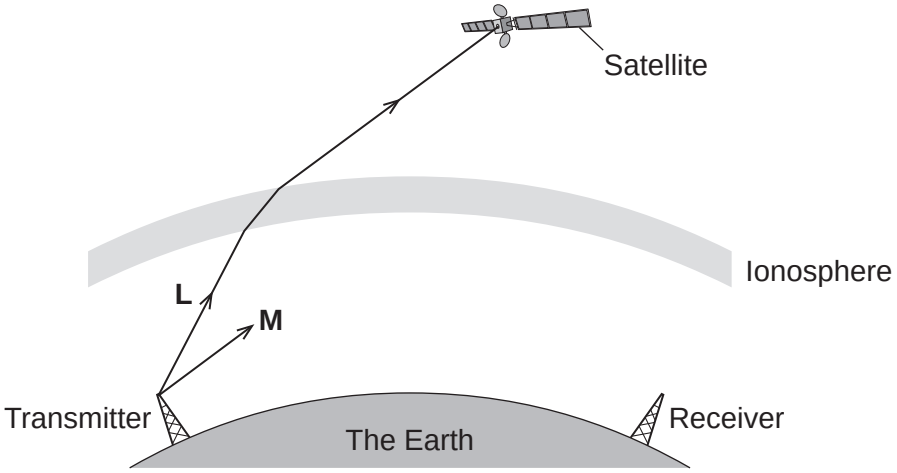
Question 07

June 2015 | PH1HP | Original Q4 | Legacy

4 Different parts of the electromagnetic spectrum are useful for different methods of communication.

Figure 4 shows a transmitter emitting two electromagnetic waves, **L** and **M**.

Figure 4



4 (a) (i) Wave **L** is used to send a signal to a satellite.
Which part of the electromagnetic spectrum does wave **L** belong to?

[1 mark]

.....

4 (a) (ii) What name is given to the process that occurs as wave **L** passes into the ionosphere?

[1 mark]

.....

4 (b) Wave **M** is **reflected** by the ionosphere.

4 (b) (i) On **Figure 4**, draw the path of wave **M** until it reaches the receiver.

[2 marks]

4 (b) (ii) On **Figure 4**, draw a line to show the normal where wave **M** meets the ionosphere.
Label the line **N**.

[1 mark]

4.6.1.3 Reflection of waves (physics only)

Question 07 · continued

4 (c) Give **two** properties of all electromagnetic waves.

[2 marks]

1 .....

.....

2 .....

.....

7

Turn over for the next question

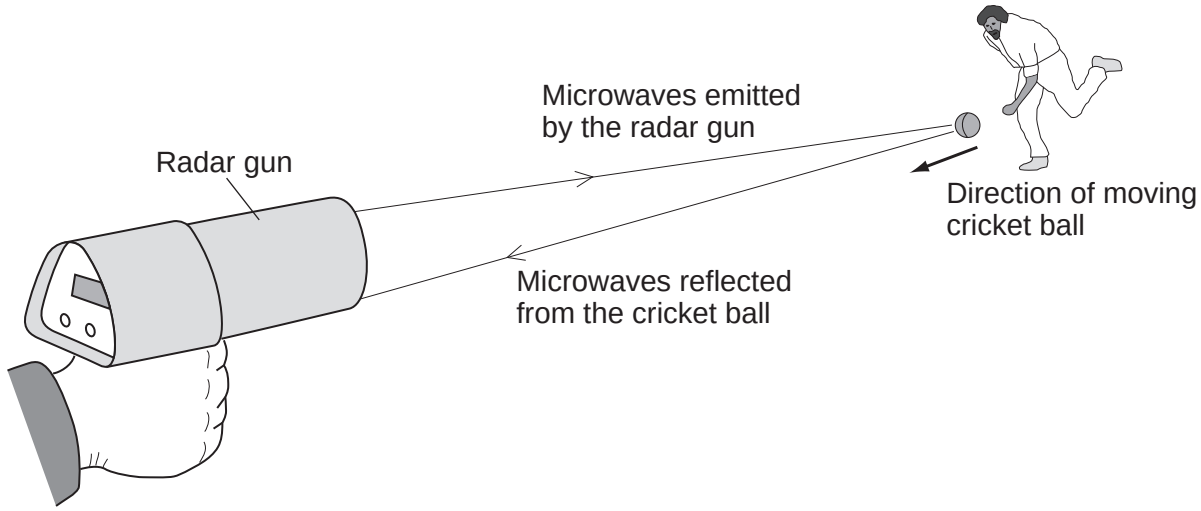
4.6.1.3 Reflection of waves (physics only)

Question 08

June 2015 | PH1HP | Original Q6 | Legacy

6 A radar gun is used to determine the speed of a cricket ball during a cricket match. The radar gun emits a beam of microwaves. The microwaves are reflected from the moving ball, as shown in **Figure 6**.

Figure 6



Comparing the microwaves emitted by the radar gun with the microwaves reflected from the cricket ball enables the speed of the ball to be determined.

6 (a) What is the name given to the effect used to determine the speed of the cricket ball?

[1 mark]

.....

6 (b) Compare the wavelength, frequency and speed of the **reflected** microwaves with the wavelength, frequency and speed of the microwaves emitted by the radar gun.

[3 marks]

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4

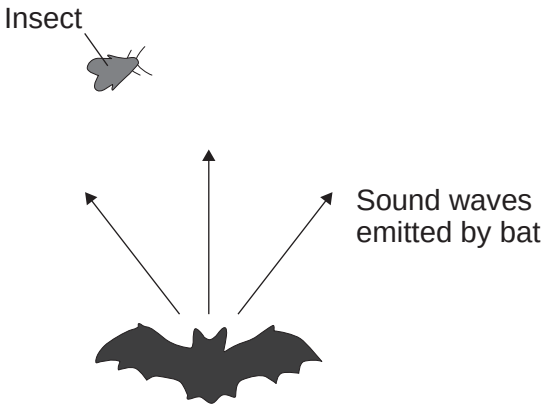
4.6.1.3 Reflection of waves (physics only)

Question 09

June 2016 | PH1HP | Original Q1 | Legacy

1 Bats use the reflection of high pitched sound waves to determine the position of objects. **Figure 1** shows a bat and an insect flying in front of the bat.

Figure 1



1 (a) What determines the pitch of a sound wave?

[1 mark]

Tick (✓) **one** box.

	Tick (✓)
amplitude	
frequency	
speed	

1 (b) State the name given to reflected sound waves.

[1 mark]

_____

4.6.1.3 Reflection of waves (physics only)

Question 09 · continued

1 (c) The bat emits sound waves with a range of wavelengths.

Some of the sound waves will be diffracted by the insect.

Complete the following sentences to explain why.

[2 marks]

Diffraction is caused by the sound waves _____ as they pass the insect.

The most diffraction happens when the wavelength of the sound wave is

_____ the size of the insect.

1 (d) The bat emits a sound wave with a frequency of 25.0 kHz and a wavelength of 0.0136 metres.

Calculate the speed of this sound wave.

Use the correct equation from the Physics Equations Sheet.

[2 marks]

_____

_____

_____

Speed = _____ m/s

1 (e) Sound waves are longitudinal. Describe a longitudinal sound wave.

[2 marks]

_____

_____

_____

_____

8

4.6.1.3 Reflection of waves (physics only)

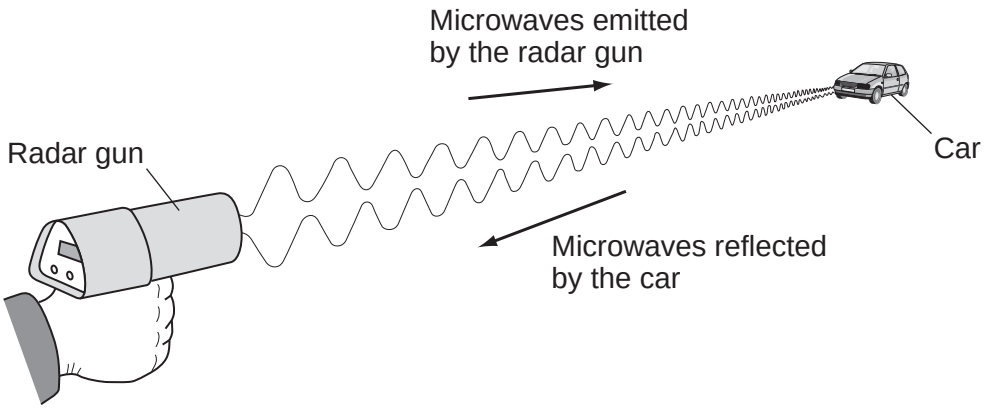
Question 10

June 2017 | PH1HP | Original Q4 | Legacy

4 A radar gun can be used to measure the speed of a car.

Microwaves are emitted by the radar gun and reflected by the car, as shown in **Figure 4**.

Figure 4



4 (a) The microwaves reflected by the moving car have a different frequency from the microwaves emitted by the radar gun.

What is the name of the effect causing this change in frequency?

[1 mark]

_____

4 (b) The data in **Table 2** are measurements taken from three different cars on the same piece of road.

Table 2

Car	Frequency of emitted microwaves in kHz	Frequency of reflected microwaves in kHz
A	27 000 000	27 000 002
B	27 000 000	27 000 000
C	27 000 000	26 999 997

4.6.1.3 Reflection of waves (physics only)

Question 10 · continued

4 (b) (i) State which car in **Table 2** is moving towards the radar gun. Give a reason for your answer.

[2 marks]

Car _____

Reason _____

_____

4 (b) (ii) State which car in **Table 2** is moving the fastest. Give a reason for your answer.

[2 marks]

Car _____

Reason _____

_____

5

Turn over for the next question

4.6.1.3 Reflection of waves (physics only)

Question 11

June 2018 | 8463/2H | Original Q5

0 5 **Figure 7** shows the apparatus a student used to investigate the reflection of light by a plane mirror.

The student drew four ray diagrams for each angle of incidence.

The student measured the angle of reflection from each diagram.

Table 2 gives the student's results.

Figure 7

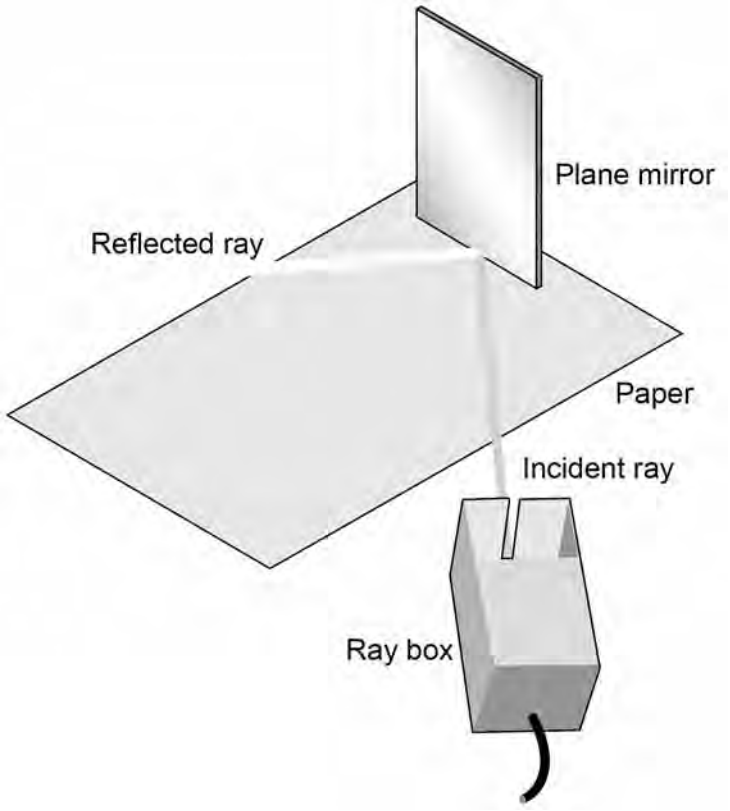


Table 2

	Angle of reflection			
Angle of incidence	**Test 1**	**Test 2**	**Test 3**	**Test 4**
20°	19°	22°	20°	19°
30°	31°	28°	32°	30°
40°	42°	40°	43°	41°
50°	56°	49°	53°	46°

4.6.1.3 Reflection of waves (physics only)

Question 11 · continued

0 5 . 1 For each angle of incidence, the angle of reflection has a range of values.

This is caused by an error.

What type of error will have caused each angle of reflection to have a range of values?

[1 mark]

0 5 . 2 Suggest what the student may have done during the investigation to cause each angle of reflection to have a range of values.

[1 mark]

0 5 . 3 Estimate the uncertainty in the angle of reflection when the angle of incidence is 50°.

Show how you determine your estimate.

[2 marks]

Uncertainty = ± _____ °

0 5 . 4 The student concluded that for a plane mirror, the angle of incidence is equal to the angle of reflection.

Explain whether you agree with this conclusion.

Use examples from the results in **Table 2** in your answer.

[2 marks]

4.6.1.3 Reflection of waves (physics only)

Question 11 · continued

0 5 . 5 What extra evidence could be collected to support the student's conclusion?

[1 mark]

0 5 . 6 State **one** change the student should make to the apparatus if he wants to use the same method to investigate diffuse reflection.

[1 mark]

8

4.6.1.3 Reflection of waves (physics only)

Question 12

June 2018 | 8463/2H | Original Q9

0 9 Light is usually described as a wave. Light can also be described as a stream of particles.

These are two different scientific models of light.

0 9 . 1 Which statement describes a scientific model?

Tick **one** box.

[1 mark]

A small scale version of a real object. ☐

A way of guessing what will happen. ☐

An idea used to explain observations and data. ☐

0 9 . 2 Why do scientists sometimes have different models like the wave and particle models of light?

[1 mark]

0 9 . 3 Sometimes an old scientific model is replaced by a new model.

Explain why scientists replace an old scientific model with a new model.

Include an example from Physics in your answer.

[4 marks]

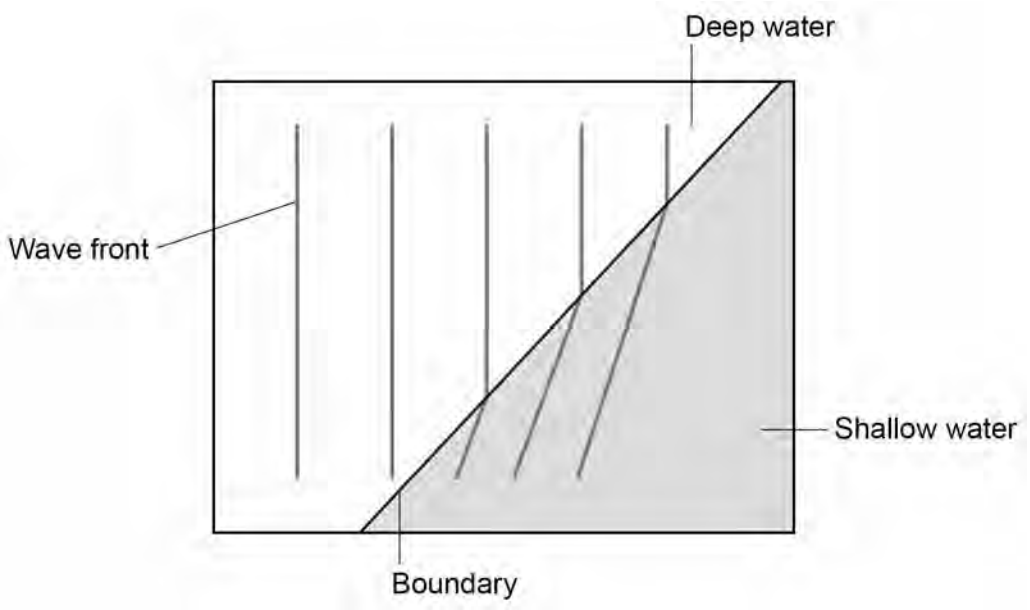
4.6.1.3 Reflection of waves (physics only)

Question 12 · continued

Some students used water waves in a ripple tank to model the behaviour of light waves.

0 9 . 4 **Figure 16** shows what happens to the wave fronts as they pass the boundary between deep water and shallower water.

Figure 16



Explain why refraction happens at the boundary between the deep water and shallower water.

[3 marks]

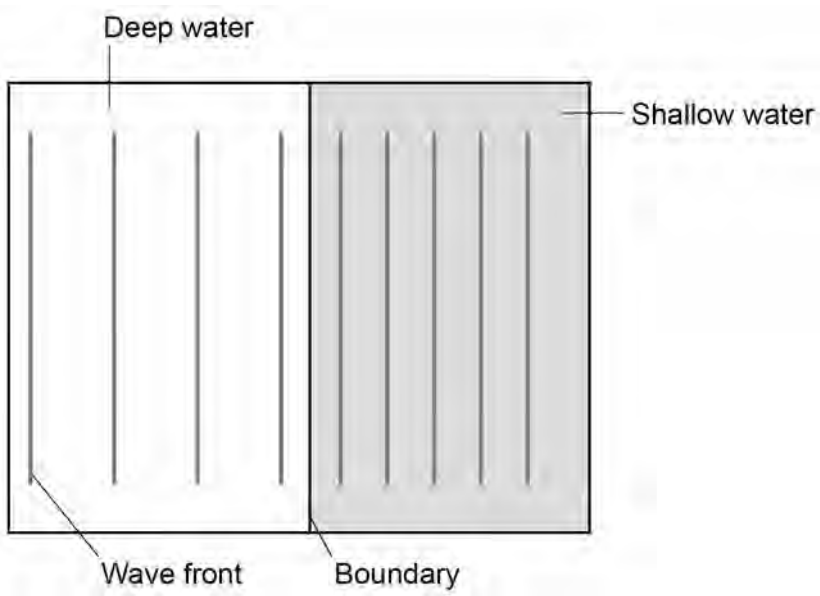
Question 9 continues on the next page

4.6.1.3 Reflection of waves (physics only)

Question 12 · continued

0 9 . 5 **Figure 17** shows the wave fronts travelling parallel to the boundary between deep water and shallower water.

Figure 17



Explain why the wave fronts in **Figure 17** do not refract at the boundary.

[2 marks]

1

4.6.1.3 Reflection of waves (physics only)

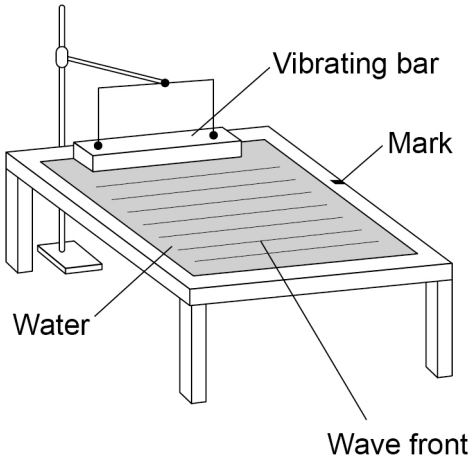
Question 13

November 2021 | 8463/2H | Original Q6

0 6 A teacher demonstrated some features of waves using a ripple tank.

Figure 10 shows the ripple tank.

Figure 10



0 6 . 1 The teacher measured the time taken for 10 wave fronts to pass the mark.

The teacher repeated this measurement three times and calculated the mean.

What is the advantage of repeating measurements and calculating a mean?

[1 mark]

4.6.1.3 Reflection of waves (physics only)

Question 13 · continued

0 6 . 2 The teacher's measurements for the time taken for 10 wave fronts to pass the mark were:

8.4 s 7.8 s 8.1 s

Calculate the mean frequency of the wave.

Give your answer to 2 significant figures.

[5 marks]

Mean frequency (2 significant figures) = _____ Hz

0 6 . 3 In a different investigation, the teacher wanted to determine the speed of water waves in the ripple tank.

The teacher did **not** measure the wavelength of the wave.

Explain how the teacher could determine the speed of the wave.

[3 marks]

9

4.6.1.3 Reflection of waves (physics only)

Question 14

June 2022 | 8463/2HR | Original Q2

0 2 A student used a ray box to shine a ray of light through air into a glass block.

The student investigated how the angle of refraction varied with the angle of incidence.

Table 1 shows the results.

Table 1

Angle of incidence in degrees	Angle of refraction in degrees
10	5
20	10
30	14
40	19
50	23
60	26
70	28
80	29

0 2 . 1 Describe a method the student could have used to obtain the results in **Table 1**.

Your answer may include a labelled diagram.

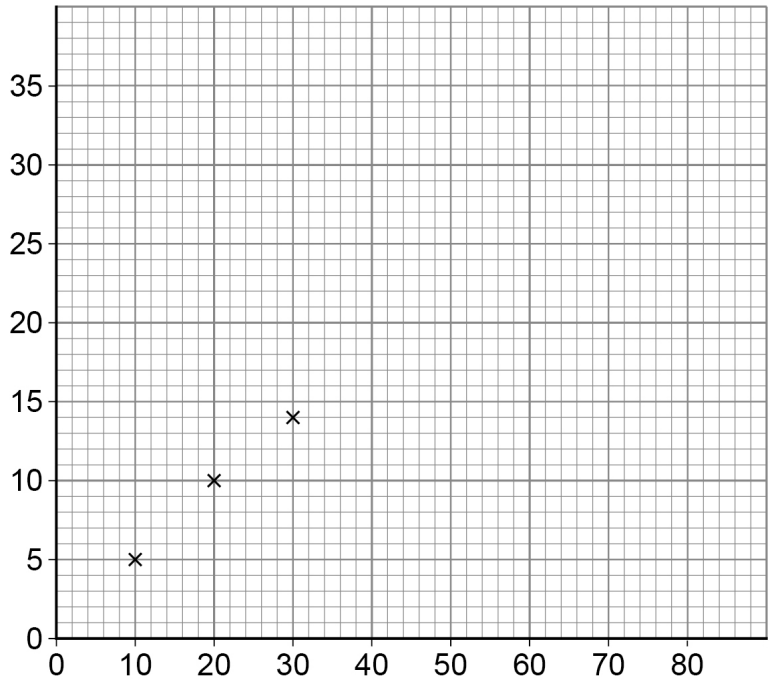
[6 marks]

4.6.1.3 Reflection of waves (physics only)

Question 14 · continued

0 2 . 2 **Figure 2** is an incomplete graph of the results.

Figure 2



Complete **Figure 2** using data from **Table 1**.

- Label the axes.
- Plot the remaining data.
- Draw a line of best fit.

[4 marks]

Question 2 continues on the next page

4.6.1.3 Reflection of waves (physics only)

Question 14 · continued

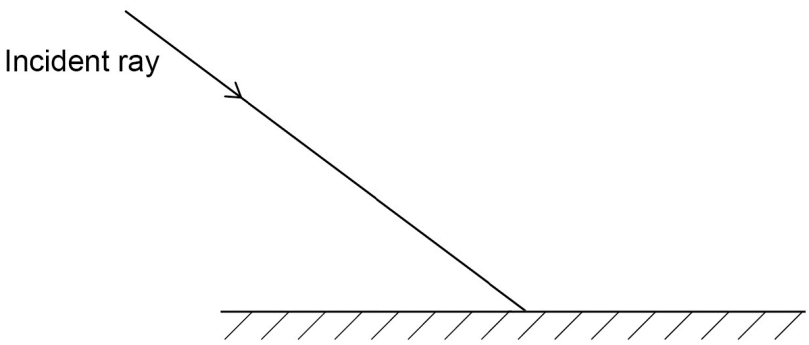
0 2 . 3 Complete the ray diagram in **Figure 3** to show the reflection of light from the surface of a plane mirror.

You should:

- draw the normal line
- draw the reflected ray.

[2 marks]

Figure 3



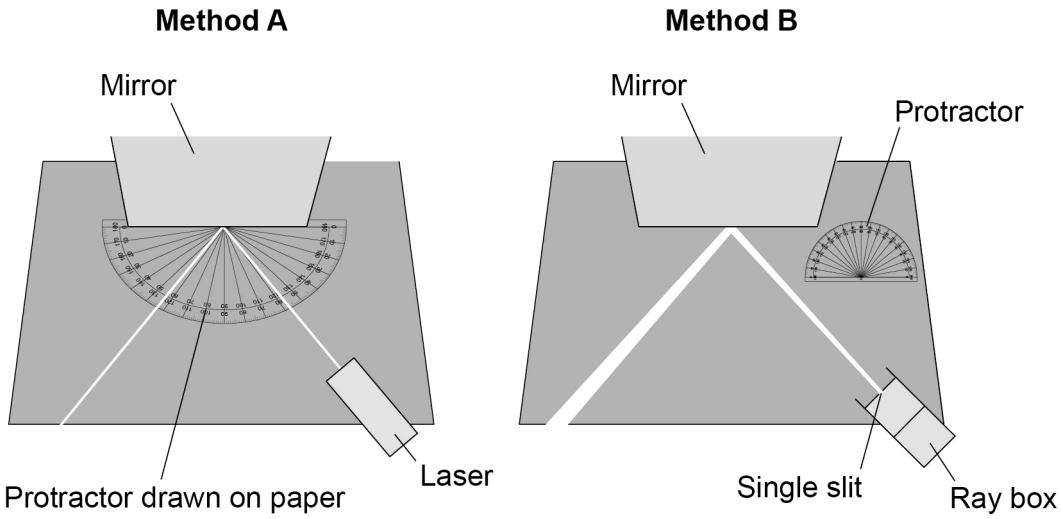
4.6.1.3 Reflection of waves (physics only)

Question 14 · continued

0 2 . 4 Two students investigated the reflection of light by a plane mirror.

Figure 4 shows the different equipment the students used.

Figure 4



Explain **two** ways that **Method A** is better than **Method B**.

[4 marks]

1 _____

_____

_____

_____

2 _____

_____

_____

_____

16

4.6.1.3 Reflection of waves (physics only)

Question 15

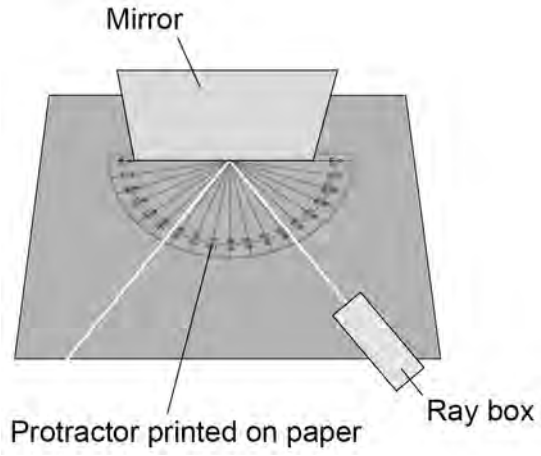
June 2023 | 8463/2H | Original Q7

0 7 A student investigated the behaviour of light.

The student used a mirror with a smooth surface to investigate reflection.

Figure 17 shows the equipment used.

Figure 17



0 7 . 1 What name is given to reflection from a smooth surface?

[1 mark]

4.6.1.3 Reflection of waves (physics only)

Question 15 · continued

The student measured the angle of reflection for different angles of incidence.

Table 2 shows the results.

Table 2

Angle of incidence in degrees	Angle of reflection in degrees			
	Test 1	Test 2	Test 3	Mean
10	8	10	11	10
20	20	21	20	20
30	28	29	32	30
40	39	41	41	40
50	49	50	52	50

0 7 . 2 What conclusion can be made from the results in **Table 2**?

[1 mark]

0 7 . 3 What type of error caused the variation in the results for the angle of reflection?

Suggest **one** cause of this error.

[2 marks]

Type of error _____

Cause of error _____

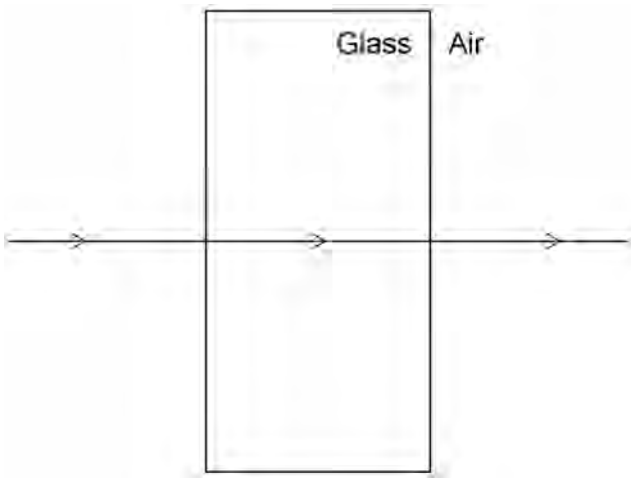
4.6.1.3 Reflection of waves (physics only)

Question 15 · continued

The student also investigated the refraction of light.

0 7 . 4 **Figure 18** shows the path of a ray of light through a glass block.

Figure 18



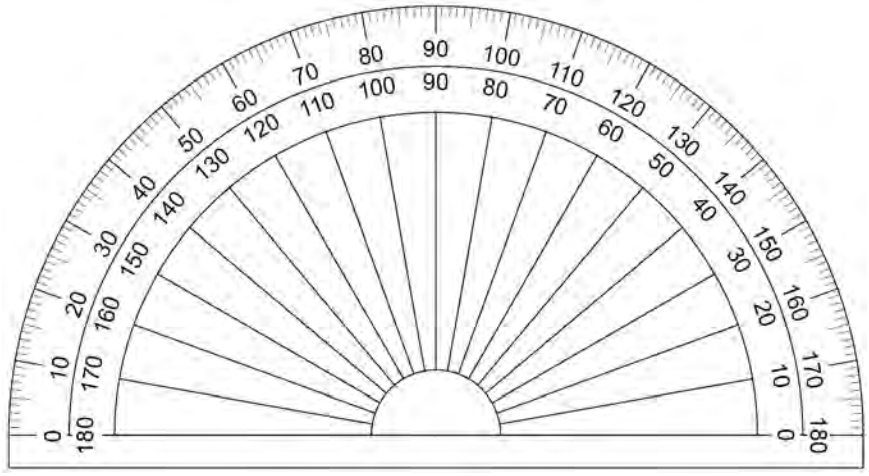
Why has refraction **not** occurred?

[1 mark]

0 7 . 5 The student measured the angle of refraction for different angles of incidence.

Figure 19 shows the protractor used.

Figure 19



When the angle of incidence was 10° the student measured the angle of refraction four times.

The student recorded the measurements as:

6.0° 6.3° 6.4° 5.8°

Explain why the student should **not** have recorded these results when using the protractor in **Figure 19** to make the measurements.

[2 marks]

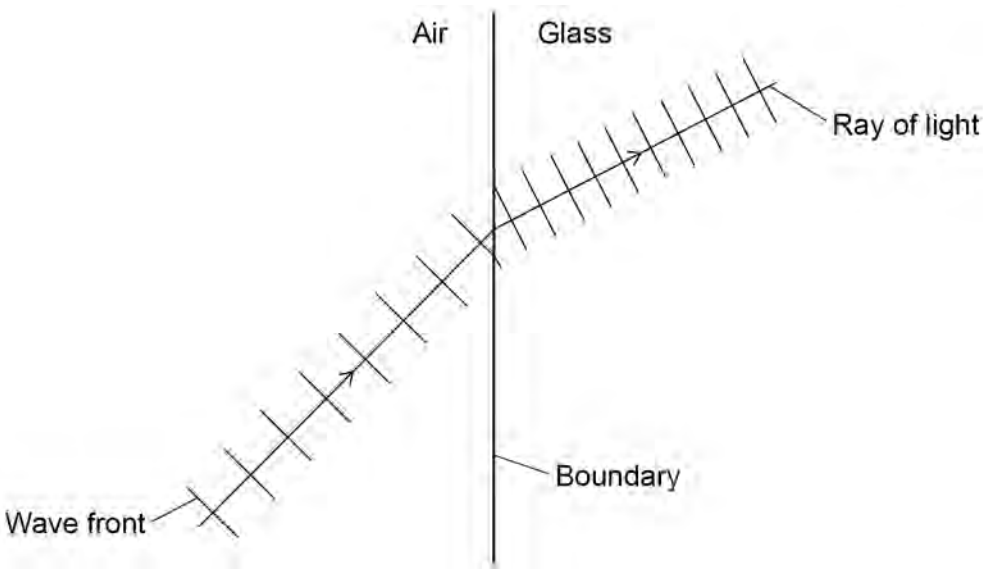
Question 7 continues on the next page

4.6.1.3 Reflection of waves (physics only)

Question 15 · continued

0 7 . 6 **Figure 20** shows what happens to wave fronts as they pass across the boundary between air and glass.

Figure 20



Explain in terms of the wave fronts, why refraction happens at the boundary between air and glass.

[3 marks]

10

4.6.1.3 Reflection of waves (physics only)

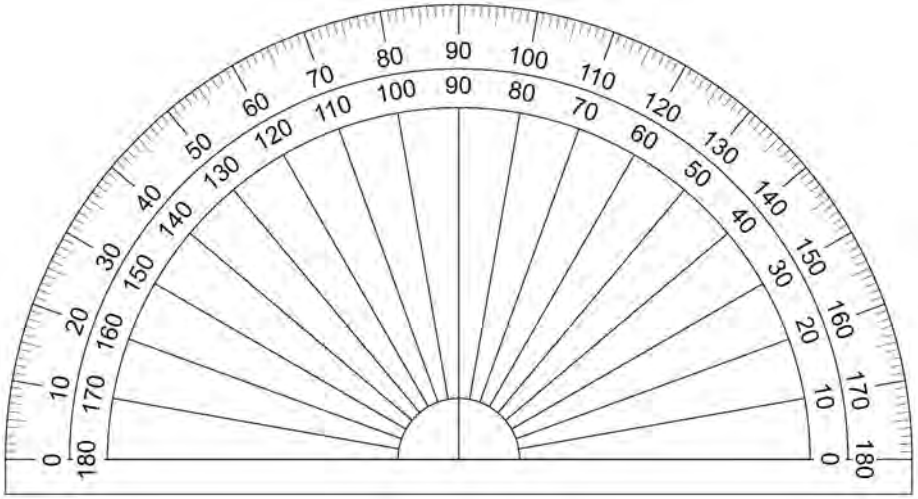
Question 16

June 2024 | 8463/2H | Original Q1

0 1 A student investigated the refraction of light by a glass block.

Figure 1 shows the protractor used to measure the angles of incidence and the angles of refraction.

Figure 1



0 1 . 1 What is the resolution of the protractor used to measure the angles?

[1 mark]

Resolution = _____ °

Table 1 shows the results.

Table 1

Angle of incidence in degrees	Angle of refraction in degrees
10	6
20	12
30	18
40	23
50	28
60	32

4.6.1.3 Reflection of waves (physics only)

Question 16 · continued

0 1 . 2 Describe a method the student could have used to obtain the data in **Table 1**.

You may include a labelled diagram.

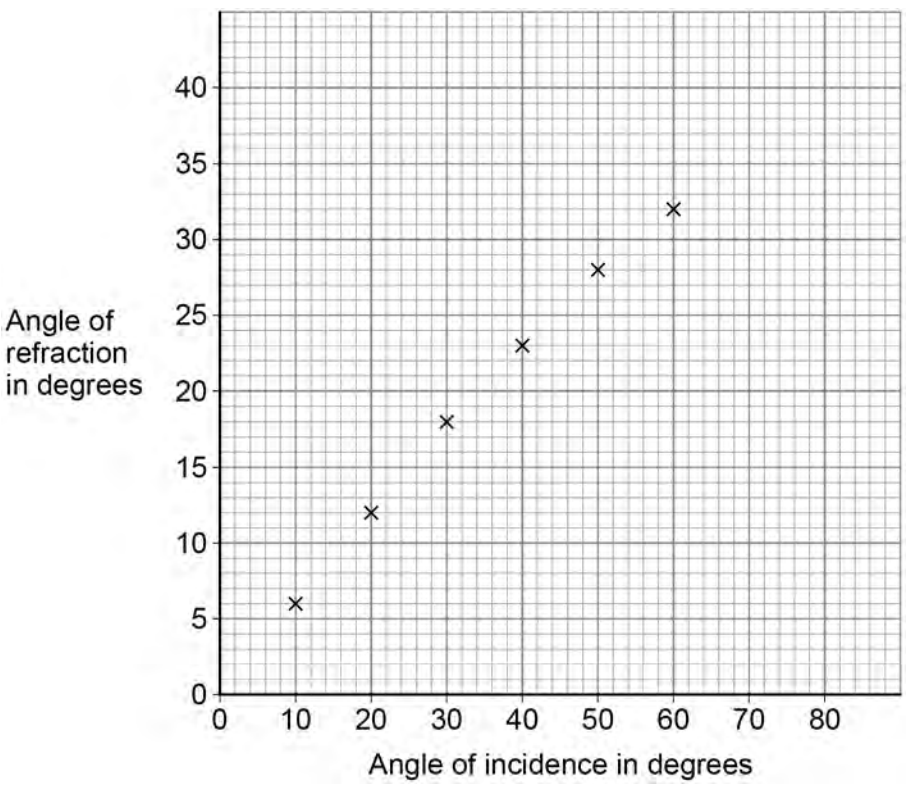
[6 marks]

4.6.1.3 Reflection of waves (physics only)

Question 16 · continued

Figure 2 shows some of the results.

Figure 2



The student measured the angles of refraction for two additional angles of incidence.

Table 2 shows the additional results.

Table 2

Angle of incidence in degrees	Angle of refraction in degrees
70	35
80	37

4.6.1.3 Reflection of waves (physics only)

Question 16 · continued

0 1 . 3 Complete **Figure 2**.

You should:

- plot the results from **Table 2**
- draw the line of best fit.

[2 marks]

0 1 . 4 How does **Figure 2** show that the angle of refraction is **not** directly proportional to the angle of incidence?

[1 mark]

Question 1 continues on the next page

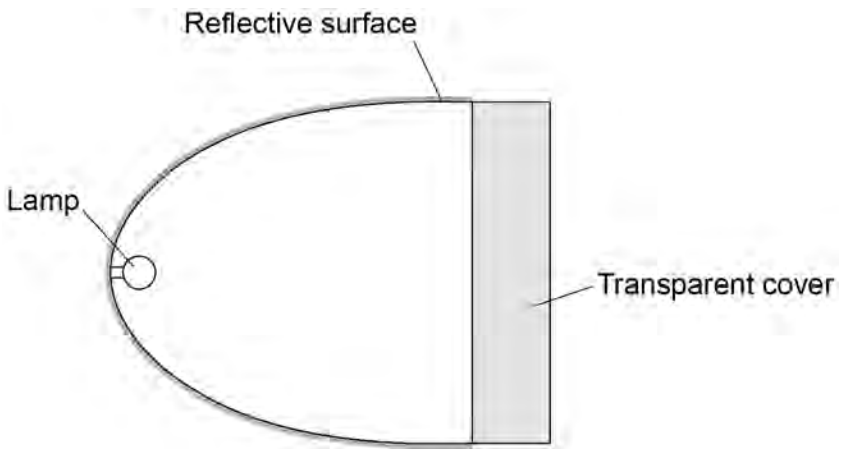
4.6.1.3 Reflection of waves (physics only)

Question 16 · continued

Figure 3 shows a diagram of a car headlight.

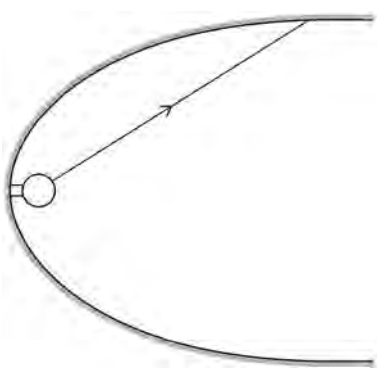
The headlight has a lamp, a reflective surface and a transparent cover.

Figure 3



0 1 . 5 **Figure 4** shows a ray of light incident on the reflective surface.

Figure 4



Complete **Figure 4** to show the reflected ray of light.

You should include the normal line at the point where the incident ray meets the reflecting surface.

[2 marks]

4.6.1.3 Reflection of waves (physics only)

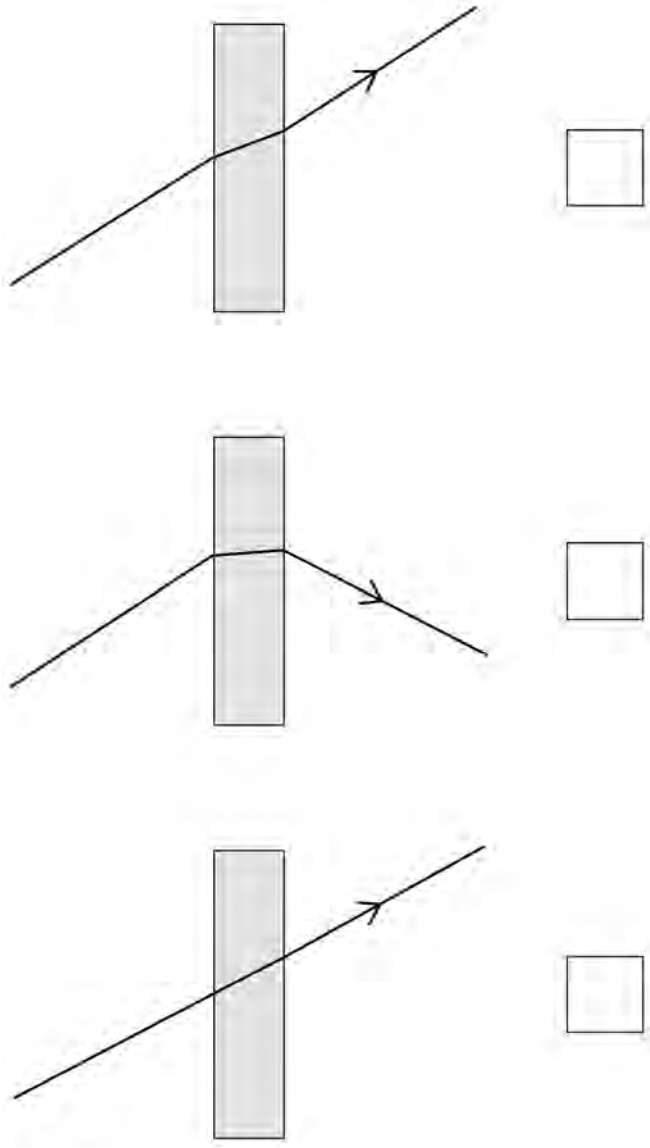
Question 16 · continued

0 1 . 6 Rays of light pass through the transparent cover of the headlight.

Which diagram shows how a ray of light passes through the transparent cover?

[1 mark]

Tick (✓) **one** box.



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