

**AQA - Waves – GCSE Combined Science Physics**

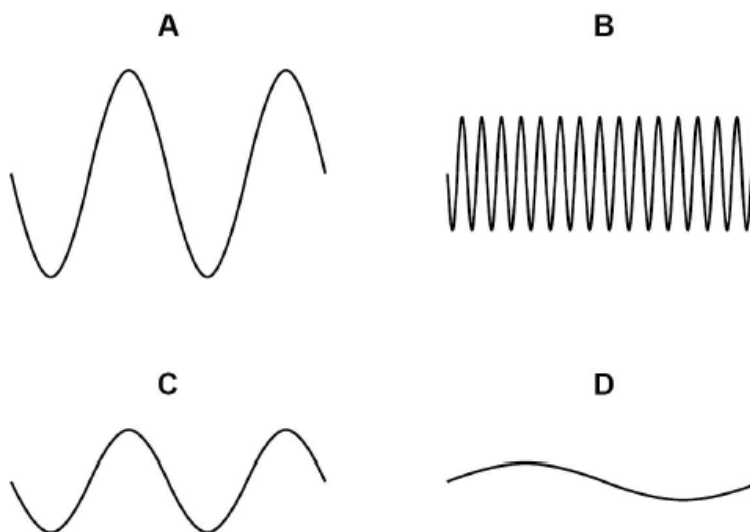
1. June/2020/Paper\_2F/No.5

0 5

Figure 6 shows four waves.

The waves are drawn to the same scale.

Figure 6



0 5 . 1

Which wave has the greatest amplitude?

[1 mark]

Tick (✓) **one** box.A B C D 

0 5 . 2

Which wave has the greatest frequency?

[1 mark]

Tick (✓) **one** box.A B C D

0 5 . 3 Which wave has the greatest wavelength?

[1 mark]

Tick (✓) **one** box.

A       B       C       D

0 5 . 4 A wave has a frequency of 1650 Hz and a wavelength of 0.200 m

Calculate the wave speed.

Use the equation:

$$\text{wave speed} = \text{frequency} \times \text{wavelength}$$

[2 marks]

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Wave speed = \_\_\_\_\_ m/s

A student uses a mobile phone app that displays sound waves.

**Figure 7** shows the student holding the mobile phone close to a loudspeaker.

**Figure 7**

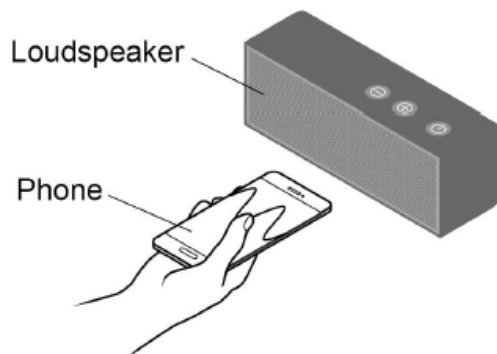
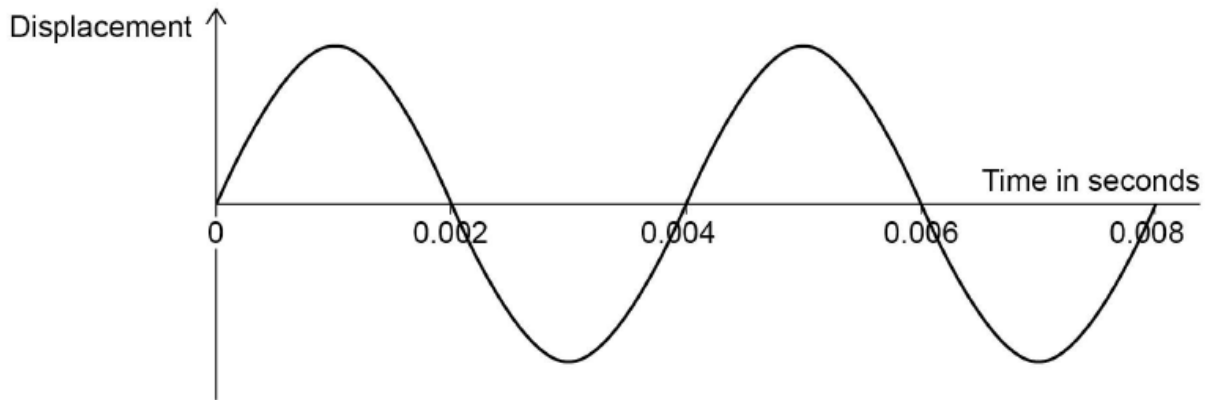


Figure 8 shows the wave pattern seen on the phone screen.

Figure 8



0 5 . 5 What is the period of the wave shown in Figure 8?

[1 mark]

Tick (✓) one box.

0.002 s

0.004 s

0.006 s

0.008 s

0 5 . 6 Determine the frequency of the wave shown in Figure 8.

Use the Physics Equations Sheet.

[3 marks]

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Frequency = \_\_\_\_\_ Hz

## 2. June/2019/Paper\_2F/No.6(6.3\_6.6)

The smart watch and mobile phone are connected to each other by a system called Bluetooth.

Bluetooth is wireless and uses electromagnetic waves for communication.

0 6 . 3

Suggest why the phone and watch being connected by a wireless system is an advantage when running.

[1 mark]

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0 6 . 4

Write down the equation that links frequency, wave speed and wavelength.

[1 mark]

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0 6 . 5

The electromagnetic waves have a frequency of 2 400 000 000 Hz

The speed of electromagnetic waves is 300 000 000 m/s

Calculate the wavelength of the electromagnetic waves.

[3 marks]

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Wavelength = \_\_\_\_\_ m

0 6 . 6 Table 3 shows some information about four types of Bluetooth.

Table 3

Type	Power in milliwatts	Range in metres
1	100	100
2	2.50	10.0
3	1.00	1.00
4	0.50	0.50

Mobile phones use type 2 Bluetooth to communicate with other devices.

Suggest **two** reasons why.

[2 marks]

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

## 3. June/2019/Paper\_2F/No.7

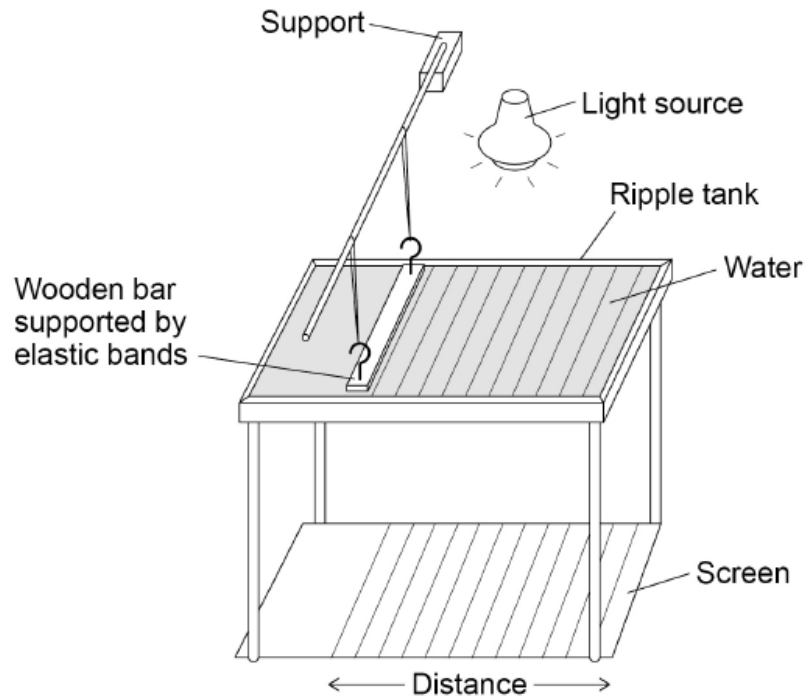
07

**Figure 11** shows the equipment a teacher used to determine the speed of a water wave.

The equipment includes:

- a ripple tank filled with water
- a wooden bar that creates ripples on the surface of the water
- a light source which causes a shadow of the ripples on the screen.

**Figure 11**



07.1

Describe how equipment in **Figure 11** can be used to measure the wavelength, frequency and speed of a water wave.

[6 marks]

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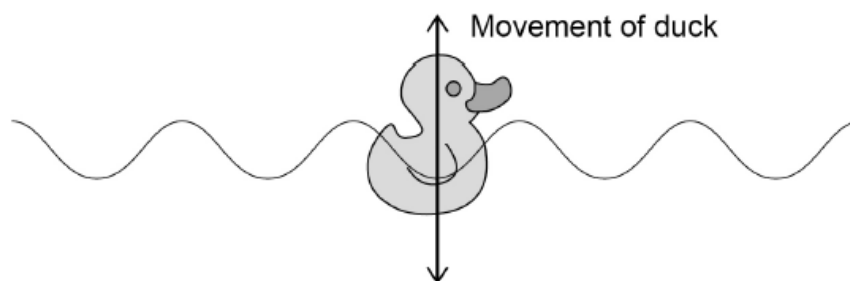
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The teacher put a plastic duck in the ripple tank as shown in **Figure 12**.  
The plastic duck moved up and down as the waves in the water passed.

**Figure 12**



0 7 . 2

How does the movement of the plastic duck in **Figure 12** demonstrate that water waves are transverse?

[1 mark]

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0 7 . 3 The teacher measured the maximum height and the minimum height of the plastic duck above the screen as the wave passed.

The teacher repeated his measurements.

Table 4 shows the teacher's measurements.

Table 4

Maximum height in mm	509	513	511
Minimum height in mm	503	498	499

Calculate the mean amplitude of the water wave.

[3 marks]

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Mean amplitude = \_\_\_\_\_ mm



4. June/2019/Paper\_2H/No.2

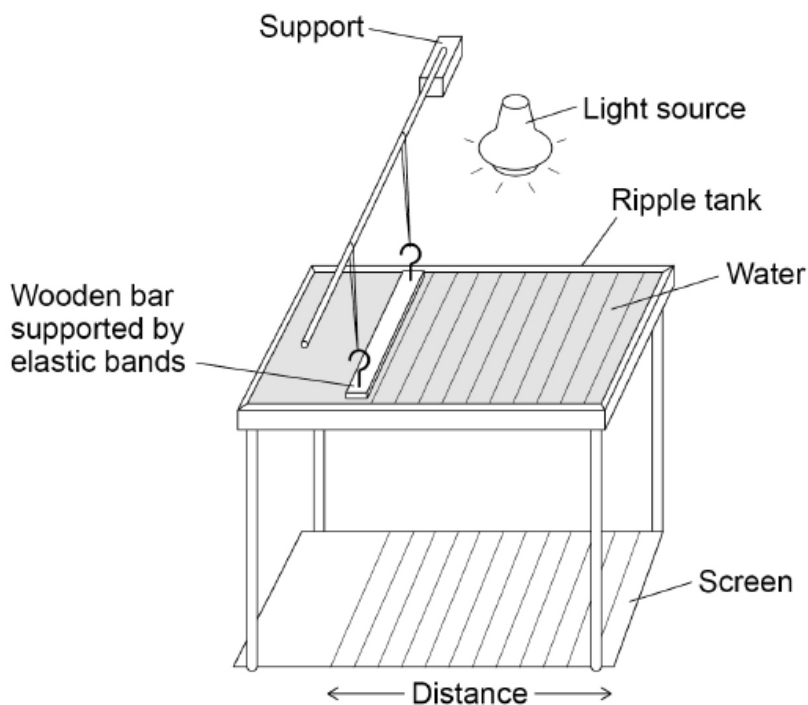
0 2

**Figure 3** shows the equipment a teacher used to determine the speed of a water wave.

The equipment includes:

- a ripple tank filled with water
- a wooden bar that creates ripples on the surface of the water
- a light source which causes a shadow of the ripples on the screen.

**Figure 3**



0 2 . 1

Describe how equipment in **Figure 3** can be used to measure the wavelength, frequency and speed of a water wave.

[6 marks]

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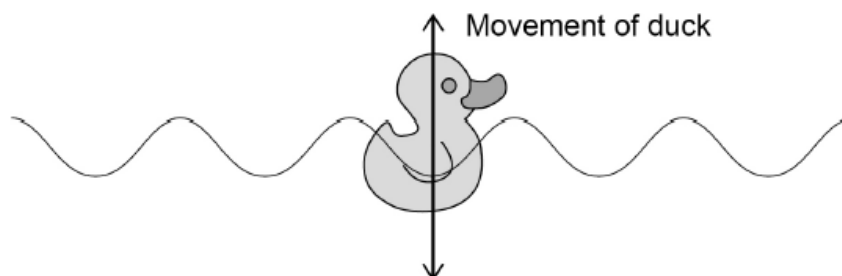
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The teacher put a plastic duck in the ripple tank as shown in **Figure 4**.  
The plastic duck moved up and down as the waves in the water passed.

**Figure 4**



**0 2 . 2** How does the movement of the plastic duck in **Figure 4** demonstrate that water waves are transverse?

**[1 mark]**

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0 2 . 3

The teacher measured the maximum height and the minimum height of the plastic duck above the screen as the wave passed.

The teacher repeated his measurements.

Table 2 shows the teacher's measurements.

Table 2

Maximum height in mm	509	513	511
Minimum height in mm	503	498	499

Calculate the mean amplitude of the water wave.

[3 marks]

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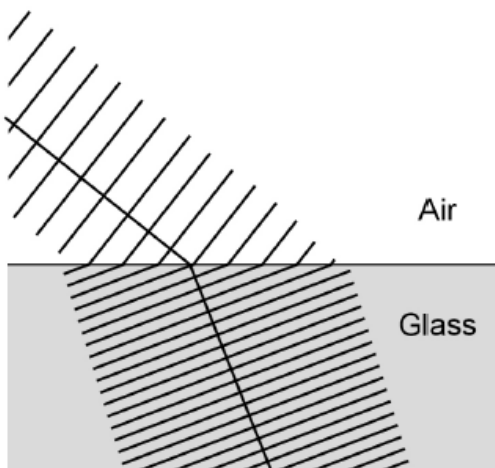
Mean amplitude = \_\_\_\_\_ mm

5. June/2019/Paper\_2H/No.7

0 7

Wave front diagrams are used to explain why light refracts when it passes from air into glass.

Figure 10



0 7 . 1

Explain why the light refracts as it passes from air into glass.

[3 marks]

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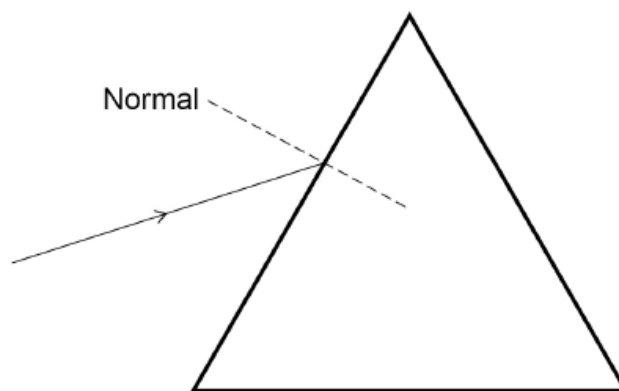
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0 7 . 2

**Figure 11** shows a ray of red light entering a glass prism.**Figure 11**

Complete the ray diagram to show the ray emerging from the glass prism.

**[3 marks]**

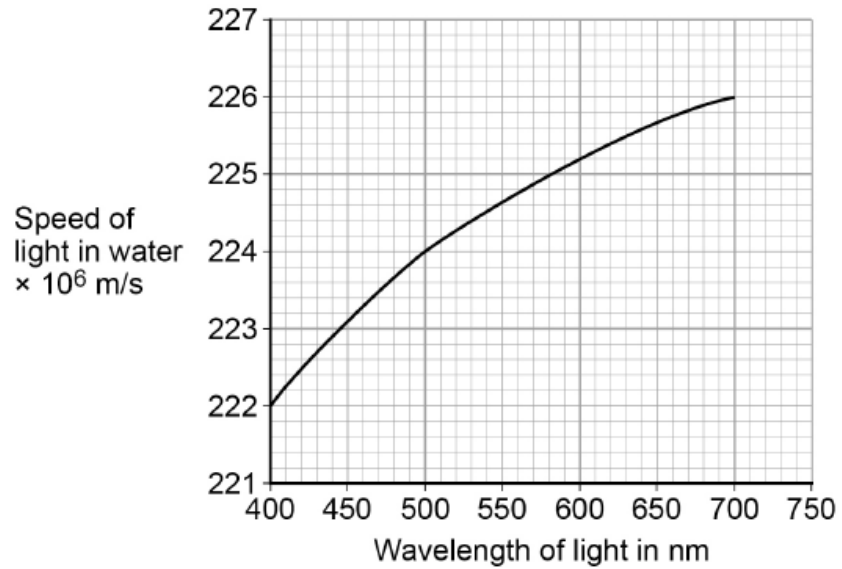
0 7 . 3

White light is made up of a continuous spectrum of different wavelengths that all travel at  $3 \times 10^8$  m/s in air.

Rainbows are produced because different wavelengths of light travel at different speeds in water.

Figure 12 shows the speed of different wavelengths of light in water.

Figure 12



Explain why violet light is refracted the most as it enters water.

[3 marks]

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