

General Properties of Waves

Question Paper

Course	CIE IGCSE Physics
Section	3. Waves
Topic	General Properties of Waves
Difficulty	Hard

Time Allowed 40

Score /33

Percentage /100

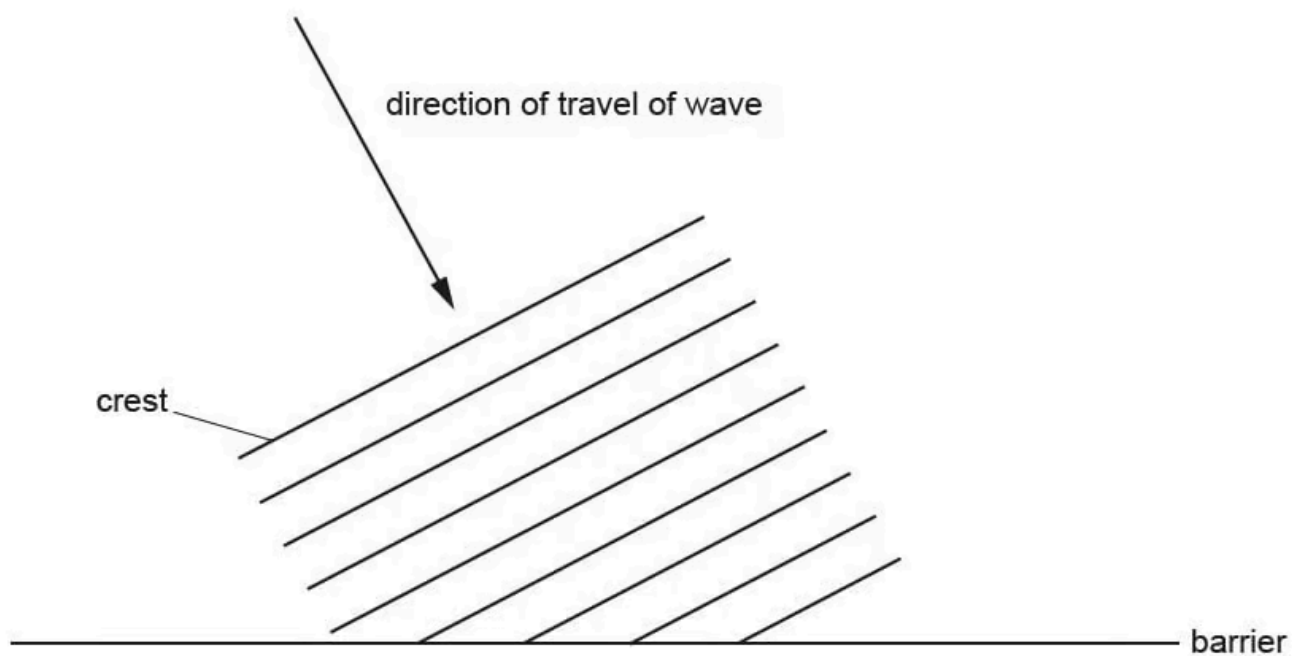
Question 1

Describe a method of using water waves to demonstrate refraction.

[4 marks]

Question 2a

Fig. 5.1 shows crests of a wave approaching a barrier where the wave is reflected.



On Fig. 5.1, draw three crests of the reflected wave.

[3 marks]

Question 2b

The wave has a wavelength of 36 cm and a speed of 1.2 m/s.

Calculate the frequency of the wave.

frequency =
[3 marks]

Question 2c

Complete the following sentences.

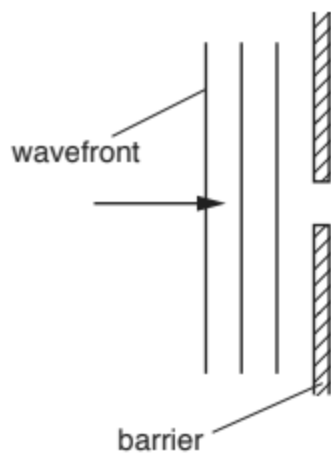
An echo is the name for a reflected wave.

The waves that form an echo are a type of longitudinal wave. Longitudinal waves are made up of and rarefactions.

[2 marks]

Question 3a**Extended tier only**

Fig. 6.1 shows wavefronts approaching a gap in a barrier.

**Fig. 6.1**

- (i) On Fig. 6.1, draw three wavefronts to the right of the barrier.
- (ii) Fig. 6.2 shows the gap in the barrier increased to five times the gap in Fig. 6.1.

[2]

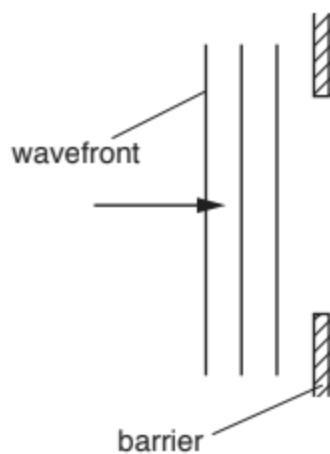


Fig. 6.2

On Fig. 6.2, draw three wavefronts to the right of the barrier.

[2]
[4 marks]

Question 3b

Describe, with a labelled diagram, an experiment using water waves that shows the reflection of wavefronts that occur at a straight barrier.

[4 marks]

Question 4a

Green light of frequency 5.7×10^{14} Hz is travelling in air at a speed of 3.0×10^8 m/s. The light is incident on the surface of a transparent solid.

Fig. 6.1 shows the wavefronts and the direction of travel of the light in the air.

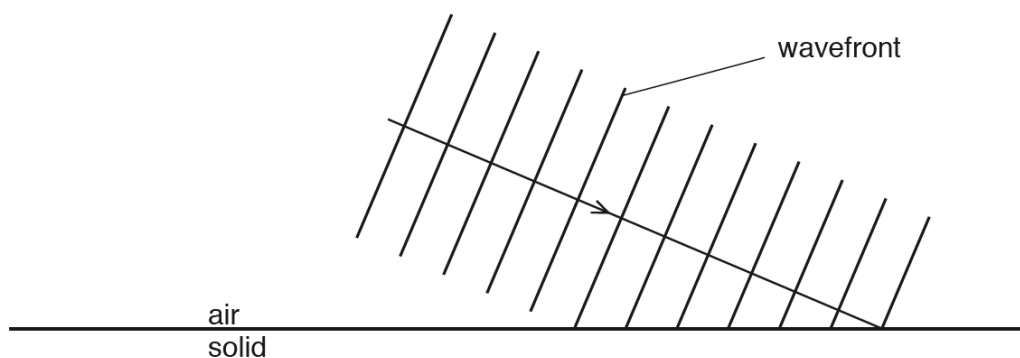


Fig. 6.1

The light travels more slowly in the transparent solid.

Explain, in terms of the wavefronts, why the light changes direction as it enters the solid. You may draw on Fig. 6.1 as part of your answer.

[3 marks]

Question 4b**Extended tier only**

The refractive index of the transparent solid is 1.3.

- (i) The light is incident on the surface of the solid at an angle of incidence of 67° .

Calculate the angle of refraction of the light in the solid.

angle of refraction = [2]

- (ii) Determine the wavelength of the green light in the transparent solid.

wavelength = [4]
[6 marks]

Question 5

A group of students want to determine the speed of sound in air.

Describe a method they can use. State the measurements they need to make.

[4 marks]