

Sound

Question Paper

Course	CIE IGCSE Physics
Section	3. Waves
Topic	Sound
Difficulty	Medium

Time Allowed	50
Score	/34
Percentage	/100

Question 1a

Fig. 8.1 shows a tuning fork and a wooden block.

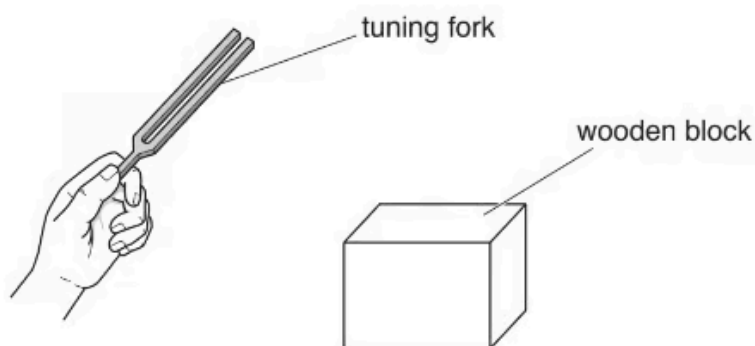


Fig. 8.1

- (i) The tuning fork is hit against the wooden block and then makes a sound.

Describe how the tuning fork produces the sound.

[1]

- (ii) The tuning fork produces a sound with a frequency of 659Hz.

State whether a healthy human ear can hear this frequency of sound.

Explain your answer.

[2]

[3 marks]

Question 1b

Fig. 8.2 represents the sound wave produced by a tuning fork.

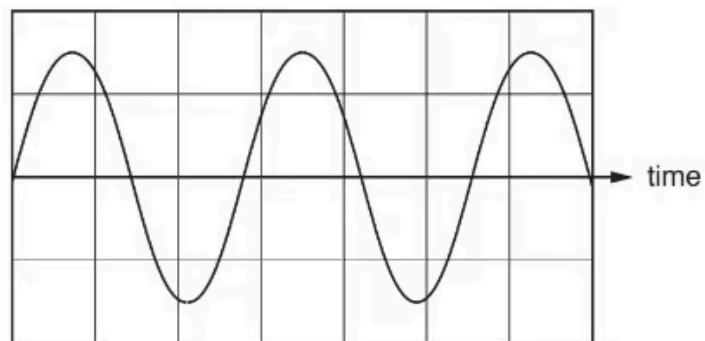


Fig. 8.2

A second tuning fork produces a different sound.

Compared with the sound represented in Fig. 8.2, this sound is quieter and has half the frequency.

On Fig. 8.2, draw the wave to show the sound produced by the second tuning fork.

[2 marks]

Question 2a

A vibrating source on a ship produces a sound wave that travels through the ocean. The wave produced is a longitudinal wave.

Explain what is meant by the term longitudinal wave.

[3 marks]

Question 2b**Extended tier only**

The frequency of the sound wave is 800Hz.

- (i) The speed of sound in air is 330m/s.

State a typical value for the speed of sound in a liquid.

[1]

- (ii) Using your value from **(b)(i)**, calculate the wavelength of the sound wave in the ocean.

wavelength =[2]

[3 marks]

Question 3a

A boat race starts on the sea, but close to land. Fig. 9.1 shows the boats at the start of the race.

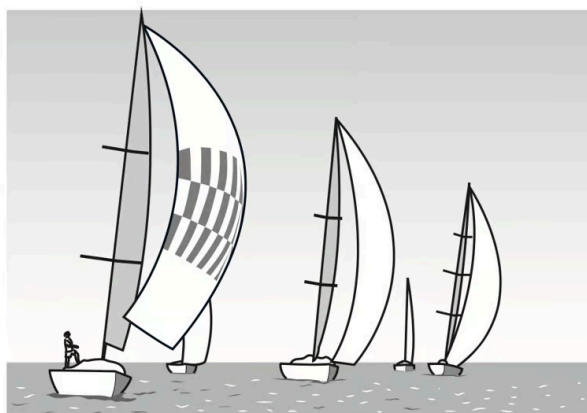


Fig. 9.1

On the land, a cannon produces a loud bang to start the race. There is a flash of light at the same time as the bang.

- (i) At the start of the race, the sailors watch for the flash of light from the cannon.

Suggest why the sailors watch for the flash of light rather than listen for the bang.

[1]

- (ii) One of the sailors is 500 m from the cannon. She measures a time difference of 1.6 seconds between seeing the flash of light and hearing the bang.

Calculate the speed of sound.

speed of sound = m/s [3]

- (iii) The value of the speed of sound obtained in **(a)(ii)** is lower than expected.

Suggest a reason for this difference.

[1]

[5 marks]

Question 3b

The race is held close to a part of the coast with high cliffs. A sailor hears a second bang shortly after the first bang.

State the term for the second bang and explain how it is produced.

[2 marks]

Question 4a

Complete the sentences about sound. Use words from the box above each sentence.

(i)	glows	reflects	refracts	vibrates
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Sound is produced when a source

[1]

(ii)	electromagnetic	longitudinal	transverse
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Sound waves are waves.

[1]

(iii)	metal	vacuum	liquid
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Sound waves cannot travel through a

[1]

[3 marks]

Question 4b

Humans, elephants, mice and dolphins have different hearing ranges. Fig. 8.1 shows the hearing range for each type of animal.

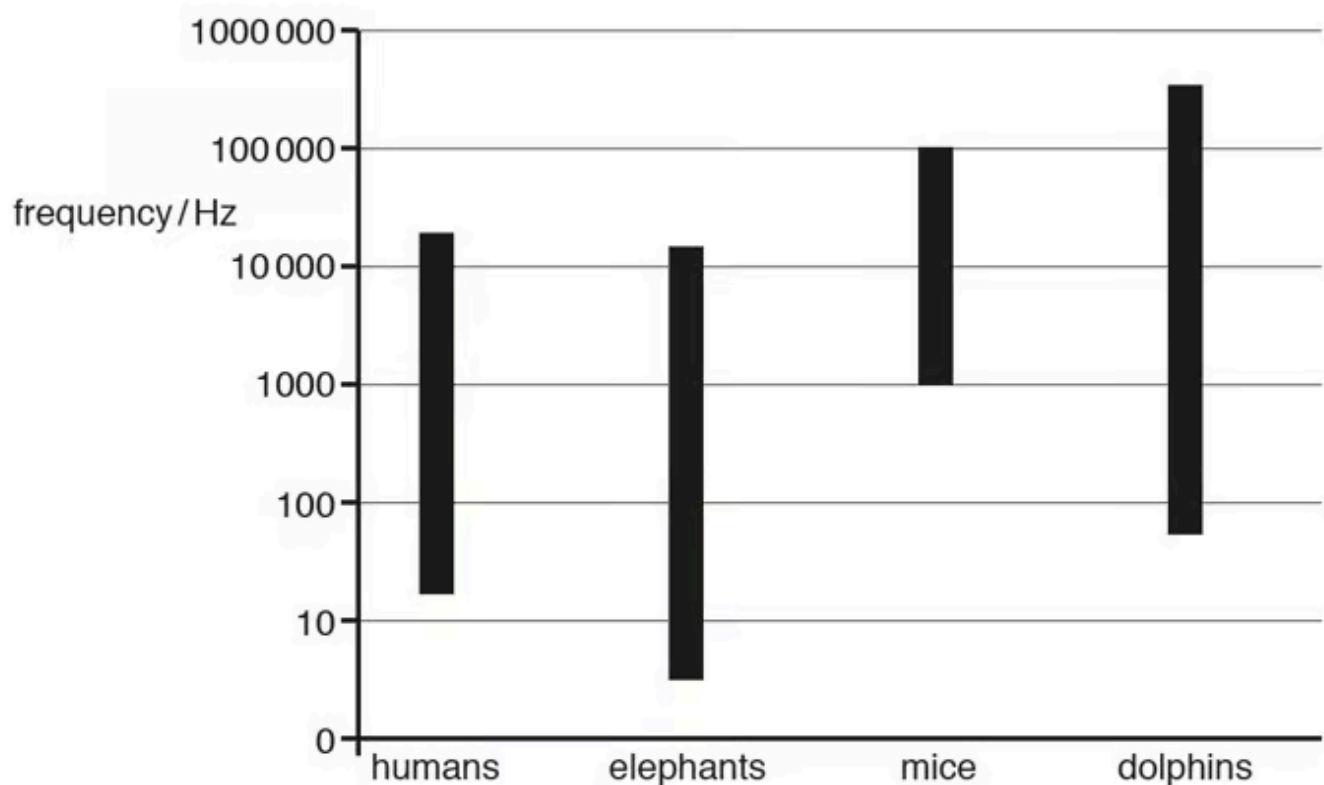


Fig. 8.1

- (i) State the lowest frequency of sound that can be heard by mice.
.....Hz [1]
- (ii) State the highest frequency of sound that can be heard by elephants.
.....Hz [1]
- (iii) Explain how the chart shows that elephants can hear some sounds that humans **cannot** hear.
[2]

- (iv) State the term given to the high frequencies that dolphins can hear but humans **cannot** hear.

[1]

[5 marks]

Question 5a

Extended tier only

Fig. 6.1 represents a sound wave of wavelength 0.45m travelling from left to right.

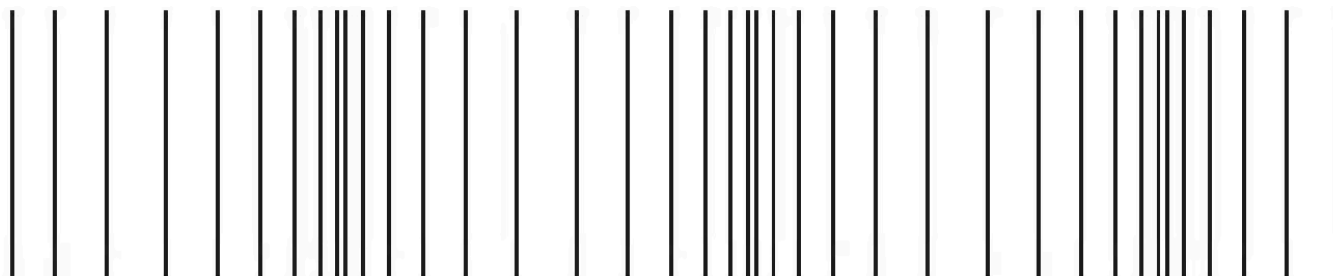


Fig. 6.1 (not to scale)

On Fig. 6.1:

- (i) at the centre of a compression, mark a cross and label it C.

[1]

- (ii) at the centre of a rarefaction, mark a cross and label it R.

[1]

- (iii) draw a double-headed arrow to represent a distance of 0.90 m.

[1]

[3 marks]

Question 5b

The frequency of the wave is 750 Hz.

Calculate the speed of the wave.

speed =

[2 marks]

Question 5c**Extended tier only**

Suggest a medium through which the sound wave is travelling and state your reasoning.

[1 mark]

Question 5d

Another type of wave that consists of compressions and rarefactions is ultrasound.

- (i) State one other similarity between sound of frequency 750 Hz and ultrasound.

[1]

- (ii) State one way in which sound of frequency 750 Hz is different from ultrasound.

[1]

[2 marks]