



Interactive Example Candidate Responses

Paper 4 (May / June 2016), Question 6

Cambridge IGCSE™

Physics 0625



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- 6 (a) Fig. 6.1 represents the waveform of a sound wave. The wave is travelling at constant speed.

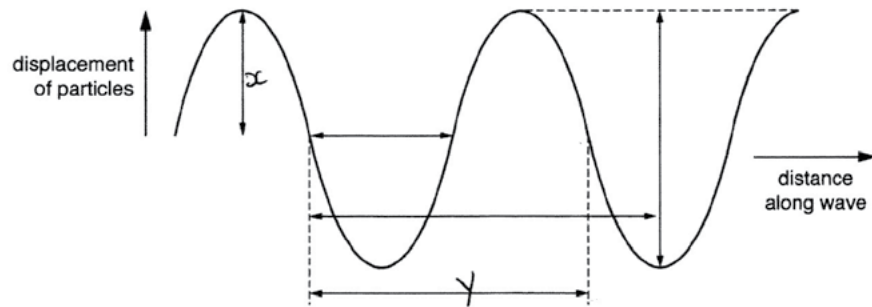


Fig. 6.1

- (i) On Fig. 6.1,

- label with the letter X the marked distance corresponding to the amplitude of the wave, [1]
- label with the letter Y the marked distance corresponding to the wavelength of the wave. [1]

- (ii) State what happens to the amplitude and the wavelength of the wave if

- the loudness of the sound is increased at constant pitch,
amplitude increases
wavelength increases [1]
- the pitch of the sound is increased at constant loudness.
amplitude decreases
wavelength decreases [1]

- (b) A ship uses pulses of sound to measure the depth of the sea beneath the ship. A sound pulse is transmitted into the sea and the echo from the sea-bed is received after 54 ms. The speed of sound in seawater is 1500 m/s.

0.054 s

Calculate the depth of the sea beneath the ship.

$$15 = 1000 \text{ m/s}$$

$$s = vt$$

$$s = \frac{d}{t}$$

$$s = \frac{2d}{t}$$

$$d = 40.5$$

$$1500 \times 0.054 = 2d$$

$$\frac{81}{2} = d$$

$$\text{depth} = \underline{40.5 \text{ m}} \quad [3]$$

[Total: 7]

Your
Mark

6(a)(i)

6(a)(ii)

6(b)

Q6	Mark scheme
(a)(i)	1. Mark amplitude with X 2. Mark wavelength with Y
(a)(ii)	1. Amplitude increases <u>and</u> wavelength stays the same 2. Amplitude stays the same <u>and</u> wavelength decreases
(b)	$v = (\text{total}) \text{ distance/time OR } d/t \text{ OR } 2d/t$ in any form $d = 1500 \times 0.054/2$ 40 m OR 41 m

- 6 (a) Fig. 6.1 represents the waveform of a sound wave. The wave is travelling at constant speed.

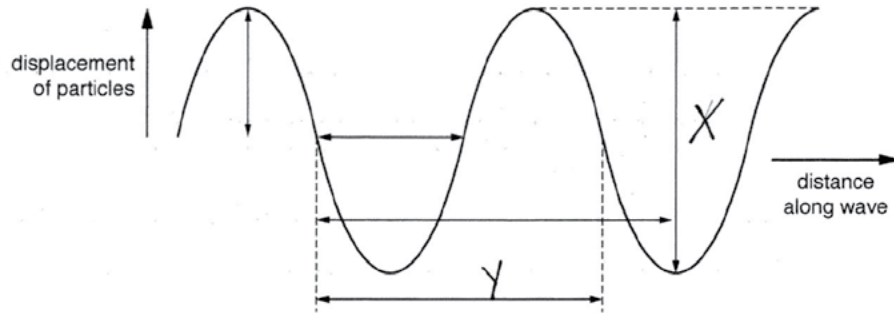


Fig. 6.1

- (i) On Fig. 6.1,

1. label with the letter X the marked distance corresponding to the amplitude of the wave, [1]
2. label with the letter Y the marked distance corresponding to the wavelength of the wave. [1]

- (ii) State what happens to the amplitude and the wavelength of the wave if

1. the loudness of the sound is increased at constant pitch,

amplitude becomes larger
wavelength becomes shorter [1]

2. the pitch of the sound is increased at constant loudness.

amplitude stays the same
wavelength becomes shorter [1]

- (b) A ship uses pulses of sound to measure the depth of the sea beneath the ship. A sound pulse is transmitted into the sea and the echo from the sea-bed is received after 54 ms. The speed of sound in seawater is 1500 m/s.

Calculate the depth of the sea beneath the ship.

$$v = \frac{2d}{t} \Rightarrow 1500 = \frac{2 \times d}{54} \Rightarrow 81,000 = 2d \Rightarrow 40,500 = d$$

depth = 40,500 m [3]

[Total: 7]

Your
Mark

6(a)(i)

6(a)(ii)

6(b)

Q6	Mark scheme
(a)(i)	1. Mark amplitude with X 2. Mark wavelength with Y
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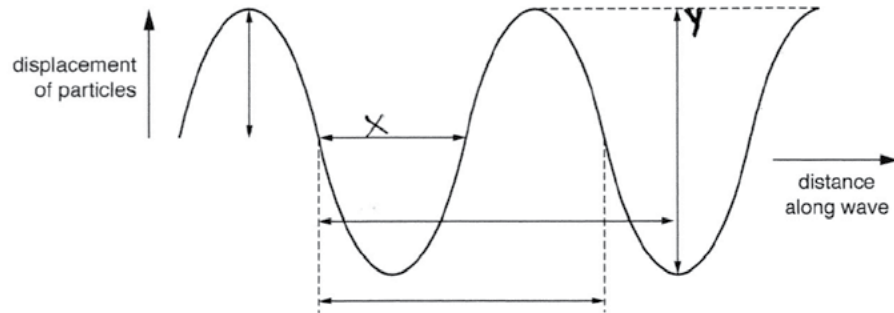


Fig. 6.1

(i) On Fig. 6.1,

1. label with the letter X the marked distance corresponding to the amplitude of the wave, [1]
2. label with the letter Y the marked distance corresponding to the wavelength of the wave. [1]

(ii) State what happens to the amplitude and the wavelength of the wave if

1. the loudness of the sound is increased at constant pitch,

amplitude stays the same
wavelength increase [1]

2. the pitch of the sound is increased at constant loudness.

amplitude decrease
wavelength decrease [1]

(b) A ship uses pulses of sound to measure the depth of the sea beneath the ship. A sound pulse is transmitted into the sea and the echo from the sea-bed is received after 54 ms. The speed of sound in seawater is 1500 m/s.

Calculate the depth of the sea beneath the ship.

$$\begin{aligned}
 S &= \frac{D}{t} \\
 \frac{54}{60} &= 0.93333 \text{ s} \\
 D &= 1500 \times 0.93 \\
 &= 1395 \text{ m} \\
 \text{depth} &= \frac{1395}{2} = 697.5 \text{ m} \quad [3] \\
 &= D = 697.5 \text{ m}
 \end{aligned}$$

[Total: 7]

Your
Mark

6(a)(i)

6(a)(ii)

6(b)

Q6

Mark scheme

(a)(i)	1. Mark amplitude with X 2. Mark wavelength with Y
(a)(ii)	1. Amplitude increases <u>and</u> wavelength stays the same 2. Amplitude stays the same <u>and</u> wavelength decreases
(b)	$v = (\text{total}) \text{ distance/time OR } d/t \text{ OR } 2d/t$ in any form $d = 1500 \times 0.054/2$ 40 m OR 41 m

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