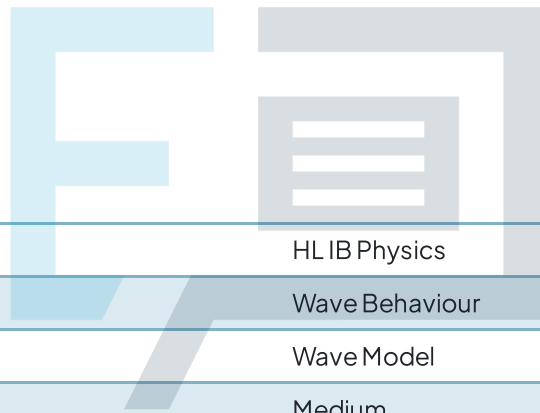




Wave Model

Question Paper



| | |
|------------|----------------|
| Course | HL IB Physics |
| Section | Wave Behaviour |
| Topic | Wave Model |
| Difficulty | Medium |

Exam Papers Practice

To be used by all students preparing for HL IB Physics
Students of other boards may also find this useful

Question 1

A travelling wave has a frequency of 200 Hz. Two consecutive points with a phase difference of $\frac{\pi}{2}$ are 1 cm apart.

What is the speed of the wave?

- A. 4 ms^{-1}
- B. 8 ms^{-1}
- C. 200 ms^{-1}
- D. 800 ms^{-1}

[1 mark]

Question 2

A radio station broadcasts in the frequency range 97–99 MHz.

What range of wavelengths are being used?

- A. $3.0 - 3.1 \times 10^{-3} \text{ m}$
- B. $3.0 - 3.1 \text{ m}$
- C. 0.33 m
- D. $0.33 \times 10^3 \text{ m}$

[1 mark]

Exam Papers Practice

Question 3

A longitudinal travelling wave has speed v and wavelength λ . What is the least distance between a compression and a rarefaction measured against the direction of propagation?

- A. v
- B. $\frac{v}{\lambda}$
- C. λ
- D. $\frac{\lambda}{2}$

[1 mark]

Question 4

A sound wave has a wavelength of 0.40 m. What is the phase difference between two points along the wave which are 1.7 m apart?

- A. zero
- B. 45°
- C. 90°
- D. 180°

[1 mark]

Question 5

Two waves are travelling from the surface of the Sun to the upper atmosphere of Earth.

Which statements must be correct?

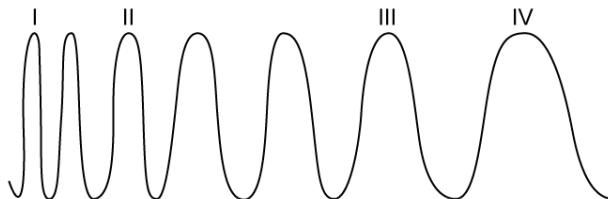
- I. The waves have the same frequency
- II. The waves have the same speed
- III. Neither wave is longitudinal
- IV. At least one of the waves is audible to humans

- A. I and II
- B. I, II and III
- C. II and III
- D. I and IV

[1 mark]

Question 6

A section of the electromagnetic spectrum is shown. What could the labelled sections represent?



| | I | II | III | IV |
|----|-------------|------------|--------------|---------------|
| A. | ultraviolet | infrared | x-rays | radio waves |
| B. | blue light | red light | orange light | green light |
| C. | x-rays | blue light | infrared | microwaves |
| D. | gamma waves | microwaves | infrared | visible light |

[1 mark]

Question 7

Which is a possible frequency of visible light?

- A. 1.2×10^{14} Hz
- B. 2.4×10^{14} Hz
- C. 4.8×10^{14} Hz
- D. 9.6×10^{14} Hz

[1 mark]

Question 8

Sound waves can be propagated through fluids and solids. Which statements are correct?

- I. Sound waves have constant speed in air
- II. Thunder always arrives before lighting because of the difference in wave speeds.
- III. Sound waves can be modelled using the equation that $v = f\lambda$
- IV. Vibrations from an earthquake will be felt in the ground before they are heard, because of the difference in wave speeds

- A. I and IV
- B. II and IV
- C. I, III and IV
- D. II, III and IV

[1 mark]

Question 9

Which cannot be observed with ultrasound?

- A. diffraction
- B. dispersion
- C. polarisation
- D. refraction

[1 mark]

Exam Papers Practice

Question 10

Approximately how many times larger is the wavelength of sound waves which are audible to humans greater than the wavelength of light waves which are visible to humans?

- A. 10^2
- B. 10^5
- C. 10^{12}
- D. 10^{24}

[1 mark]