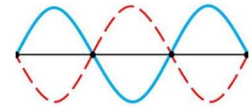


- 1) In stationary wave the particle velocity at the nodal positions is,
 a. maximum and finite b. minimum but non-zero c. zero d. infinite
- 2) The amplitude of superposition of two waves $y_1 = 5 \sin \omega t$ and $y_2 = 5 \cos \omega t$ is,
 a. 0 b. 5 c. $5\sqrt{2}$ d. 10
- 3) A standing wave is shown in the figure. The number of nodes and antinodes are,
 a. 4 nodes 3 antinodes b. 3 nodes, 4 antinodes
 c. 3 nodes, 3 antinodes d. 4 nodes, 4 antinodes
- 4) A wave is represented by the equation $y = 7 \sin (7\pi t - 0.04 \pi x - (\pi/3))$ x is in meter and t is in second. The speed of the wave is,
 a. 175 m/s b. 49 m/s c. 49π m/s d. 0.028 m/s



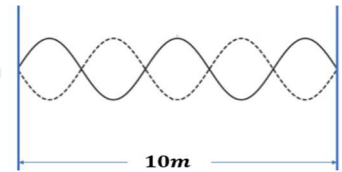
5. a. What are stationary waves? Prove that the distance between any two consecutive nodes or consecutive antinodes in a stationary wave is $\lambda/2$. [3]

b. A stretched string of given length resonates in one second as shown in figure.

i. What is the type of wave shown in fig? [1]

ii. Discuss the mechanism of formation of wave shown in fig. [2]

iii. Determine the frequency, wavelength, propagation constant and speed of the wave. [2]



6. a. A ship's Sonar sends down a signal of 6000Hz through water in which the speed of sound is 1500 m/s. The echo from the sea-bed is received after 2 seconds. What is the depth of the sea bed? [2]

b. The distance between two consecutive nodes in a stationary wave is 20cm. If the speed of wave at $0^\circ C$ be 330m/s, calculate its frequency at $0^\circ C$? What would be the velocity of sound at $20^\circ C$? [2]

c. Is polarization possible for longitudinal waves? Why? [2]

7. a. If you are walking on the moon surface, can you hear the cracking sound behind you? Explain. [2]

b. State principle of superposition of wave. Write an equation of stationary wave. [1]

c. The distance between two consecutive nodes in a stationary wave is 20cm. If the speed of wave at $0^\circ C$ be 330m/s, calculate its frequency at $0^\circ C$? [2]

d. For a travelling wave: $y = 2.0 \cos (10t - 0.8 x + 0.35)$, where x & y are in m, t in seconds. What is the difference between oscillatory motions at two points separated by a distance of: (i) 4 m & (ii) $3\lambda/4$?

[Ans: (i) 3.2 radian (ii) 4.7 radian] [2]

e. A wave has frequency of 5KHz and amplitude 2m. Find maximum particle velocity. [2]

8. Obtain the conditions of maxima and minima in standing waves. How standing waves are different from progressive waves? A standing wave is set up on a string that has a frequency of 120 Hz. The distance between nodes in the pattern is 37 cm. Find (a) wavelength of the wave (b) their speed. [3]

(Ans: a. 74 cm b. 88.8 ms^{-1})