or $\frac{2\pi}{\lambda}x = n\pi \quad ; n = 0,1,2,\ldots$

or $\boxed{x = n\frac{\lambda}{2}}$

This indicates the position of antinodes.

Position of nodes **(minimum- zero amplitude)**

The amplitude will be minimum if $coskx$ is minimum,

i.e., $coskx = 0$ and $A_{min} = 0$

or $\cos\frac{2\pi}{\lambda}x = \cos(\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}\ldots\ldots)$

or $\frac{2\pi}{\lambda}x = (2n+1)\frac{\pi}{2}$

or $\boxed{x = (2n+1)\frac{\lambda}{4}}$

This indicates the position of nodes.

Distance between two successive nodes and antinodes $= \frac{\lambda}{4}$

Positions of nodes:

$x = \frac{\lambda}{4}, \frac{3\lambda}{4}, \frac{5\lambda}{4} \ldots\ldots\ldots$

Distance between two successive nodes $\Delta x = \frac{\lambda}{2}$

Node is a point of minimum displacement (or amplitude) and maximum pressure (maximum pressure variation). Hence the displacement node is called as pressure antinode.

Maximum (intense) sound is heard at node (as sound wave is a pressure wave).

i. When a wave is reflected from a denser medium, the change in phase is:

a. 0 b. π c. 2π d. 3π

ii. A stationary wave is represented by: $y = A\,sin(100t)\,cos(0.01x)$ where *A & y are in millimeters, t in sec and x in meter*. The velocity of wave is:

a. $10^2\ ms^{-1}$ b. $10^3\ ms^{-1}$ c. $10^4\ ms^{-1}$ d. $10^5\ ms^{-1}$

iii. The equation of a stationary wave is $y = 5\,sin\frac{\pi x}{3}\,cos\,40\pi\,t$, where x and y in cm and t is second.

Then the separation between two consecutive node is:

b. 12 cm b. 6 cm c. 3 cm d. 1.5 cm

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Assignment