

Consider the superposition of two traveling waves

1.  $y_1 = A_0 \sin(kx - \omega t)$ .

2.  $y_2 = A_0 \sin(kx + \omega t)$ .

The amplitude vanishes only at which of the following values of  $kx$

A)  $kx = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \dots$

B)  $kx = \frac{\pi}{2}, \frac{5\pi}{2}, \frac{9\pi}{2}, \dots$

C)  $kx = 0, \pi, 2\pi, 3\pi, \dots$

D)  $kx = 0, 2\pi, 4\pi, \dots$

Using

$$\sin \alpha + \sin \beta = 2 \sin \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2},$$

$$y = y_1 + y_2 = 2 A_0 \sin k x \cos \omega t.$$

The zeros of the amplitude function occurs at  $k x = 0, \pi, 2\pi$  etc.

Answer **C**

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