Consider the superposition of two traveling waves
1. \( y_1 = A_0 \sin\left( k x - \omega t \right) \).
2. \( y_2 = A_0 \sin\left( k x + \omega t \right) \).
The amplitude vanishes only at which of the following values of \( k x \)?

A) \( k x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \ldots \)

B) \( k x = \frac{\pi}{2}, \frac{5\pi}{2}, \frac{9\pi}{2}, \ldots \)

C) \( k x = 0, \pi, 2\pi, 3\pi, \ldots \)

D) \( k x = 0, 2\pi, 4\pi, \ldots \)

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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