SP211
Quiz 8: 13 Nov. 2015

For each of the following questions please write the most correct answer in using CAPITAL LETTERS in the space provided.

Question 1

The height of a wave on a string is given by the following

\[ y(x, t) = (0.5\text{m}) \sin((5\text{rad/m})x + (10\text{rad/s})t) \]

What is the wave speed and propagation direction of this wave?

A) 0.5 m/s in the +x direction
B) 0.5 m/s in the -x direction
C) 2.0 m/s in the +x direction
D) 2.0 m/s in the -x direction
E) more information is needed

\[ v = \frac{\lambda}{T} = \frac{1}{T} = \frac{\text{wavelength}}{\text{period}} = \frac{10}{2} = 5 \text{ m/s} \]

Answer: D

Question 2

A tube of length \( L \) is open on both ends. In air (\( v_{\text{sound in air}} = 343 \text{ m/s} \)) the fundamental frequency (the 1st harmonic) of this tube is 100 Hz. The tube is then put in a chamber that is filled with an unknown gas the speed of sound in which is twice that of the speed of sound in air. What is the fundamental frequency of the tube in this unknown gas?

A) \( f_1 = 400 \text{ Hz} \)
B) \( f_1 = 200 \text{ Hz} \)
C) \( f_1 = 100 \text{ Hz} \)
D) \( f_1 = 50 \text{ Hz} \)
E) \( f_1 = 25 \text{ Hz} \)

\[ f_1 = \frac{v}{2L} = 100 \text{Hz} \] (fundamental in air)

\[ f'_1 = \frac{v'}{2L} = \frac{2v}{2L} = 2f_1 \] (fundamental in unknown)

Answer: B