Chapter: WAVE MOTION (EE117) **Worksheet# 06 (Sec: ____)**

1. Transverse waves with a speed of 50.0 m/s are to be produced on a stretched string. A 5.00-meter length of string with a total mass of 0.0600 kg is used. (a) What is the required tension in the string? (b) Calculate the wave speed in the string if the tension is 8.0 N.

2. Transverse waves travel at 20.0 m/s on a string that is under a tension of 6.00 N. What tension is required for a wave speed of 30.0 m/s in the same string?

3. (a) Write the expression for y as a function of x and t for a sinusoidal wave traveling along a rope in the negative x direction with the following characteristics: A = 8.00 cm, λ =80.0 cm, f = 3.00 Hz, and y(0, t) =0 at t = 0. (b)Write the expression for y as a function of x and t for the wave in part (a) assuming that y(x, 0) = 0 at the point x = 10.0 cm.

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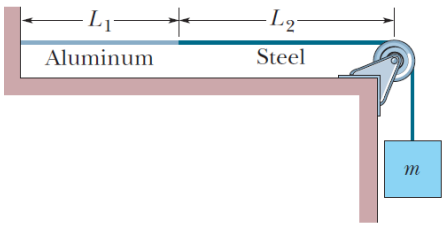
4. The linear density of a string is 1.6×10^{-4}kg/m. A transverse wave on the string is described by the equation y = (0.021 m) sin [(2.0 m^{-1})x - (30 s^{-1})t]. What are (a) the wave speed and (b) the tension in the string?

5. A sinusoidal wave in a rope is described by the wave function y = (0.20m) Sin (0.75 πx + 18 πt), the rope has a linear mass density of 0.25kg/m. if the tension in the rope is provided by an arrangement shown below , what is the value of the suspended mass?



6. Find the fundamental frequency and the next three frequencies that could cause a standing wave pattern on a string that is 30.0 m long has a mass per unit length of 9.00 x10-3 kg/m and is stretched to a tension of 20.0 N.

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7. A sinusoidal wave on a string is described by the equation $y = (0.15\ m) \sin(0.80x - 50t)$ where x and y are in meters and t is in seconds. If the mass per unit length of this string is 12.0 g/m, determine (a) the speed of the wave, (b) the wavelength (c) the frequency, and (d) the power transmitted to the wave.

8. A standing wave is established in a 120-cm long string fixed at both ends. The string vibrates in four segments when driven at 120 Hz. (b) what is the fundamental frequency of the string? A cello a string vibrates inn its first normal mode with a frequency of 220 vibrations/s. the vibrating segment is 70.0cm long and has a mass of 1.20 g. (a) find the tension in the string (b) determine the frequency of vibration when the string vibrates in three segments.

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