**Chapter-17**

1. Two waves on one string are described by the wave functions

y1 = 3.0 cos (4.0x - 1.6t) y2 = 4.0 sin (5.0x - 2.0t)

where x and y are in centimeters and t is in seconds. Find the values of y1 + y2 at the points (a) x = 1.00, t 5 1.00; (b) x 5 1.00, t 5 0.500; and (c) x 5 0.500, t 5 0. Note: Remember that the arguments of the trigonometric functions are in radians.

1. 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. (a) Determine the wavelength. (b) What is the fundamental frequency of the string?

1. A taut string has a length of 2.60 m and is fixed at both ends. (a) Find the wavelength of the fundamental mode of vibration of the string. (b) Can you find the frequency of this mode? Explain why or why not

1. A string that is 30.0 cm long and has a mass per unit length of 9.00 3 1023 kg/m is stretched to a tension of 20.0 N. Find (a) the fundamental frequency and (b) the next three frequencies of possible standing-wave patterns on the string

1. The windpipe of one typical whooping crane is 5.00 feet long. What is the fundamental resonant frequency of the bird’s trachea, modeled as a narrow pipe closed at one end? Assume a temperature of 378C
2. A student holds a tuning fork oscillating at 256 Hz. He walks toward a wall at a constant speed of 1.33 m/s. (a) What beat frequency does he observe between the tuning fork and its echo? (b) How fast must he walk away from the wall to observe a beat frequency of 5.00 Hz?