**Chapter – 17**

**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?**

**Solution:**

**2. An air column in a glass tube is open at one end and closed at the other by a movable piston. The air in the tube is warmed above room temperature, and a 384-Hz tuning fork is held at the open end. Resonance is heard when the piston is at a distance d1= 22.8 cm from the open end and again when it is at a distance d2 = 68.3 cm from the open end. (a) What speed of sound is implied by these data? (b) How far from the open end will the piston be when the next resonance is heard?**

**Solution:**

**3. Review. 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?**

**Solution:**

**4.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**

**Solution:**