

S-17-10

Calculate the pressure amplitude of a 2.0 kHz sound wave in air if the displacement amplitude is equal to  $2 \times 10^{-8}$  m.

S-17-20

A vacuum cleaner has measured sound level of 70 dB 3 meters away. What is the intensity of this sound in  $\text{W}/\text{m}^2$ ? How much sound noise (in watts) does this vacuum cleaner produce (assume an isotropic source of sound)?

S-17-23

A speaker is placed between two observers who are 110 meters apart, along the line connecting them. If one observer records a sound level of 60 dB while the other observer records 80 dB, how far is the speaker from each observer?

S-17-60

A bat, moving at 5 m/s, is chasing a flying insect. If the bat emits a 40.0 kHz chirp and receives back an echo at 40.4 kHz, at what speed is the insect moving toward or away from the bat? (take the speed of sound in air to be  $v = 340$  m/s).

S-18-12

Two harmonic waves traveling in opposite directions interfere to produce a standing wave described by

$$y(x,t) = (1.50 \text{ m}) \sin(0.400 x) \cos(200 t)$$

where  $x$  is in meters and  $t$  is in seconds. Determine the wavelength, frequency and speed of the interfering waves.

S-18-32

If an organ pipe is to resonate at 20.0 Hz, what is its required length if it is

- a- open at both ends
- b- closed at one end

S-18-41

An air column 2.00 m in length is open at both ends. The frequency of a certain harmonic is 410 Hz, and the frequency of the next higher harmonic is 492 Hz. Determine the speed of sound in the air column.

H&R-18-16

In the figure, sound with 40.0 cm wavelength travels rightward from a source and through a tube that consists of a straight portion and a half-circle. Part of the sound wave travels through the half circle and then rejoins the rest of the wave, which goes directly through the straight portion. The rejoining results in interference.

What is the smallest radius ( $r$ ) that results in an intensity minimum at the detector?

Ans. 17.5 cm

S-18-31

An open pipe 0.40 m in length is placed vertically in a cylindrical bucket having a bottom area of 0.10 m<sup>2</sup>. Water is poured into the bucket until a sounding tuning fork of frequency 440 Hz, placed over the pipe, produces resonance. Find the mass of water in the bucket at this moment.

Ans. 21kg