

Wave Motion and Sound

1. A sound wave with wavelength of 3.2 meters vibrates 150 times per second. What is the speed of this wave?
2. What is the wavelength of a sound wave with a frequency of 325 vibrations per second and a speed of 330 m/s?
3. What is the frequency of a microwave (speed = speed of light 2.998×10^8 m/s) with a wavelength of 0.185 meters?
4. A very high energy X ray (speed = speed of light 2.998×10^8 m/s) has a period of 8.4×10^{-19} sec. What is the frequency and wavelength of this X ray?
5. What is the temperature of air through which sound passes with a velocity of 342.8 m/sec?
6. A flash of lightning is seen and the sound of the resulting thunder is heard 3.50 seconds later. The temperature of the air is 30° C. How far away is the lightning?

7. How much time is required for sound to travel 3.00 km if the temperature of the air is 20°C ?

8. What is the wavelength, in meters, of the sound produced by a tuning fork which has a frequency of 288 Hz? The temperature of the air is 23°C .

9. The echo of a ship's foghorn, reflected from an iceberg, is heard 4.0 seconds after the horn was sounded. The temperature is -15.0°C . How many meters away is the iceberg?

10. A man stands in a large auditorium with parallel vertical walls. He yells and hears the echo from one wall in 0.5 seconds. He hears the echo from the opposite wall 0.50 seconds after hearing the first echo. The temperature is 20°C . What is the width of the auditorium?

11. An organ pipe closed at one end and open at the other is 60 cm. Long. What are the fundamental and first two overtones in this pipe at 15°C ?

12. What is the length of a closed organ pipe that resonates with a frequency of 160 Hz. At 0°C ?