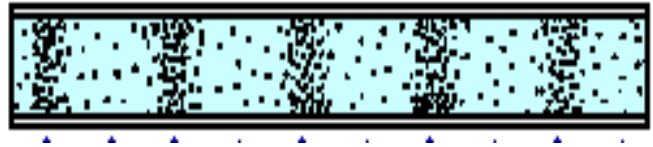


Chapter 14-16 Worksheet 2

1. What is the source of all sounds? Give some examples .
2. What is pitch?
3. What is the normal frequency range for humans?
4. Define infrasonic and ultrasonic.



5. Identify the parts of the Longitudinal wave.
(compression, rarefaction, wavelength, amplitude)
6. Why can't sound travel through a vacuum?
7. What does the speed of sound in a material depend upon? (2 things)
8. Why does sound travel faster in solids and liquids than in gases
9. What is intensity of a sound?
10. What is loudness? What does it mean to say the "loudness is subjective"?
11. What is natural frequency and what does it depend on?
12. Define resonance.
13. Which wave of the electromagnetic spectrum has the lowest frequency? Highest frequency? Longest wavelength? Shortest wavelength? Most energy?
14. Describe why light passes through glass but ultraviolet and infrared waves do not?
15. What is the difference between opaque and transparent?

16. What is polarization?

Doppler Problems

1. One afternoon, Mr. Hinsley is sitting in his driveway, enjoying the outdoors. What frequency will Mr. Hinsley hear as a jet, whose engines emit sound at a frequency of 1200.0 Hz, flies toward him at a speed of 100.0 m/s? (1700. Hz)
2. What frequency will Hinsley hear as the jet flies away at the same speed? (927.3 Hz)
3. A sparrow chases a hawk with a speed of 5.00 m/s, while chirping at a frequency of 900.0 Hz. What frequency of sound does the hawk hear as he flies away from the sparrow with a speed of 3.50 m/s? (904 Hz use 3 sig figs)
4. One morning, Ms. Harper is driving her Harley to work. As she is driving down Morriss Road, one of her students presses on the horn of their vehicle to get Harper's attention. If Harper is driving at 18.0 m/s, and the horn has a frequency of 320.0 Hz, What frequency does Harper hear as she drives toward the student? (338 Hz)
5. Mr. Robbins is speeding to school at 22.0 m/s. Witnessing the speeding vehicle, Officer Lemoine pursues the vehicle at 25.0 m/s, and turns on the siren, whose frequency is 850.0 Hz. What frequency does Robbins hear as the officer approaches? (858 Hz)

Sound Problems

6. A bat flying in a cave emits a sound and receives its echo 0.10 seconds later. How far away is the wall of the cave? (34 m)
7. The USS Crump, an oceanic depth surveying vessel, surveys the ocean bottom with ultrasonic sound that travels at 1530 m/s in seawater. Find the depth of the water if the time delay of the echo to the ocean floor and back is 8.25 seconds. (6310 m)
8. Mr. Robbins is singing in class one day when he belts out a middle C, which has a frequency of 256 Hz. What is the period of one vibration of this tone? What is the wavelength of this tone? ($T = 3.91 \times 10^{-3}$ s) (1.33 m)
9. While doing your fitgram in the gym, your teacher yells "Don't cut the corners!" from across the gym. If your teacher is standing 34 m away, how long does it take the sound to reach you? (.10 s)

Light Problems

10. Alice, in her physics class, uses her phone to text Sally, who is sitting downstairs in her English class. The signal leaves Alice's phone, travels to a cell tower, and then is sent to Sally's phone. The text travels 6.5 km. How long does it take the message to get from Alice's phone to Sally's phone? (2.2×10^{-5} s)
11. A radio signal takes 4.4 years to reach Alpha Centauri, the nearest star beyond the sun. How far away is Alpha Centauri? (4.2×10^{16} m)
12. The wavelength of green light from an argon ion laser is 0.000000488 m. How many micrometers is this? How many nanometers? What is the frequency of the light? (.488 μm) (488 nm) (6.15×10^{14} Hz)