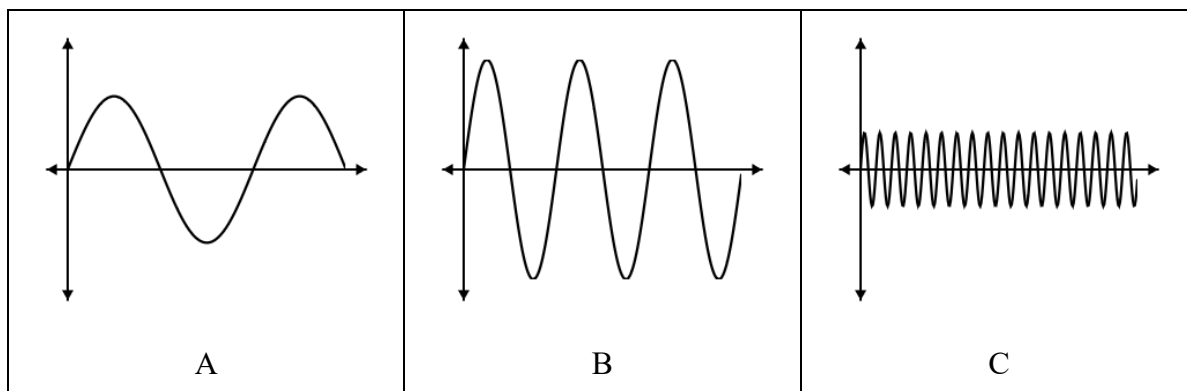


Sound Waves Review

1. What is the speed of sound in air at -30°C ?
2. What is the wavelength of sound produced by a bat if the frequency of the sound is 90 kHz on a night when the air temperature is 22°C ?
3. A fan at a baseball game is 100 m from home plate. If the speed of sound is 350 m/s, how long after the batter hits the ball does the fan hear the crack of the bat?
4. A lightning flash is seen 10.0 s before the rumble of the thunder is heard. Find the distance to the lightning flash if the temperature is 20°C .
5. 1.2 s after a woman makes a sound, the echo returns from a nearby wall. How far is the woman from the wall, assuming the speed of sound is 340 m/s?
6. An armed forces ship patrolling the ocean receives its own signals back, by underwater reflection, 4.5 s after emitting them. How far away is the reflecting surface if the speed of sound in water is 1450 m/s?
7. A person is listening to music at a loudness of 50dB. If the volume is increased so that it is twice as loud, what is the new loudness?
8. The following graphs represent sound waves.



Which of the sounds has

- (a) the highest pitch.
 - (b) the loudest volume.
9. A train blows its whistle as it approaches a crossing. Explain what an observer standing at the crossing would hear as the train passes by.

10. Draw a sketch of a standing wave and label the nodes and antinodes.
11. What is the first harmonic of a standing wave on a 1.0 m long string if the velocity of a wave on a string is 250 m/s?
12. The third harmonic of an open tube is 1600 Hz. The speed of sound is 340 m/s. What is the length of the tube?
13. Two consecutive harmonics in a closed tube are 200 Hz and 250 Hz when the speed of sound is 340 m/s. Calculate the length of the tube.
14. You sound two tuning forks together. One has a frequency of 300 Hz and the other a frequency of 302 Hz. What do you hear?
15. A tuning fork with a frequency of 440 Hz is struck with a second fork, and you count 20 beats in 5 s. What are the possible frequencies of the second tuning fork?