

SOUND REVIEW 2

Short Answers

1. What is the source of all sound?
 - a. All sounds originate in the vibrations of material objects.
2. How does a sound wave travel through air?
 - a. As a source of sound vibrates, a series of compressions and rarefactions travels outward from the source.
3. What media transmit sound?
 - a. Sound travels in solids, liquids, and gases.
4. What determines the speed of sound in a medium?
 - a. The speed of sound in a gas depends on the temperature of the gas and the mass of the particles in the gas.
 - b. The speed of sound in a material depends on the material's elasticity.
5. How far away is a storm if you note a 3-second delay between a lightning flash and the sound of thunder?
 - a. For a speed of sound in air of 340 m/s, the distance is $(340 \text{ m/s}) \times (3 \text{ s}) = \text{about } 1000 \text{ m}$ or 1 km. Time for the light is negligible, so the storm is about 1 km away.
6. What happens when an elastic material is disturbed?
 - a. When any object composed of an elastic material is disturbed, it vibrates at its own special set of frequencies, which together form its special sound.
7. What causes resonance?
 - a. An object resonates when there is a force to pull it back to its starting position and enough energy to keep it vibrating.
8. What are the effects of constructive and destructive interference?
 - a. When constructive interference occurs with sound waves, the listener hears a louder sound. When destructive interference occurs, the listener hears a fainter sound or no sound at all.
9. What causes beats?
 - a. When two tones of slightly different frequency are sounded together, a regular fluctuation in the loudness of the combined sounds is heard.
10. What is the beat frequency when a 262-Hz and a 266-Hz tuning fork are sounded together?
 - a. The 262-Hz and 266-Hz forks will produce 4 beats per second, that is, 4 Hz

Multiple Choice

1. The sound waves that humans cannot hear are those with frequencies
 - a. from 20 to 20,000 Hz.
 - b. below 20 Hz.
 - c. above 20,000 Hz.
 - d. both B and C

Answer: D

2. Sound travels in air by a series of
 - a. compressions.
 - b. rarefactions.
 - c. both compressions and rarefactions.
 - d. pitches.

Answer: C

3. Sound travels faster in
 - a. a vacuum compared to liquids.
 - b. gases compared to liquids.
 - c. gases compared to solids.
 - d. solids compared to gases.

Answer: D

4. The speed of sound varies with
- a. amplitude.
 - b. frequency.
 - c. temperature.
 - d. pitch.

Answer: C

5. The loudness of a sound is most closely related to its
- a. frequency.
 - b. period.
 - c. wavelength.
 - d. intensity.

Answer: D

6. When you tap various objects they produce characteristic sounds that are related to
- a. wavelength.
 - b. amplitude.
 - c. period.
 - d. natural frequency.

Answer: D

7. When the surface of a guitar is made to vibrate we say it undergoes
- a. forced vibration.
 - b. resonance.
 - c. refraction.
 - d. amplitude reduction.

Answer: A

8. When an object is set into vibration by a wave having a frequency that matches the natural frequency of the object, what occurs is
- a. forced vibration.
 - b. resonance.
 - c. refraction.
 - d. amplitude reduction.

Answer: B

9. Noise-canceling devices such as jackhammer earphones make use of sound
- a. destruction.
 - b. interference.
 - c. resonance.
 - d. amplification.

Answer: B

10. The phenomenon of beats is the result of sound
- a. destruction.
 - b. interference.
 - c. resonance.
 - d. amplification.

Answer: B

11. If the energy in a longitudinal wave travels from south to north, the particles of the medium ____.
- a. move from north to south, only.
 - b. vibrate both north and south.
 - c. move from east to west, only.
 - d. vibrate both east and west.

Answer: B

12. The main factor which effects the speed of a sound wave is the ____.
- a. amplitude of the sound wave
 - b. intensity of the sound wave
 - c. loudness of the sound wave
 - d. properties of the medium
 - e. pitch of the sound wave

Answer: D

13. As a wave travels into a medium in which its speed increases, its wavelength ____.
- a. decreases
 - b. increases
 - c. remains the same

Answer: B

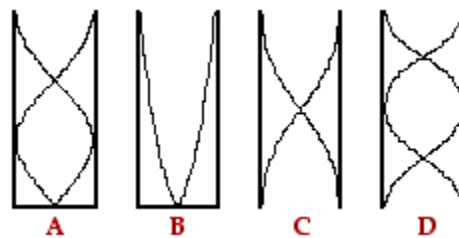
14. A vibrating object with a frequency of 200 Hz produces sound which travels through air at 360 m/s. The number of meters separating the adjacent compressions in the sound wave is ____.
- a. 0.90
 - b. 1.8
 - c. 3.6
 - d. 7.2
 - e. 200

Answer: B

15. A 20.0-cm long pipe is covered at one end in order to create a closed-end air column. A vibrating tuning fork is held near its open end, forcing the air to vibrate in its first harmonic. The wavelength of the standing wave pattern is ____.
- a. 5.0 cm
 - b. 10.0 cm
 - c. 20.0 cm
 - d. 40.0 cm
 - e. 80.0 cm

Answer: E

16. The diagrams represent four different standing wave patterns in air columns of equal length. Which of the columns will produce the note having the highest pitch?



- a. A
- b. B
- c. C
- d. D

Answer: D