Sound Waves

Choose one answer per question. Circle A, B, C, or D.

1. What starts the sound you hear immediately after a tight drumhead is tapped?
   A. The drumhead vibrates and disturbs nearby air.
   B. The drumhead emits ultraviolet light.
   C. The air pressure stops changing everywhere.
   D. The drum replaces the air with water vapor.

2. Which measurable property is most directly associated with the pitch of a pure tone?
   A. Speaker distance
   B. Source mass
   C. Frequency
   D. Wave intensity alone

3. Within a sound wave in air, what is a compression?
   A. A pocket containing no molecules
   B. A region of higher pressure than the undisturbed air
   C. A region of lower pressure than the undisturbed air
   D. A place where all molecules permanently stop

4. Which process lets a shout return from a rock wall as an echo?
   A. Polarization
   B. Condensation
   C. Melting
   D. Reflection

5. If a tuning fork repeats its motion 440 times per second, how is its frequency written?
   A. 440 m/s
   B. 440 Hz
   C. 440 dB
   D. 440 m

6. Two otherwise identical speakers play the same tone. At the same distance, which change typically makes one sound louder?

A. Increasing its sound pressure amplitude
B. Halving its sound pressure amplitude
C. Keeping the sound pressure amplitude unchanged
D. Reducing its sound pressure amplitude by one quarter

7. A sensor sends out a 40,000 Hz sound pulse. Why is it called ultrasound?

A. It only exists in empty space.
B. It travels faster than visible light.
C. Its frequency is below all audible bass tones.
D. Its frequency is above the usual upper limit of human hearing.

8. In still air under otherwise comparable conditions, which path generally carries sound faster?

A. Both always give exactly the same speed.
B. A path through cooler air
C. A path through warmer air
D. Only the path with the louder sound

9. A 170 Hz tone travels through air at 340 m/s. What is its wavelength?

A. 2 m
B. 0.5 m
C. 170 m
D. 510 m

10. If a speaker doubles the frequency while the speed of sound in the room stays the same, what happens to its wavelength?

A. It stays the same.
B. It doubles.
C. It quadruples.
D. It is halved.

11. An ambulance moves toward a stationary listener while emitting a tone of fixed frequency. What change does the listener hear compared with a stationary ambulance?

A. A lower speed of sound in the surrounding air
B. A lower frequency
C. A higher frequency
D. No change in frequency

12. An echo comes back 0.20 s after a pulse. At 340 m/s, how far away is the reflecting wall?

A. 68 m
B. 34 m
C. 17 m
D. 170 m

13. Sound A has ten times the intensity of Sound B. How much greater is its sound intensity level in decibels?

A. 100 dB
B. 1 dB
C. 20 dB
D. 10 dB

14. Two notes heard together have frequencies of 440 Hz and 444 Hz. How many loudness beats occur each second?

A. 4
B. 2
C. 442
D. 884

15. Two echoes reach a microphone 0.10 s apart. Sound travels at 340 m/s along each path straight out and back. How much farther away is the second reflector?

A. 3.4 m
B. 34 m
C. 17 m
D. 68 m