____ 43. Which statement(s) about vibrations is (are) true?
a. A vibration is a cyclical motion of an object about an equilibrium point.
b. All vibrations need a medium to transfer waves.
c. The particles of an elastic medium return to their original location after a wave passes through.
d. all of the above

____ 44. What is the approximate speed of sound in air at a temperature of 27.0 °C?
a. 315 m/s
b. 348 m/s
c. 358 m/s
d. 304 m/s

____ 45. What is the speed of sound in air at 0 °C?
a. 5170 m/s
b. 344 m/s
c. 319 m/s
d. 331 m/s

____ 46. Which term refers to the distance between two similar points in successive identical cycles in a wave?
a. period
b. amplitude
c. frequency
d. wavelength

____ 47. Which statement is true about wave reflections?
a. With a fixed-end reflection, the reflected wave is inverted.
b. With a free-end reflection, the reflected wave is inverted.
c. If a wave travels from a medium in which its speed is slower to a medium in which its speed is faster, the reflected wave has the same orientation as the original.
d. If a wave travels from a medium in which its speed is faster to a medium in which its speed is slower, the reflected wave is inverted.

____ 48. Two waves meet and form a wave with an amplitude less than one of the initial waves. Which statement must be true?
a. The waves were in phase and constructive interference occurred.
b. The waves were out of phase and constructive interference occurred.
c. The waves were in phase and destructive interference occurred.
d. The waves were out of phase and destructive interference occurred.

____ 49. A wave moves from one medium into a less dense medium. How will it be reflected?
a. in the same orientation and with the same amplitude as the incoming wave
b. with the same amplitude but in an inverted orientation from the incoming wave
c. in the same orientation but with a greater amplitude than the incoming wave
d. in the same orientation but with a lesser amplitude than the incoming wave

____ 50. A police cruiser is moving toward a stationary observer at 22.0 m/s. The frequency of the siren on the car is 750 Hz. What is the frequency detected by the observer as the police cruiser approaches? Assume the speed of sound to be 342 m/s.
a. about 1020 Hz
b. about 705 Hz
c. about 802 Hz
d. about 750 Hz

____ 51. Which of the following accurately describes the Doppler effect?
a. As an object emitting a sound approaches an observer, the sound waves expand, so that the observer hears a higher frequency.
b. As an object emitting a sound approaches an observer, the sound waves expand, which reduces their energy and dampens the noise.
c. As an object emitting a sound approaches an observer, the sound waves become compressed, so that the observer hears a higher frequency.
d. As an object emitting a sound approaches an observer, the sound waves become compressed, so that the observer hears a lower frequency.

____ 52. What is the audible hearing range of a healthy young adult?
a. 10 Hz to 20 Hz
b. 20 Hz to 20 kHz
c. 5 Hz to 20 Hz
d. 10 Hz to 10 kHz

____ 53. Which of the following animals make(s) use of echolocation?
a. elephants
b. bats
c. house cats
d. all of the above

____ 54. An organ pipe which is open at one end has a length of 28.0 cm. What is the fundamental frequency of the pipe if the temperature in air is 22 °C?
a. 310 Hz
b. 304 Hz
c. 306 Hz
d. 308 Hz

____ 55. An elephant produces a low-frequency sound at 28.7 Hz and with a wavelength of 281 m. Another group of elephants detects this sound 1.14 s later. How far away is the group of elephants?
a. 10.2 km
b. 8.72 km
c. 7.54 km
d. 9.19 km

Solutions #43-55

43.	44.	45.	46.	47.	48.	49.	50.	51.	52.	53.	54.	55.
B	C	B	B	B	D	A	A	D	B	A	C	D