Final Reg Wave and Sound Review

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1) What is the frequency of a 2.5 m wave traveling at 1400 m/s? 1) _____

2) The frequency of a train horn is 500 Hz. Assume the speed of sound in air is 340 m/s. What is the frequency heard by an observer if the observer is approaching the train with a speed of 30.0 m/s? 2) _____

3) What is the frequency heard by a stationary observer when a train approaches with a speed of 30 m/s. The frequency of the train horn is 600 Hz and the speed of sound is 340 m/s. 3) _____

4) For a periodic process, the number of cycles per unit time is called the 4) _____

5) A sound has a frequency of 1000 Hz. If a listener moves with a speed of 30 m/s away from the source, what is the frequency heard by the observer? (The sound speed is 340 m/s.) 5) _____

6) A pendulum has a period of 2.0 s on Earth. What is its length? 6) _____

7) The number of crests of a wave passing a point per unit time is called the wave's 7) _____

8) Compared to the wavelength of a 400 Hz sound, the wavelength of a 200 Hz sound in air is 8) _____

9) The frequency of a train horn is 500 Hz. Assume the speed of sound in air is 340 m/s. What is the frequency heard by an observer if the observer is moving away from the train with a speed of 30.0 m/s? 9) _____

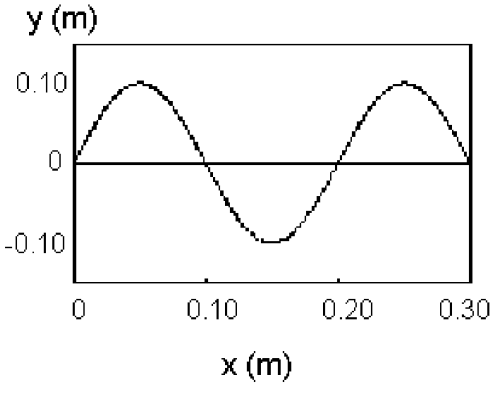


FIGURE 11-2

10) Figure 11-2 is a "snapshot" of a wave at a given time. The frequency of the wave is 120 Hz. What is the amplitude? 10) _____

11) Figure 11-2 is a "snapshot" of a wave at a given time. The frequency of the wave is 120 Hz. What is the wavelength? 11) _____

12) Figure 11-2 is a "snapshot" of a wave at a given time. The frequency of the wave is 120 Hz. What is the wave speed? 12) _____

13) In a wave, the maximum displacement of points of the wave from equilibrium is called the wave's 13) _____

14) The speed of an ultrasonic sound of frequency 45 kHz in air is 352 m/s. What is the air temperature? 14) _____

15) A mass on a spring undergoes SHM. When the mass is at its maximum displacement from equilibrium, its instantaneous velocity 15) _____

16) The distance between successive crests on a wave is called the wave's 16) _____

17) A sound source departs from a stationary observer. The frequency heard by the observer is 17) _____

18) The lowest tone to resonate in a closed pipe of length L is 200 Hz. Which of the following frequencies will not resonate in that pipe? 18) _____

19) A mass on a spring undergoes SHM. It goes through 10 complete oscillations in 5.0 s. What is the period? 19) _____

20) The pendulum of a grandfather clock is 1.0 m long. What is its period on the Moon where the acceleration due to gravity is only 1.7 $m/s^2$? 20) _____

21) The wavelength in air of a sound wave of frequency 500 Hz is 21) _____

22) What is the wave speed if a wave has a frequency of 12 Hz and a wavelength of 3.0 m? 22) _____

23) An organ pipe open at both ends has a length of 0.80 m. If the velocity of sound in air is 340 m/s, what is the frequency of the second harmonic? 23) _____

24) Two tunes have frequencies of 440 Hz and 444 Hz. What is the beat frequency? 24) _____

25) You shout at a cliff, and hear the echo in 4.00 s. The temperature is 0°C. How far away is the cliff? 25) _____

26) On a day when the speed of sound in air is 340 m/s, a bat emits a shriek whose echo reaches it 0.0250 s later. How far away was the object that reflected back the sound? 26) _____

27) The third harmonic of a complex tone has a frequency of 1200 Hz. What is the frequency of the fourth harmonic? 27) _____

28) As the temperature of the air increases, what happens to the velocity of sound? (Assume that all other factors remain constant.) 28) _____

29) A sound source approaches a stationary observer. The frequency heard by the observer is 29) _____

30) What is the length of the shortest pipe closed on one end that will have a fundamental frequency of 60 Hz on a day when the velocity of sound is 340 m/s? 30) _____

31) What happens to a simple pendulum's frequency if both its length and mass are increased? 31) _____

32) A music tuner uses a 550-Hz tuning fork to tune the frequency of a musical instrument. If the tuner hears a beat frequency of 2 Hz, what is the frequency of the instrument? 32) _____

33) What determines "loudness" of a musical note? 33) _____

34) What determines the "pitch" of a musical note? 34) _____

35) For vibrational motion, the maximum displacement from the equilibrium point is called the 35) _____

36) What is the frequency of a wave which has a period of 6.00 ms? 36) _____

37) A simple pendulum consists of a 0.25-kg spherical mass attached to a massless string. When the mass is displaced slightly from its equilibrium position and released, the pendulum swings back and forth with a frequency of 2.0 Hz. What frequency would have resulted if a 0.50-kg mass (same diameter sphere) had been attached to the string instead? 37) _____

38) When the mass of a simple pendulum is tripled, the time required for one complete vibration 38) _____

39) Both pendulum A and B are 3.0 m long. The period of A is T. Pendulum A is twice as heavy as pendulum B. What is the period of B? 39) _____

40) A 3.00-m long pipe is in a room where the temperature is 20°C. What is the fundamental frequency if the pipe is closed at one end? 40) _____

41) A pendulum makes 12 complete swings in 8.0 s. (a) What are its frequency and period on Earth? 41) _____

42) A 3.00-m long pipe is in a room where the temperature is 20°C. What is the frequency of the second harmonic if the pipe is closed at one end? 42) _____

43) A 3.00-m long pipe is in a room where the temperature is 20°C. What is the fundamental frequency if the pipe is open at both ends? 43) _____

44) A stretched string is observed to have four equal segments in a standing wave driven at a frequency of 480 Hz. What driving frequency will set up a standing wave with five equal segments? 44) _____

45) A train is traveling away from you at 120 km/h. It blows its whistle, and you hear a tone of 400 Hz. Take the speed of sound to be 340 m/s. What is the actual frequency of the whistle? 45) _____

46) The frequency of the third harmonic of an open pipe is 900 Hz. What is the length of the pipe? 46) _____

47) An echo is heard 2.0 s from a cliff on a day the temperature is 15°C. Approximately how far is the cliff from the observer? 47) _____

48) If you hear thunder 5.0 s after seeing a flash of lightning, the distance to the lightning strike is about 48) _____

49) The frequency of a wave increases. What happens to the distance between successive crests if the speed remains constant? 49) _____

50) A train is traveling away from you at 120 km/h. The train blows its 400-Hz whistle. Take the speed of sound to be 340 m/s. What frequency do you hear? 50) _____

51) What is the spring constant of a spring that stretches 2.00 cm when a mass of 0.600 kg is suspended from it? 51) _____

52) What is the period of a wave with a frequency of 1500 Hz? 52) _____

53) A string, fixed at both ends, vibrates at a frequency of 12 Hz with a standing transverse wave pattern containing 3 loops. What frequency is needed if the standing wave pattern is to contain 4 loops? 53) _____

54) What is the velocity of a wave that has a wavelength of 3.0 m and a frequency of 12 Hz? 54) _____

55) The pendulum of a grandfather clock is 1.0 m long. What is its period on the Earth? 55) _____

56) For a wave, the frequency times the wavelength is the wave's 56) _____

57) The time for one cycle of a periodic process is called the 57) _____

58) A train is traveling toward you at 120 km/h. The train blows its 400-Hz whistle. Take the speed of sound to be 340 m/s. What frequency do you hear? 58) _____

59) If a guitar string has a fundamental frequency of 500 Hz, which one of the following frequencies can set the string into resonant vibration? 59) _____

60) Compared to the velocity of a 400 Hz sound, the velocity of a 200 Hz sound through air is 60) _____

61) A mass is attached to a vertical spring and bobs up and down between points A and B. Where is the mass located when its kinetic energy is a minimum? 61) _____

62) The fundamental frequency in a pipe closed at one end is 330 Hz. What is the frequency of the third harmonic? 62) _____

63) On a 30°C day, there is an explosion. The sound is heard 3.4 s after seeing the flash. How far away was the explosion? 63) _____

64) You are moving at 120 km/h toward a stationary train. The train blows its 400-Hz whistle. Take the speed of sound to be 340 m/s. What frequency do you hear? 64) _____

65) The lowest tone to resonate in an open pipe of length L is 400 Hz. What is the frequency of the lowest tone that will resonate in an open pipe of length 2L? 65) _____

66) A 3.00-kg pendulum is 28.84 m long. What is its period on Earth? 66) _____

67) A closed organ pipe of length 0.75 m is played when the speed of sound in air is 340 m/s. What is the fundamental frequency? 67) _____