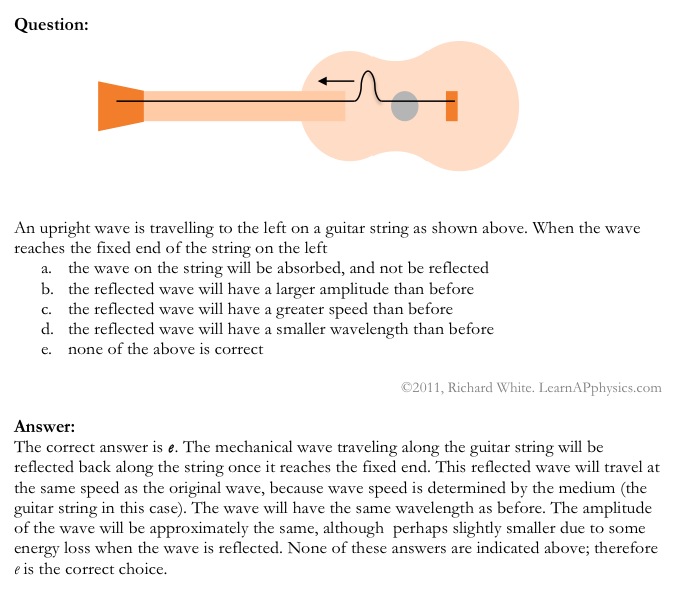
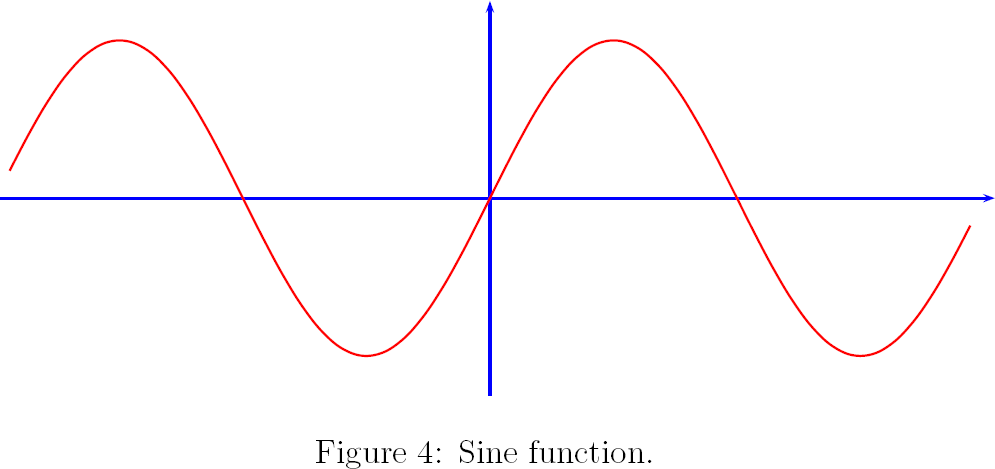
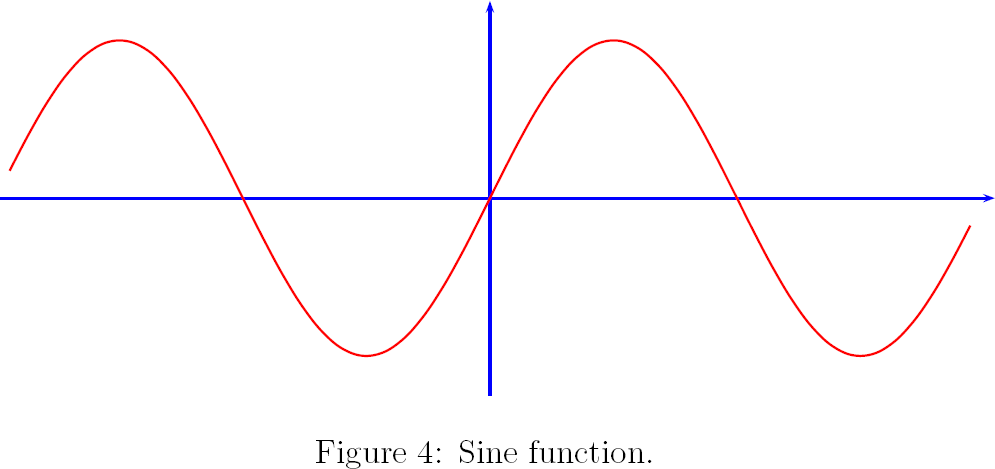
Sound, Waves & Interference Test

AP Physics 1



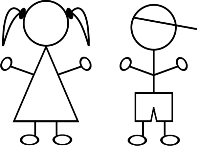
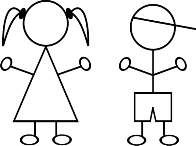
1. An upright wave is travelling to the left on a guitar string as shown above. When the wave reaches the fixed end of the string on the left,
   1. The wave on the string will be absorbed, and not reflected
   2. The reflected wave will be upright & travel at the same speed as the original
   3. The reflected wave will be inverted & travel slower than the original
   4. The reflected wave will be inverted & travel at the same speed as the original
2. A periodic wave travels at 16m/s and has a wavelength of 0.25m. The frequency of the wave is:
   1. 4Hz
   2. 16Hz
   3. 32Hz
   4. 64Hz
3. A standing wave at the 6th harmonic is formed in a string of length 1.8m. The wavelength of this wave is:
   1. 10.8m
   2. 5.4m
   3. 0.6m
   4. 0.3m
4. A flutist creates a fundamental frequency of 150Hz in an open-end resonator (his flute). The speed of sound in the room is 350m/s. Find the wavelength of the wave.
   1. 52500m
   2. 3.5m
   3. 2.3m
   4. 0.43m
5. A musician creates a standing wave in a closed-end resonator with a frequency of 600Hz. The speed of sound in the room is 350m/s. The period of the wave is most nearly:
   1. 1.71s
   2. 0.58s
   3. 0.0029s
   4. 0.0017s

Use the following diagram for questions 6-8



1. A teacher creates a standing wave as shown above. This wave is at the \_\_\_\_\_\_\_\_\_\_\_ harmonic.
   1. 2nd
   2. 4th
   3. 8th
   4. 10th
2. The wavelength of the standing wave in is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ times the length of the string (L)
   1. ½
   2. 1
   3. 3/2
   4. 2
3. If the length of the string is six meters and the teacher moves her hand at a rate of 5 oscillations per second, what is the velocity of the wave in the rope?
   1. 60m/2
   2. 30m/s
   3. 15m/s
   4. 7.5m/s
4. A student sends a wave pulse down a thin piece of string. The pulse passes from the thin string to a thicker string. The *transmitted* pulse will:
   1. Have a shorter wavelength
   2. Move with a greater velocity
   3. Be inverted
   4. Exhibit no change
5. Mr Henry shouts to his class. Students in the back whisper about prom. The MAIN difference between these sound waves **that cause the difference in loudness** is:
   1. The difference in frequencies
   2. The difference in amplitudes
   3. The difference in wavelengths
   4. The difference in wave speed.
6. A kidnapper phones in to demand a ransom. The receiver of the phone call remarks that the person on the phone sounds like a female. This *might* be because:
   1. The wavelength of the sound wave was long, which we interpret as a higher tone.
   2. The amplitude of the sound wave was high, which we interpret as a higher tone.
   3. The frequency of the sound wave was high, which we interpret as a higher tone.
   4. The velocity of the sound wave was high, which we interpret as a higher tone.
7. A sound wave passes through air with velocity va, water with velocity vw, and steel with velocity vs. Which of the following is true:
   1. Vs > Vw > Va
   2. Va > Vw > Vs
   3. Vw < Va < Vs
   4. Vs < Va < Vs

Use the following diagram for questions 13 & 14



1. Bob and Tina are currently equidistant from a police car speeding to the right.   
   The sound of the siren appears \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to Bob than to Tina
   1. Louder
   2. Softer
   3. Higher
   4. Lower
2. Bob and Tina are experiencing:
   1. The Doppler Effect
   2. The Boltzmann Effect
   3. Constructive Wave Interference
   4. Destructive Wave Interference
3. A rope is tied to a wall (creating a fixed end). A student sends a pulse down the rope. The reflected pulse will be:
   1. Upright
   2. Inverted
   3. Elongated
   4. There will be no reflected pulse
4. By increasing the tension in a rope, it will cause:
   1. The velocity and wavelength of waves to increase
   2. The wavelength and frequency of the waves to increase
   3. The velocity and damping of the waves to increase
   4. The velocity and frequency of the waves to increase
5. A wave pulse travels through a thick medium and encounters a thinner medium. The *transmitted* pulse will:
   1. Have a lower velocity
   2. Have a lower amplitude
   3. Have a higher wavelength
   4. Be inverted
6. How many anti-nodes will a standing wave at the third harmonic have?
   1. 1
   2. 2
   3. 3
   4. 4
7. Nodes refer to:
   1. Areas of maximum oscillation
   2. Areas of minimal oscillation
   3. Areas of high amplitude
   4. Areas the wave does not pass through
8. A 100Hz wave creates a standing wave in the string at the right. Waves propagate through the string at 10m/s. Find the length of the strings.
   1. 0.1m
   2. 0.2m
   3. 0.4m
   4. 1.0m
9. A wave of unknown frequency creates a standing wave in the 1m long string to the right. Waves propagate through the string at 10m/s. Find the frequency of the wave.
   1. 15Hz
   2. 10Hz
   3. 5Hz
   4. 1.5Hz



1. How many wave lengths are present in the closed-end resonator to the right?
   1. 2.50
   2. 2.25
   3. 1.50
   4. 1.25
2. If the frequency of the wave in problem 22 is 175Hz, and air in this room travels at 350m/s, find the length of the tube.
   1. 1.25m
   2. 1.75m
   3. 2m
   4. 2.5m
3. In the open-end resonator at the right, the tube has a length of 30cm. If the sound played has a frequency of 1250Hz, find the speed of sound in this room.



* 1. 37500m/s
  2. 375m/s
  3. 350m/s
  4. 35m/s

1. The speed of a sound wave depends on the:
   1. Frequency of the wave
   2. Amplitude of the wave
   3. Properties of the medium
   4. Wavelength of the wave
2. A period of 5s corresponds to a frequency of \_\_\_\_\_\_ Hz
   1. 0.2
   2. 0.5
   3. 0.02
   4. 0.05
3. A mechanical wave:
   1. Is formed by the motion of various machinery
   2. Requires a medium to travel
   3. Consists of troughs only
   4. Does not include sound waves
4. A sound wave consists of:
   1. Areas of alternating high and low pressure in a medium
   2. Peaks and troughs that correspond to the different frequencies of a sound
   3. Condensations and rarefactions that can travel regardless of the presence of a medium
   4. All of the above
5. When the frequency of a sound wave increases, which of the following are *true?*:
   * 1. The tone increases
     2. The velocity decreases
     3. The wavelength decreases
6. i and ii
7. ii and iii
8. i and iii
9. i, ii, and iii
10. All of the following statements are true **except:** 
    1. Waves are created by a vibration
    2. As a wave moves through a medium, the individual particles of the medium move from the sources of the wave to the end of the wave some distance away
    3. Sound waves are longitudinal waves
    4. Sound waves are mechanical waves