

Physics 221 – Spring 2012

Quiz #1

Name: Solution

1. Clearly explain the difference between resonance and sympathetic vibration.

Resonance is the frequency something likes to vibrate at. This frequency is determined by the physical characteristics of the medium.

Sympathetic vibration or forced vibration happens when an object that is vibrating is brought in contact with another object. The vibrations (energy) travels to the other object and causes it to vibrate. For example, if we put the handle of a vibrating tuning fork onto a table, the table begins vibrating.

2. For a piano identify

- a. The source of sound (hint: Pressing a key is not the correct answer)

The source of vibration is when a hammer hits a string. Pressing a key cause that key's hammer to strike that key's string (actually a set of strings).

- b. The way pitch is changed

Each string has a certain length, density and tension that is tuned to the note that it corresponds with.

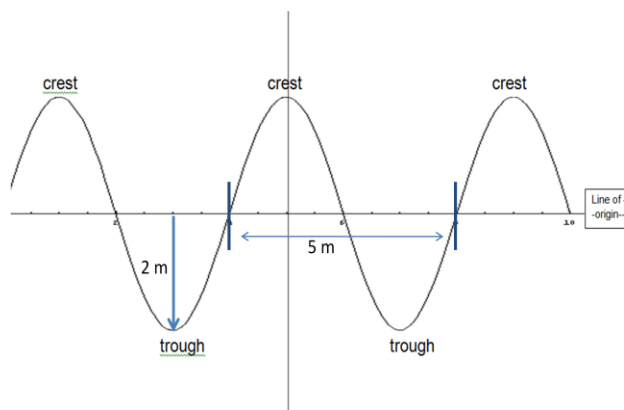
- c. What amplifies the sound. Be specific about the part and with what mechanism.

The strings are mounted to the sound board. When a string vibrates, the vibrations are transferred to the sound board via *sympathetic vibration*.

3. The sinusoidal wave shown is traveling in the positive x-direction and has a frequency of 66 Hz.

Find the

- a. Amplitude 2 m
b. Wavelength 5 m
c. Period $1/f = 1/66\text{ Hz} = 0.015\text{ s}$
d. Frequency 66 Hz
e. Speed of the Wave
 $v = 5\text{ m } 66\text{ Hz} = 330\text{ m/s}$



$$v = \lambda f \quad f = 1/T$$