

Physics 10

Extra Sound Practice Problems.

1. Which is a better model for sound waves?
 - a. Waves rolling in at the beach
 - b. Dominoes knocking over their neighbors
2. Rank the speed of sound waves through the following media from fastest -> slowest.
 - a. Methane Gas (density = 0.03 g/ml)
 - b. 24 degrees Celsius Air (density = 0.11 g/ml)
 - c. Granite
 - d. 24 degrees Celsius Air with lower humidity than (b)
 - e. Ocean water
3. A bat sends out a chirp at 2000 Hz which bounces off a tree and returns to the bat's ears 0.62 seconds later.
 - a. If the temperature is 14 degrees Celsius, how far away is the bat from the tree?
 - b. If the bat is flying towards the tree, which of the following pitch will he most likely hear?
 - i. 2000 Hz
 - ii. 1800 Hz
 - iii. 2012 Hz
 - iv. 8000 Hz
4. While playing in the ocean, little Timmy notices that it takes 2.2 seconds for his raft to go from its highest point to its lowest point in the waves.
 - a. Determine the period and frequency of these waves:
 - b. The distance from crest to adjacent trough is 8.2 m, determine the speed of these waves
5. A modern clarinet is effectively a pipe with 1 closed and 1 open end and is 0.8 meters long. Assume temperature is 17 degrees Celsius for this problem.
 - a. Draw the fundamental frequency and the first 4 overtones for the clarinet.
 - b. Determine the frequency of the 4th overtone. Which harmonic is this?
6. The tenor clarinet is a slightly higher pitched version of a standard clarinet with the same shape, but a different length. On a 17 degree Celsius day, the seventh harmonic of a tenor clarinet produces a tone with a frequency of 1050 Hz. What must be the length of the air column in a tenor clarinet?
7. What must be the air temperature on a day when the fundamental frequency of a trombone is 125 Hz? The trombone is effectively a pipe with two open ends and is 1.4 meters long.