Physics 202 Quiz 6

May 20, 2013

Word Problems

Show all your work and circle your final answer. (Ten points each.)

1. One method for measuring the speed of sound uses standing waves. A cylindrical tube is open at both ends, and one end admits sound from a tuning fork. A movable plunger is inserted into the other end at a distance L from the end of the tube where the tuning fork is. For a fixed frequency, the plunger is moved until the smallest value of L is measured that allows a standing wave to be formed. Suppose that the tuning fork produces a 485-Hz tone, and that the smallest value observed for L is 0.264 m. What is the speed of the sound in the gas in the tube?

2. The range of human hearing is roughly from 20 Hz to 20 kHz. Based on these limits and a value of 343 m/s for the speed of sound, what are the lengths of the longest and shortest pipes (open at both ends and producing sound at their fundamental frequencies) that you expect to find in a pipe organ?