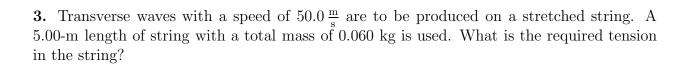
Phys 2010 (NSCC), Fall 2005 Problem Set #14

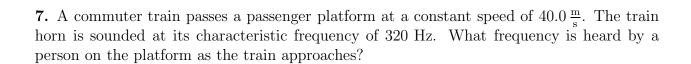
1. A bat can detect small objects such as an insect whose size is approximately equal to one wavelength of the sound the bat makes. If bats emit chirps at a frequency of 60.0 kHz, and if the speed of sound in air is $340 \, \frac{\text{m}}{\text{s}}$, what is the smallest insect a bat can detect?

2. If the frequency of oscillation of the wave emitted by an FM radio station is 88.0 MHz, determine (a) the waves's period of vibration and (b) its wavelength. (Radio waves travel at the speed of light, $3.00 \times 10^8 \, \frac{\rm m}{\rm s}$.)



4. For the string in Problem 3, find the wave speed if the tension is 8.00 N.

5. An outside speaker (which you can consider to be an isotropic source) emits sound waves
with a power output of 100 W. Find the intensity 10.0 m from the source.
3. For the situation given in problem 5 (same sound source and distance) what is the ntensity level in decibels at that distance?
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8. For the train horn described in problem 7, what frequency is heard by someone on the platform if the train is receding (i.e. moving away) at a speed of $30.0 \, \frac{\text{m}}{\text{s}}$?