Physics 212 Homework 2 Dr. Kotowich

Directions: Please complete all problems and show all details of your work. No work equals no credit. If units are not present the problem is incorrect.

1. A steel piano wire is 0.7 m long and has a mass of 5g. It is stretched with a tension of 500N.
2. What is the velocity of transverse waves on the wire?
3. To reduce the wave velocity by a factor of 2 without changing the tension, what mass of copper wire would have to be wrapped around the steel wire?
4. Waves of frequency 200 Hz and amplitude 1 cm move along a 20 m string that has a mass of 0.06 Kg and a tension of 50N.
5. What is the total energy of the waves on the string?
6. Find the power transmitted past a given point on the string.
7. Show that the following functions satisfy the wave equation:
8. y(x,t) = (x + vt)2
9. y(x,t) = ln(x – vt)
10. A whistle of frequency 500 Hz moves in a circle of radius 1 m at 3 rev/s. What are the maximum and minimum frequencies heard by a stationary listener in the plane of the circle and 5 m away from its center.