Physics 202 Quiz 1

Apr 8, 2013

Word Problems

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

1. One end of a piano wire is wrapped around a cylindrical tuning peg and the other end is fixed in place. The tuning peg is turned so as to stretch the wire. The piano wire is made from steel ($Y = 2.0 \times 10^{11}$ N/m². It has a radius of 0.80 mm, and an unstrained length of 0.76 meters. The radius of the tuning peg is 1.8 mm. Initially, there is no tension in the wire. Find the tension in the wire when the tuning peg is turned through two revolutions.

2. An 86.0-kilogram climber is scaling the vertical wall of a mountain. His safety rope is made of nylon that, when stretched, behaves like a spring with a spring constant of 1200 N/m. He accidentally slips and falls freely for 0.750 meters before the rope runs out of slack. How much is the rope stretched when it breaks his fall and momentarily brings him to rest?