Physics 1210
Homework 12 Written-out Problems

1.

You are hired by an automotive company to choose a spring to use on each of the four wheels of a 2000 kg racing vehicle designed to go 180 miles per hour. When you set the car on the tires the entire car is supposed to sag not more than 10 cm. The car also needs shocks to damp out road vibrations. The damping constant should be chosen such that the amplitude of oscillation reduces to 1⁄2 the original undamped amplitude after one full period of oscillation. Give values for k, the spring constant, and b, the damping constant. State any other assumptions you might need to make.

2.

You find a hubcap (mass M) on the road and decide to add it to your collection of hubcaps in the garage. You hang it from a nail at some distance d from its center as shown and you notice that it oscillates if perturbed. Find a period for the oscillation in terms of the shown variables and state any assumptions you need to make.