Phys 410 – Homework #3

All numbered problems from Taylor.

1) 3.7 (3 pts)
2) 3.12 (a and b) (6 pts)
3) 3.35 (a, b, and c) (9 pts)
4) 4.8 (3 pts)
5) 4.22 (3 pts)
6) 4.23 (a, b, and c) (9 pts total) Check all three force laws to determine which are conservative; then calculate the potential energy for just the force in part (a).

7) EXTRA CREDIT (3 pts) A bead is threaded on a horizontal wire and slides without friction in the x-direction. Two springs, both with spring constant (k), connect to the bead as shown below, with a distance of (L) between the wire and the fixed roof and floor. The relaxed length of each spring is (L0), where (L0) is greater than (L). Determine the equilibrium positions of the bead, and calculate the frequency of small oscillations.
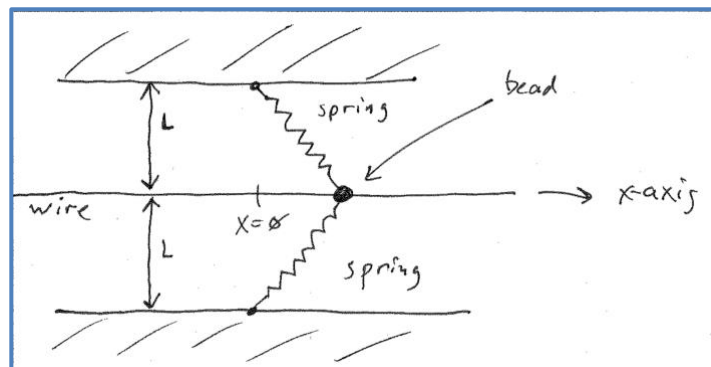
Optional problems, for further study. If you attempt one of these, we will read your solution and give you written feedback. No extra credit. Solutions will be posted.

8) 3.11 (a, b, c, and d)
9) 3.36
10) 4.2
11) 4.15
12) 4.29
13) 4.38
14) 4.39