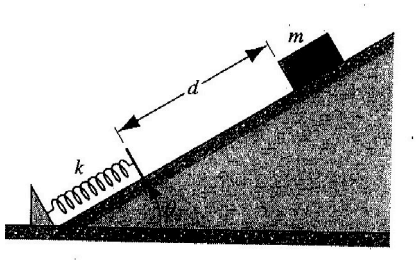
Ph201H/211H
F08 Homework assignments – week 7

Assignment due Thursday, November 13:

1. Chapter 6, problem 43
2. Chapter 6, problem 46
3. An ideal spring can be compressed 0.0233 m by a force of 268 N. A block of mass 3.18 kg is released from rest at the top of the frictionless incline, which makes an angle of 32.0° with the horizontal. The block comes momentarily to rest after it has compressed the spring by 0.0548 m. (a) What is the distance *d* that the block moves down the incline from its release point to the point at which it comes to rest on the spring? (b) What is the speed of the block just as it first contacts the spring?



Answers:
1. (a) 0.167 m (b) 3.74 m/s (c) 0.36 W
2. (a) $-(mg)^2 / 2k_s$ (b) $2mg / k_s$ (c) $\sqrt{k_s s^2 / m - 2g(L+s)}$
3. (a) 1.05 m (b) 3.21 m/s

Assignment due Monday, November 17:

1. Chapter 6, problem 48
2. Chapter 6, problem 52
3. Chapter 6, problem 58
4. A sled of mass 15 kg starts up a 30° incline with a speed of 3.5 m/s. (a) In the absence of friction, what distance would it travel along the incline before coming to rest? (b) Because of friction, the sled travels only 0.95 m up the incline as it comes to rest. How much work was done by friction over that distance? (c) The sled now slides back down the incline. Assuming the same amount of frictional work is done on the way down, what is its speed as it reaches the bottom?

Answers:
1. (a) 97 W (b) 450 W (your answer may vary depending on your estimates) (c) 0.7 d
2. 1.5×10^4 J/s, 56 kWh
3. $v_0 + (t / m)(k_s s \cos\theta + \mu k_s s \sin\theta - \mu mg)$
4. (a) 1.25 m (b) 22.1 J (c) 2.5 m/s