**A-Day: Due Fri., Feb 8 (Assigned: 2/4)**
**B-Day: Due Mon., Feb 11 (Assigned: 2/5)**

# 2008 Harmonic Motion 3

1. When a spring has a bigger spring constant, is it easier or harder to stretch?

2. Positive, Negative, or Zero?

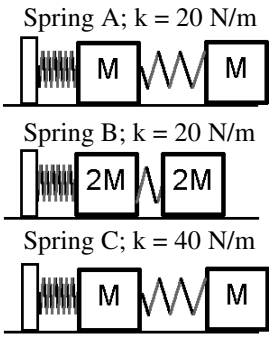
   A. ___ x: when you stretch a spring;
   B. ___ x: when you compress a spring;
   C. ___ F: when you stretch a spring;
   D. __ F: when you compress a spring.
   E. ___ F: at the equilibrium position.
   F. ___ x: at the equilibrium position.

3. Maximum (Mx) or Minimum (Mn)?

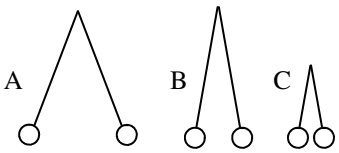
   A. ___ Ep at the endpoints.
   B. ___ Ek at the endpoints.
   C. ___ Ek at equilibrium.
   D. ___ Ep at x = 0.
   E.____ Ek at -A
   F. ____ Ep at +A
   G.____ Ek at x = 0.
   H.____ F at x = 0
   I. ___ x at equilibrium
   J.____ F at +A
   K. ___ x at –A
   L. ___ v at x = 0
   M. ___ v at x = -A
   N. ___ a at x = 0
   O. ___ a at x = -A
   P.____ a at x = A

4. Using the pendulums and springs at the right, answer the following:

   A. ___ Spring A or B has the biggest amplitude?
   B. ___ Pendulum A or B has the smallest amplitude?
   C. ___ Pendulum A or C has the quickest period?
   D. ___ Spring A or C has the quickest period?
   E. ____ Spring A or B has the quickest period?
   F. ____ Pendulum B or C has the greatest frequency?
   G. ___ Spring A or C requires more force to compress it?
   H. ___ Spring B or C has the smallest amplitude?
   I. ___ Which pendulum has the most energy?
   J. ___ Spring A or B has the most energy?
   K. ___ Spring A or C has the most energy?




5. If M = 0.5 kg, find the period of Spring A.




6. A spring moves a total distance from side to side of 6 cm. Answer the following.
   A. How big is its amplitude?
   B. Where is its equilibrium position?
   C. How far does it travel in one complete cycle?

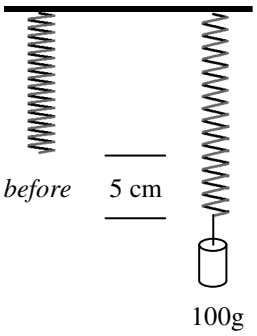
7. Spring A has a spring constant of 10 N/m (Newtons per meter). Spring B's k = 20 N/m.
   A) How many Newtons are necessary to stretch Spring A 1 meter?
   B) How many Newtons are necessary to stretch Spring B 1 meter?
   C) If you pull on (stretch) Spring A with 10 N, how far does Spring A stretch?

   D) If you stretch Spring B with 10 N, how far does Spring B stretch?

   E) So, which Spring has the higher spring constant?
   F) Which Spring stretches farther with the same 10 N force?

8. If 1000g = 1 kg and 100 cm = 1 m:

   A. 450 cm = _____ m
   B. 350 g = _____ kg
   C. 15 cm = _____ m
   D. 1.2 kg = _____ g
   E. .05 cm = _____ m
   F. .04 m = _____ cm




9. 100g is hung on a spring. The spring stretches 5 cm.
   A. What is the mass of the object in kilograms?

   B. How much force is pulling down on the spring?

   C. Calculate the spring constant of the spring.

   D. Calculate the period of the spring.

10. 700 g is hung on a spring, which stretches 16 cm. Calculate the spring constant of the spring.

11. Which is a more accurate way of measuring a pendulum: a stop watch or a classroom wall clock?

12. How does taking multiple sample increase the accuracy of measurements?