PreAP: Due: Mon., Feb 13 (Assigned: Thurs., Feb 9)
Reg: Due: Tues., Feb 14 (Assigned: WFri., Feb 10)

Harmonic Motion 4

1. (Y or N) Which of the following affects the period of a spring?
   A. ____ Mass at the end of the spring? B. ____ Spring constant? C. ____ Amplitude?

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

3. Positive, Negative, or Zero?

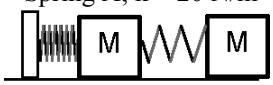
   A. ___ x: when you stretch a spring;
   B. ___ x: when you compress a spring;
   C. ___ F: when you stretch a spring;
   D. __ F: when you compress a spring.
   E. ___ F: at the equilibrium position.
   F. ___ x: at the equilibrium position.

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

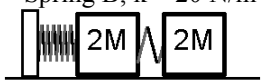
   A.____ Ep at the endpoints.
   B.____ Ek at the endpoints.
   C.____ Ek at equilibrium.
   D.____ Ep at x = 0.
   E. ____ Ek at -A
   F. ____ Ep at +A
   G.____ Ek at x = 0.
   H.____ F at x = 0
   I. ____ x at equilibrium
   J._____F at +A
   K. ____x at –A
   L. ____v at x = 0
   M.___ v at x = -A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

5. 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 highest 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?

Spring A; k = 20 N/m

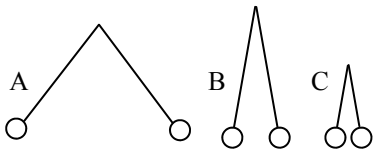


Spring B; k = 20 N/m



Spring C; k = 40 N/m

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



7. If the period of Pendulum C is 1.2 seconds, find its length.

8. 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?

9. If a spring has a spring constant of 52 N/m, answer the following.
   A. Find the force of the spring if it is stretched 30 cm (notice units).

   B. Find the force of the spring if it is compressed 15 cm.

   C. If the spring pulls with +20 N, find the displacement of the spring.

   D. If the spring pulls with –3 N, find the displacement of the spring.

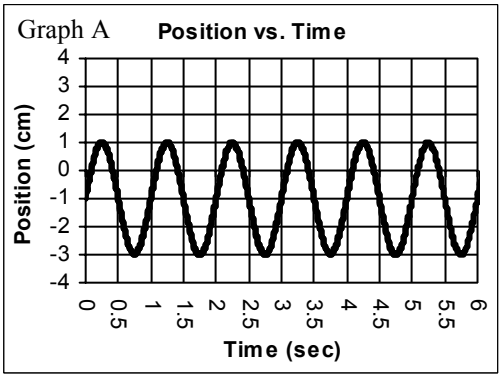
   E. How hard will you have to push to give it an amplitude of 12 cm?

10. If a spring is hanging, how will its equilibrium position change if you hang a heavier mass on it?

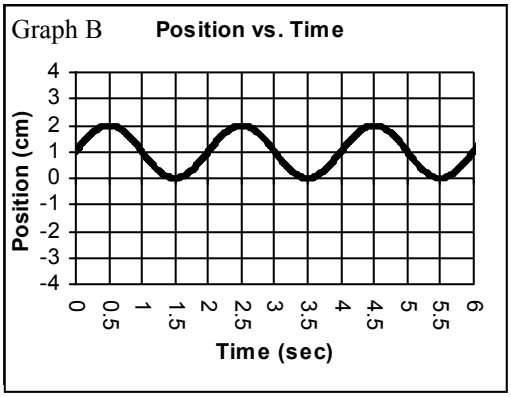
11. You hang a 1.5 kg mass on a spring and it stretches 4 cm. Find its spring constant.

12. Use Graphs A-C to answer the following:
    A. ____ If they were the same spring, which one has a heavier mass on it?
    B. ____ If they were different springs, but equal masses, which one has the higher spring constant?
    C. ____ Which one shows a spring with a bigger amplitude?

Graph A



Graph B



13. What's the medium that the waves travel through?
    A. Sound in a room:
    B. Waves in the ocean:
    C. The slinky in class:

14. What happens to a wave with no medium?

15. Can we hear sound in space?

16. Why or why not?

Use the two Graduated Cylinders at the bottom to answer the following:

17. What do we call the curvature of water near glass?

18. What do we know about the charges of water and glass?

19. What is the volume of the left cylinder?

20. Is this cylinder glass or plastic?
21. How do you know?

22. Find the volume of the snorkeler.

23. What do we call this method of finding volume?

Graph C