# 2009-10 Harmonic Motion 5

1.   In which case will a wave move faster: if molecules are closer together or farther apart?

2.   Use the graphic at the right to answer the following.
     A.   Is it a transverse or longitudinal wave?
     B.   What is the frequency of the second ball?
     C.   If it takes 0.4 seconds for the energy to travel from
          the first ball to the third, how fast is the wave traveling?

25 Hz

84 cm
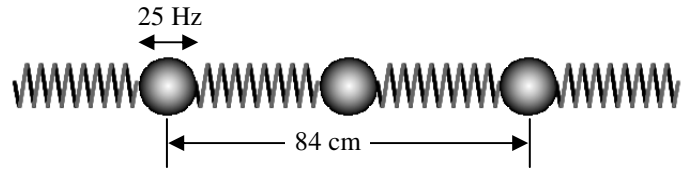
   D.   Since you know the frequency of the wave, calculate its wavelength.

L =
0.75 m
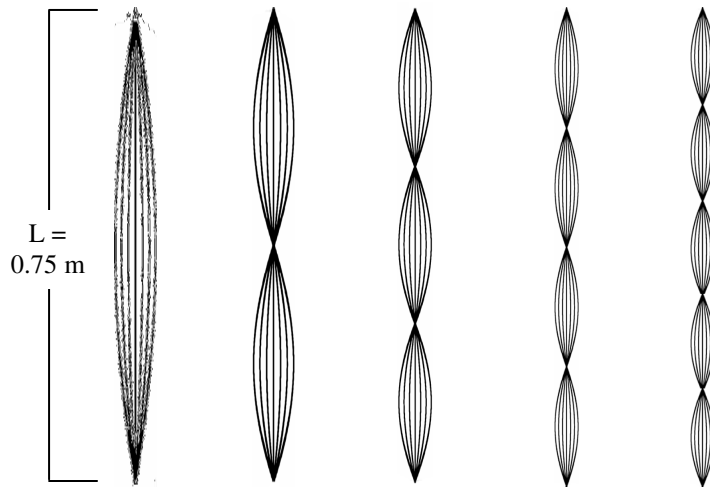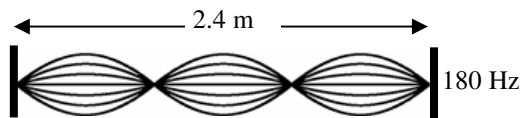
3.   A 0.75m string is vibrated at different frequencies.
     The given shapes were found.
     A.   These shapes are known as what?

     B.   Give the three names for one the one
          big antinode.

     C.   Fill in the chart. The last row asks for
          the actual wavelengths for each.

     D.   Calculate the period of harmonic 3.

     E.   What is the velocity of harmonic 2's wave?

Harm					
Freq			36 Hz		
# of λ					
λ					

     F.   What is the velocity of harmonic 5's wave?

     G.   What changes if the string is tightened?

2.4 m

180 Hz

4.   A different string vibrating at 180 Hz produces the above harmonic.
     A._____Which harmonic is it?
     B._____How many nodes does it have?
     C._____If a high speed camera were to take its picture, draw what the string would look when frozen.
     D._____How many wavelengths is the harmonic?
     E._____What is the wavelength of this harmonic?

     F. _____Calculate the speed of the wave on the string.

     F. _____What is the frequency of the first harmonic for this string?

     G._____What is the wavelength of the fundamental for this string?

Now turn to the "Standing Waves" notes:

5. Why do guitars have a body?

6. A small music box organ plays when the handle is turned, but it is not very loud when held in your hand.
   A. How can you make it louder?

   B. What is this called?

Position vs. Time
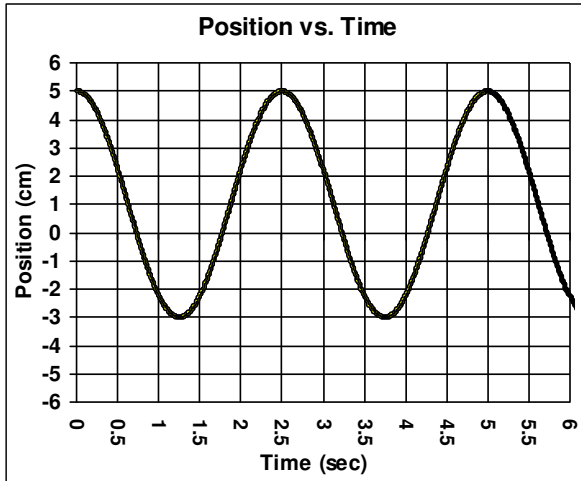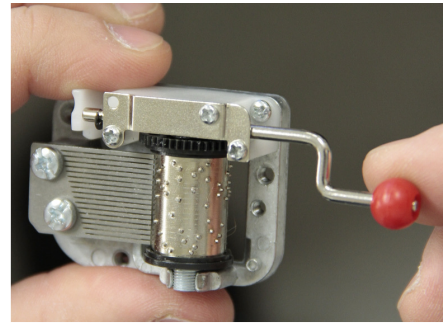
7. A. What is the period of the wave shown?

   B. How many total cycles are shown?

   C. What is the amplitude of the motion?

   D. What is the equilibrium position?

before   5 cm
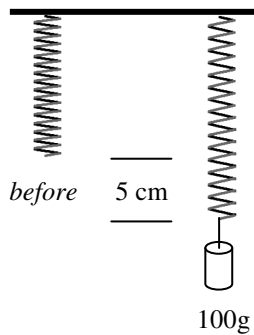
100g

From "Spring-Mass Systems" notes:

8. A 100 g mass 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 (*think weight*)?

   C. Calculate the spring constant of the spring.

   D. Calculate the period of the spring.

And do the TAKS Homework: Water