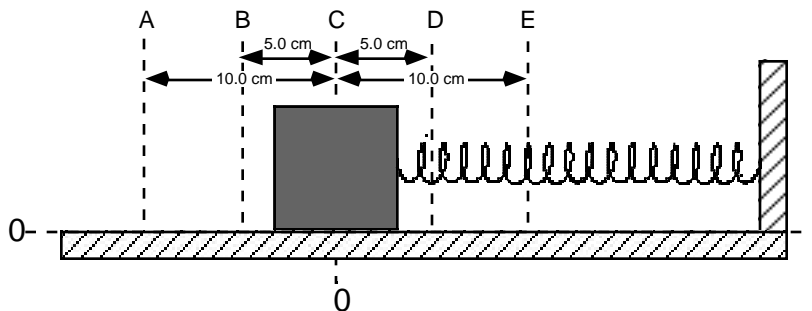


Waves Unit I: Worksheet 2

The diagram to the right shows a 0.100 kg block attached to a Hookean spring. The block experiences no net force when it is at position C. When the block is to the left of point C the spring pulls it to the right. When the block is to the right of point C, the spring pushes it to the left.



The mass is pulled to the left from point C to point A and released. The block then oscillates between positions A and E. Assume that the system consists of the block, spring, and the horizontal surface on which the spring oscillates.

1. When there is no friction between the block and the surface, the force required to hold the block at rest at position A is 5.00 N. Calculate the spring constant for the spring.

2. Calculate the elastic energy at the following positions:
 - a. Position A

 - b. Position B.

 - c. Position C.

 - d. Position D.

 - e. Position E.

3. Calculate the kinetic energy of the system at each of the following positions:
 - a. Position A

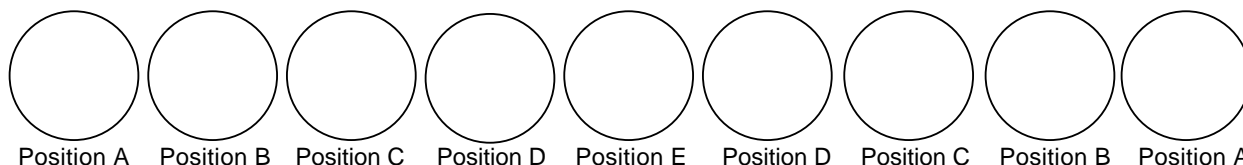
 - b. Position B

 - c. Position C

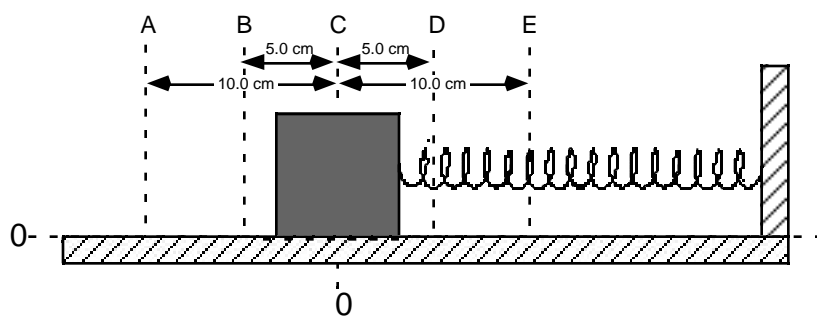
 - d. Position D

 - e. Position E

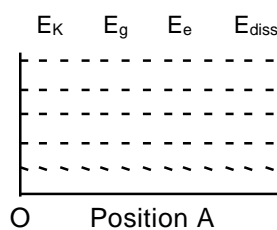
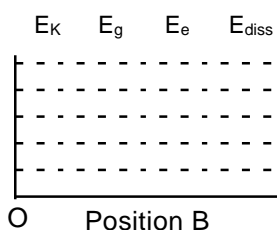
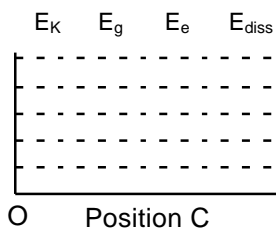
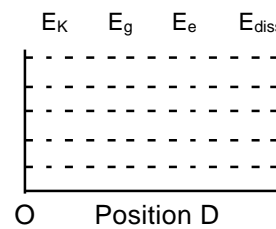
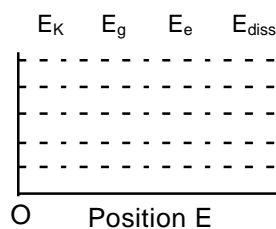
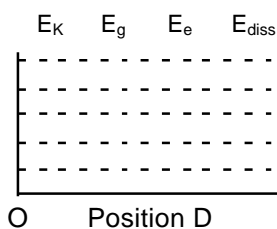
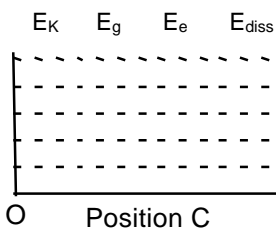
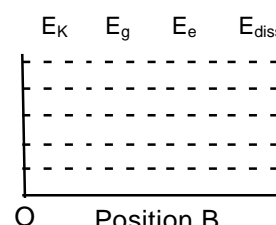
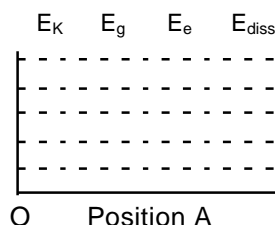
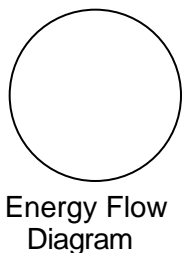
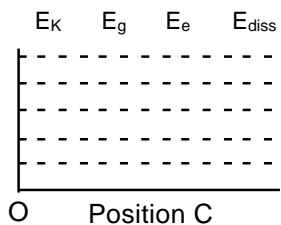
4. Create a set of qualitative energy pie charts for this system starting from the instant of release at point A and ending after the system has completed one full cycle and returns to position A



5. Complete a set of quantitative energy bar graphs/flow diagrams for the system described in question 1. Once again, assume no frictional effects.

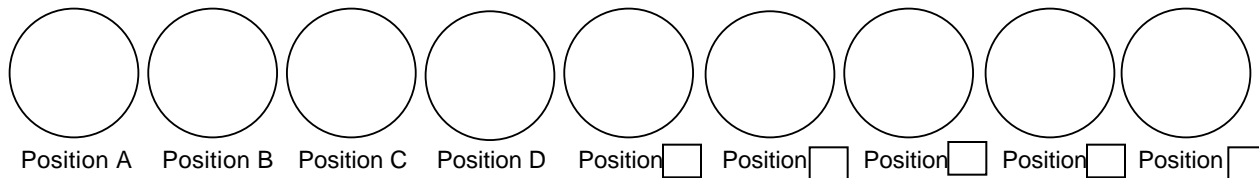


(Block is at rest.)



- b. Why have no energy flow diagrams been provided after the initial transition from position C to position A?

6. Assume that the system now has noticeable frictional effects. Create a set of qualitative energy pie charts for this system starting from the instant of release at point A and ending after the system has completed one full cycle.



7. Will the block return to position A? Explain!