

## Ch. 16 Worksheet

1. A simple pendulum with mass 3.5 kg undergoes simple harmonic motion taking 0.25 s to travel from one point of zero velocity to the next such point. The distance between those points is 36 cm. Calculate the period, frequency, angular frequency, and length.
  
2. A mass 25.0 kg is attached to a spring with spring constant  $k = 100.0$  N/m. The system executes simple harmonic motion about the point  $x = 0.0$  m. At  $t = 0.0$  s, it has displacement  $x = 1.50$  m and zero velocity.
  - a. Sketch a picture of this situation.
  - b. Where will the potential energy be greatest? What about the kinetic energy? Justify your answer.
  - c. What are the period, angular frequency, and linear frequency for this system?
  - d. What is the amplitude of the oscillation?
  - e. What is the maximum potential energy?
  - f. What is the magnitude of the maximum velocity?
  - g. What is the maximum kinetic energy?
  - h. What is the magnitude of the maximum acceleration?
  - i. Determine the position as a function of time,  $x(t)$ .
  - j. Determine the velocity as a function of time,  $v(t)$ .
  - k. Determine the acceleration as a function of time,  $a(t)$ .