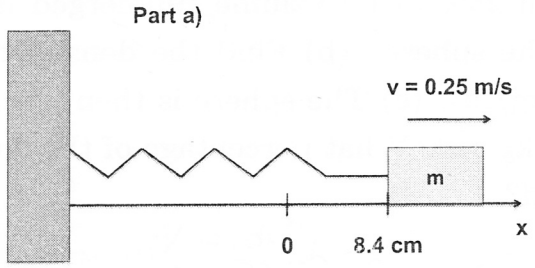
Problem 2

A 2.0-kg mass is attached to a spring with a spring constant of 45 N/m. (a) If the mass is released with a speed of 0.30 m/s at a distance of 7.8 cm from the equilibrium position of the spring, what is the current total mechanical energy of the system? (b) What is the speed of the mass when it passes through the equilibrium position? Hint: use conservation of energy.



$K_E =$

$m = 2.0\,kg$

$V = 0.30\ m/s$

$K =$

$d = 7.8\ cm = 0.0780\ m$

$U = \frac{1}{2} k x^2 \quad = K = \frac{1}{2} m v^2.$

$E_{Total} = \frac{1}{2} k x^2 + \frac{1}{2} m v^2$

$= \frac{1}{2}(45)(0.078)^2 + \frac{1}{2}(2.0\,kg)(0.30\,m/s)^2$

$= 0.23\,J$

$V =$

b) $E_{Tot} = K_E$

$0.23 = \frac{1}{2}(2.0kg)(0.3)v^2$

$v^2 =$