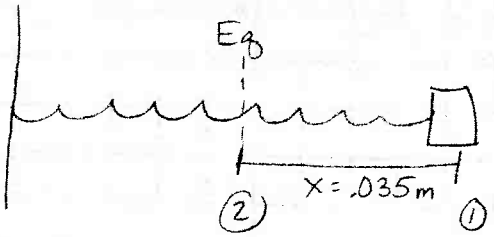
P #16

Ch. 13 - Pg 419

a) $X_{max} = 3.5\ cm = .035\ m$
$k = 250\ N/m$
$m = .50\ kg$



$$PE_{s_1} + KE_1 = \frac{1}{2} \cdot k \cdot x_1^2 + 0$$

$$= \frac{1}{2} \cdot (250\ N/m)(.035\ m)^2$$

$$\boxed{PE + KE = .15\ J}$$

b) $$PE_{s_1} + KE_1 = PE_{s2} + KE_2$$

$$.15\ J = 0 + \frac{1}{2} \cdot m \cdot v_2^2$$

$$.15\ J = \frac{1}{2} \cdot (.50\ kg) \cdot v_2^2$$

$$\boxed{v_2 = .78\ m/s}$$

c) $X_{max} = .035\ m$
$k = 250\ N/m$

$$F_s = -k \cdot x_{max}$$

$$= -(250\ N/m)(.035\ m)$$

$$F_{max} = -8.75\ N$$

$$F = m \cdot a$$

$$(-8.75\ N) = (.50\ kg) \cdot a$$

$$\boxed{a = -17.5\ m/s^2}$$