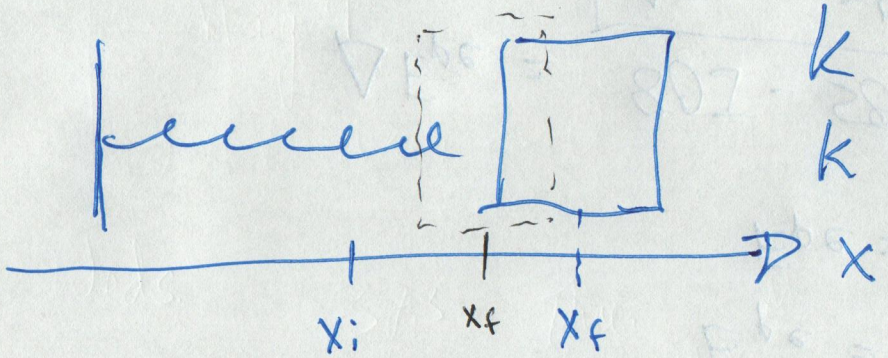
HRHS Physics May 7, 2020



k = same for a give spring

k = is different for different springs.

$\vec{\Delta x} = 0.400\,m$

$E_{pe} = 500\,J$

a) $E_{pe} = \frac{1}{2} k (\Delta x)^2$

$k = \frac{2 E_{pe}}{(\Delta x)^2} = \frac{2(500\,J)}{(0.400\,m)^2}$

$k = 6,250\,\frac{J}{m^2}$ $\quad k = 6,250\,N/m$

$1\frac{J}{m^2} = \frac{1\,N \cdot m}{m^2} = 1\frac{N}{m}$

$F_r = k\,\Delta x$

$= \left(6,250\frac{N}{m}\right)(0.400\,m)$

$F_r = 2,500\,N$

b) "decreases" $F_r = 1000\,N$

b)

$E_{pe} = ?$

$k = 6,250\ N/m$

$\Delta x = ?$

$F_r = ?$

$F_r = k\Delta X$

$\Delta X = \frac{F_r}{k} = \frac{(1000N)}{(6,250N/m)}$

$\Delta X = 0.160\ m$

$E_{pe} = \frac{1}{2}k(\Delta X)^2 = \frac{1}{2}\left(6,250\frac{N}{m}\right)(0.160\ m)^2$

$E_{pe} = 500\ N\cdot m$

$E_{pe} = 500\ J$

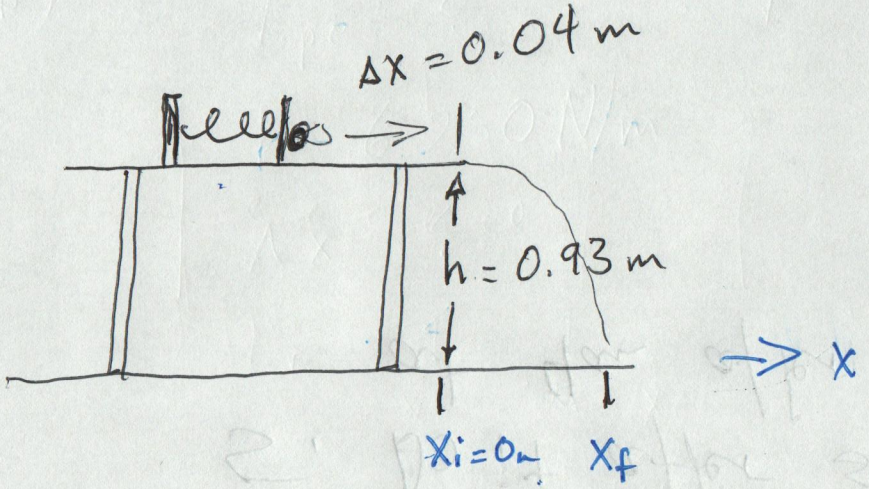
$E_{pe} = 80\ Nm$

$E_{pe} = 80\ J$

$\Delta E_{pe} = 80J - 500J$

$\boxed{\Delta E_{pe} = -420\ J}$

$k = 12\,N/m$ $\quad m = 0.0083\,kg$



$V = ?$

$E_{pe} = ? = \frac{1}{2} k \Delta x^2$

$E_{ke} = \frac{1}{2} m V^2$

$E_{ke} = E_{pe}$

$\frac{1}{2} m V^2 = \frac{1}{2} k \Delta x^2$

$V^2 = \frac{k \Delta x^2}{m}$

$V = \pm\sqrt{\frac{k \Delta x^2}{m}} = \pm\left[\frac{(12N/m)(0.04m)^2}{0.0083kg}\right]^{1/2}$

$V = 1.5209\,m/s$

$\sqrt{\frac{1\,kN/m \cdot m^2}{kg}}$

$= \sqrt{\frac{1\,kg\,m/s^2 \cdot m}{kg}} = 1\,m/s$

$V_{ix} = 1.5209\,m/s$ $\quad V_{fx} = 1.5209\,m/s$

$x_i = 0m$ $\quad x_f = ?$ (3)

$t_i = 0s$ $\quad t_f = ?$

$V_{iy} = 0\,m/s$ $\quad V_{if} = ?$

$a_y = -9.8\,m/s^2$

$y_i = 0.93m$ $\quad y_f = 0m$

$y_f = y_i + (V_{iy} \Delta t) + \frac{1}{2} a_y \Delta t^2$

$y_i = -\frac{1}{2} a_y \Delta t^2$

$\Delta t^2 = \frac{-2 y_i}{a_y}$

$\Delta t = \pm\sqrt{\frac{-2 y_i}{a_y}} = \sqrt{\frac{-2(0.93m)}{-9.8\,m/s^2}}$

$\Delta t = 0.4357s$

$x_f = x_i + V_{ix} \Delta t$

$= (1.5209\,m/s)(0.4357s)$

$x_f = 0.6626m$ $\quad \underline{x_f = 0.7m}$

5steps

1. Don't know something exists
2. Somebody shows you.
3. ~~Doity~~ Do it on your own (20% no help)
4. Do it on your own (80% no help)
5. Do it after someone wakes at 4am after a night of partying. (100% correct)

Transverse Waves

Water waves

(wind)

Guitar

Any Instrument

Sound in solid

Longitudinal Waves

Sound air

sound solid