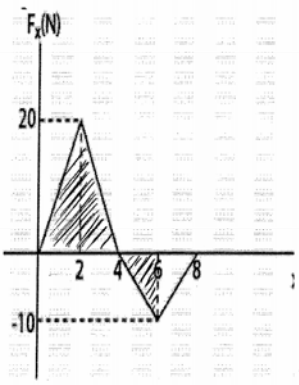
PHYS101.13
QUIZ#6- CHAPTER7
DATE: 21/4/09

Name: Key Id#:

The figure gives the only force F_x that can act on a 2.0 kg particle.
(a) Find the work by the force as the particle moves from x = 0 to x = 6.0 m.
(b) If the particle start from rest at x = 0, find its speed at x = 6.0 m.
(c) What is the instantaneous power delivered by the force when the particle is at x = 6.0 m



a) W = area under the curve

$= 20 \times 4 \times \frac{1}{2} - 10 \times 2 \times \frac{1}{2}$

$= 40 - 10 = \boxed{30\,J}$

b) $W = \Delta K = K_f - \cancel{K_i}^{\,0} = \frac{1}{2} m v_f^2$

$v_f = \sqrt{\frac{2W}{m}} = \sqrt{\frac{60}{2}} = \sqrt{30} = \boxed{5.5\,m/s}$

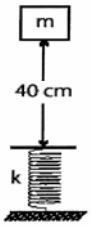
c) $P_{inst} = \vec{F} \cdot \vec{v} = |F||v| \cos 180^\circ = -10 \times 5.5$

$\boxed{P_{inst} = -55\,W}$

PHYS101.14
QUIZ#6- CHAPTER 7
DATE: 21/4/09

Name: Key Id#:

A 3.00 kg block is dropped from rest from a height of 40 cm onto a spring of spring constant k as shown in the figure. If the maximum distance the spring is compressed = 0.130 m, find
(a) The work done by the force of gravity
(b) The work done by the spring force
(c) The change in kinetic energy of the block
(c) The spring constant k



a) $W_g = mgh = 3 \times 9.8 \times (0.4 + 0.13)$

$= \boxed{15.6\ J}$

b) $W_s = \frac{1}{2} k (x_f^2 - x_i^2) = -\frac{1}{2} k (0.13)^2$

c) $\Delta K = W_g + W_s = 0$

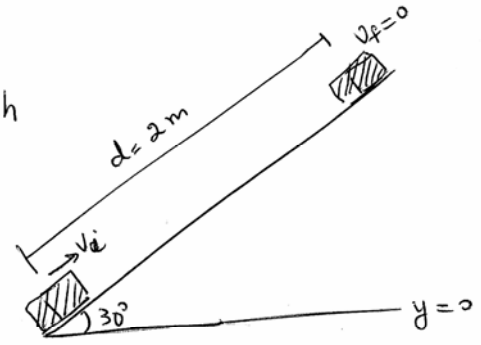
$\Rightarrow W_g = -W_s \Rightarrow 15.6 = \frac{1}{2} k (0.13)^2$

$\boxed{k = 1846\ N/m}$

PHYS101.15
QUIZ#6- CHAPTER 7
DATE: 19/4/09

Name: Key Id#:

A 4.0 *kg* block starts up a frictionless 30^0 incline with an initial speed v_o and comes to rest 2.0 *m* up the incline. Calculate
(a) The work done by the force of gravity
(b) The work done by the normal force
(c) The initial speed of the block.



a) $W_g = -mg\,d\sin 30^\circ = -mgh$

$= \boxed{-39.2\,J}$

b) $W_{F_N} = F_N\,d\cos 90^\circ$

$= \boxed{0}$

c) $\Delta K = W_g \Rightarrow \frac{1}{2}m\cancel{v_f^2}^{\,0} - \frac{1}{2}m v_i^2 = W_g$

$-2v_i^2 = -39.2 \Rightarrow \boxed{v_i = 4.4\ m/s}$