國立東華大學

Department of Physics
National Dong Hwa University, 1, Sec. 2,
Da Hsueh Rd., Shou-Feng, Hualien, 974, Taiwan

**General Physics I, Quiz 2**
PHYS1000AA, Class year102
10-03-2013

SN:________________, Name:_________________

*Chapter 1-8, Serway; ABSOLUTELY NO CHEATING!*
**Please write the answers on the blank space or on the back of this paper to save resources.**

**1.** We use the graphical representation of the definition of work. *W* equals the area under the force-displacement curve. This definition is still written $W = \int F_x dx$ but it is computed geometrically by identifying triangles and rectangles on the graph.

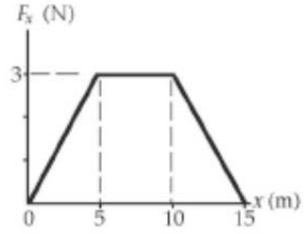
(a) For the region $0 \le x \le 5.00$ m,

$$W = \frac{(3.00\,\text{N})(5.00\,\text{m})}{2} = \boxed{7.50\,\text{J}}$$

(b) For the region $5.00 \le x \le 10.0$, $W = (3.00\text{ N})(5.00\text{ m}) = \boxed{15.0\text{ J}}$

(c) For the region $10.00 \le x \le 15.0$, $W = \frac{(3.00\,\text{N})(5.00\,\text{m})}{2} = \boxed{7.50\,\text{J}}$

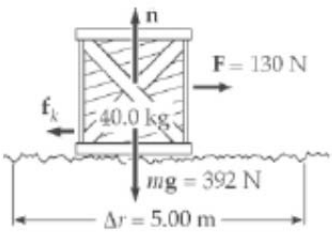
(d) For the region $0 \le x \le 15.0$, $W = (7.50 + 7.50 + 15.0)\text{ J} = \boxed{30.0\text{ J}}$




**ANS. FIG. 1**

**2.** $\sum F_y = ma_y$: $n - 392\text{ N} = 0$

$$n = 392\text{ N}$$
$$f_k = \mu_k n = (0.300)(392\text{ N}) = 118\text{ N}$$




**ANS. FIG. 2**

(a) The applied force and the motion are both horizontal.

$$W_F = Fd\cos\theta$$
$$= (130\text{ N})(5.00\text{ m})\cos 0°$$
$$= \boxed{650\text{ J}}$$

(b) $\Delta E_{\text{int}} = f_k d = (118\text{ N})(5.00\text{ m}) = \boxed{588\text{ J}}$

Since the normal force is perpendicular to the motion,

$$W_n = nd\cos\theta = (392\text{ N})(5.00\text{ m})\cos 90° = \boxed{0}$$

The gravitational force is also perpendicular to the motion, so

$$W_g = mgd\cos\theta = (392\text{ N})(5.00\text{ m})\cos(-90°) = \boxed{0}$$

We write the energy version of the nonisolated system model as

$$\Delta K = K_f - K_i = \sum W_{\text{other}} - \Delta E_{\text{int}}$$
$$\frac{1}{2}m\upsilon_f^2 - 0 = 650\text{ J} - 588\text{ J} + 0 + = \boxed{62.0\text{ J}}$$

(c) $$\upsilon_f = \sqrt{\frac{2K_f}{m}} = \sqrt{\frac{2(62.0\text{ J})}{40.0\text{ kg}}} = \boxed{1.76\text{ m/s}}$$