Quiz 3 – PH241 **Name**________________________ ☐ **Pledged**

$\vec{g} = 9.81 m/s^2$ downward, for a constant force $W = \vec{F} \cdot \vec{d}$
$K = .5mv^2$ $U_g = mgh$ $E = K + U$ $f_k = \mu_k F_N$ $\vec{F} = m\vec{a}$
$\Delta E = W_{ext} + W_{friction}$ $\Delta K = W_{Net}$

A skier, who weighs 55 kg, is on a frictionless hill which is 860 m high. She starts down the hill with an initial velocity of 5.0 m/s and does not use her ski poles.
(A) What is her velocity at the bottom of the hill?
(B) If she continues up a second hill, how high will she go before stopping?
(C) If she only makes it to 500 meters and then stops, there must have been friction! How much energy was lost to friction?
(D) How much energy then would she have to exert through her ski poles to get back to the original height of 860 m?

$V_0 = 5 m/s$
$h = 860 m$

(A) $mgh + \frac{1}{2}mV_0^2 = \frac{1}{2}mV_B^2$

$gh + \frac{1}{2}V_0^2 = \frac{1}{2}V_B^2$

$V_B = \sqrt{2gh + V_0^2} = \boxed{130 m/s}$

(B) $mgh + \frac{1}{2}mV_0^2 = mgh_2$

$h_2 = h + \frac{\frac{1}{2}V_0^2}{g} = 860m + 1m = \boxed{861 m} = h_2$

(C) $\Delta E_f = mgh_2 - mg(500m) = \boxed{1.95 \times 10^5 J} \sim 2.0 \times 10^5 J$

"ideal" "what actually happened"

(D) $\Delta E_{ext} = mg(860m) - mg(500m) = \boxed{1.94 \times 10^5 J} \sim 2.0 \times 10^5 J$

(860)