Quiz # 6: Physics 131(Winter 2005, 8:30 Section) **Prof. Hughes**

Name: **SOLUTION KEY** Recitation Instructor: _____

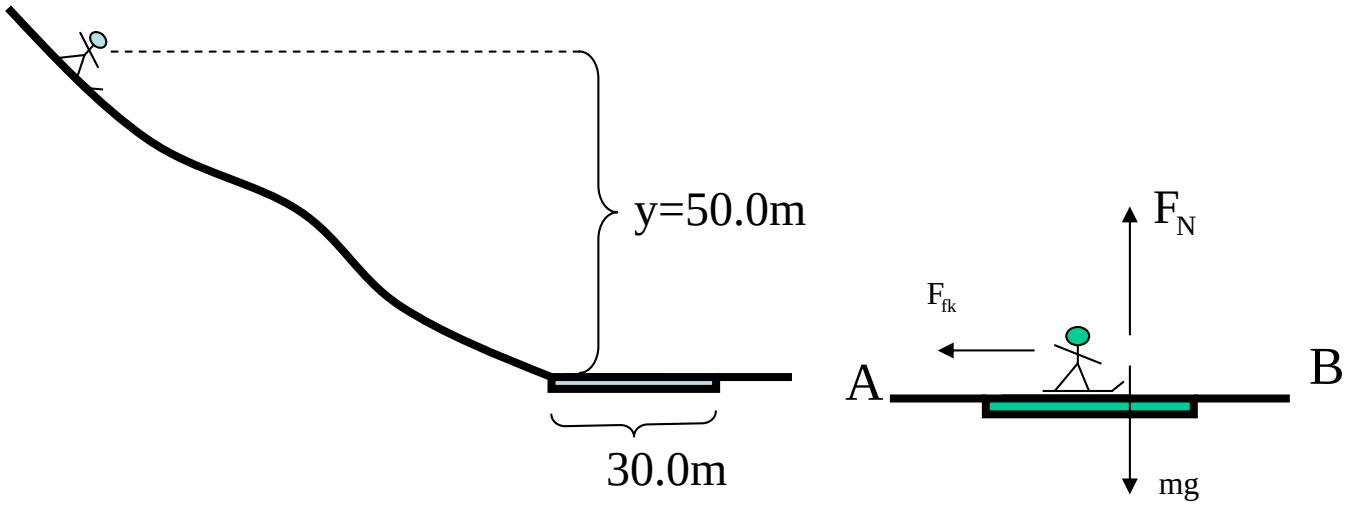
$F_{fk} = \mu_k F_N \quad W = \vec{F} \cdot \vec{d} = Fd\cos\theta \quad K = \frac{1}{2}mv^2 \quad U_g = mgh \quad U_s = \frac{1}{2}kx^2 \quad E = K + U \quad \Delta E = -F_f d$

Multiple Choice (5 pts): A nonconservative force:

A) violates Newton's second law
B) violates Newton's third law
C) cannot do any work
D) must be perpendicular to the velocity of the particle on which it acts
E) none of the above

Show all work: A skier of mass 50.0kg starts from rest on a ski hill as shown below. Just when she reaches the bottom, there is a rough icy region 30.0m long, with coefficient of kinetic friction between the skis and the ice of 0.20.

a) What is the skier's speed right after leaving the rough region? (10pts)
b) A second skier of mass 85.0kg leaves from rest at the same initial position as the first. What is this skier's speed right after leaving the rough region? (5 pts)



a)

$\Delta E = E_f - E_i = -F_{fk} d$

$K_f + U_f - (K_i + U_i) = -F_{fk} d$

$F_{fk} = \mu_k F_N = \mu_k mg$

$\frac{1}{2}mv_f^2 + 0 - (0 + mgh) = -F_{fk} d = -\mu_k mgd$

$v_f^2 = 2(gh - \mu_k gd)$

$v_f = \sqrt{2(9.8 \cdot 50 - 0.20 \cdot 9.8 \cdot 30)}$

$v_f = 29.4 m/s$

b) The speed is the same as in part a), since v does not depend on m.