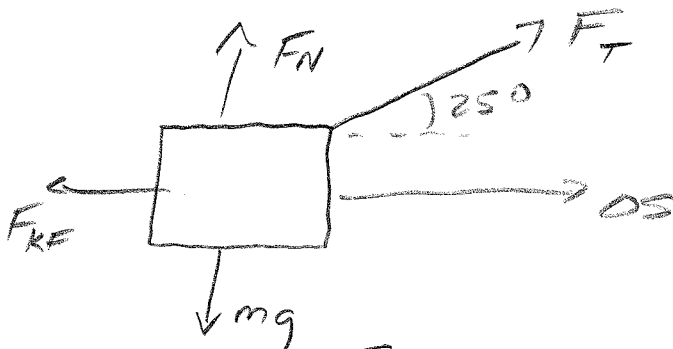


Quiz #5A

Clearly indicate (with a box) your answers to the following questions. SHOW ALL WORK.

1. A 27 kg block is pulled across a rough, horizontal floor by a rope at an angle of 25° above the horizontal. The tension in the rope is 141 N, and the block starts at rest. After the block have travelled a horizontal distance of 1.5 meters, it has a speed of 2.2 meters/sec.

- The work done by the normal force.
- The work done by the force of gravity.
- The work done by the tension force.
- The work done by friction.
- The coefficient of kinetic friction.



a) $W_N = 0$ (\perp to motion)

b) $W_{grav} = 0$ (\perp to motion)

c) $W_T = F_T \Delta S \cos 25$

$$= (141)(1.5) \cos 25 = \boxed{190 \text{ N}}$$

d) $W_{KE} : W_N + W_{grav} + W_T + W_{KE} = \Delta K$

$$0 + 0 + 190 + W_{KE} = \frac{1}{2}(27)(2.2)^2 - 0$$

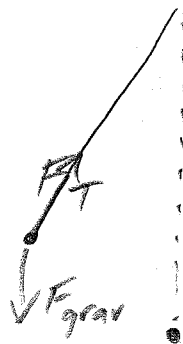
$$W_{KE} = 65.3 - 190 = \boxed{-124.7 \text{ N}}$$

$$F_N = mg - F_T \sin 25^\circ = (27)(9.8) - (141) \sin 25$$
$$= 205 \text{ N}$$

$$W_{KE} = -124.7 = -\mu_k F_N \Delta S$$

$$\mu_k = \frac{124.7}{(205)(1.5)} = \boxed{0.41}$$

2. A monkey swings on a 22.0-m long vine at an initial angle of 25.7° with respect to the vertical. If he pushes off with an initial speed of 2.5 meters/sec, what is his speed at the bottom of the swinging motion?



$$y = 22(1 - \cos 25.7^\circ) = 2.176 \text{ m}$$

$$\Sigma W_F = W_T + W_{\text{grav}} = \frac{1}{2}mv^2 - \frac{1}{2}mv_0^2$$

$$= 0 + mg(2.176) = \frac{1}{2}mv^2 - \frac{1}{2}m(2.5)^2$$

$$2(21.325) = v^2 - 6.25$$

$$v^2 = 48.9$$

$$v = 7.0 \text{ m/s}$$