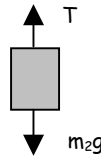
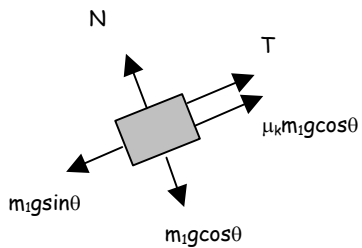
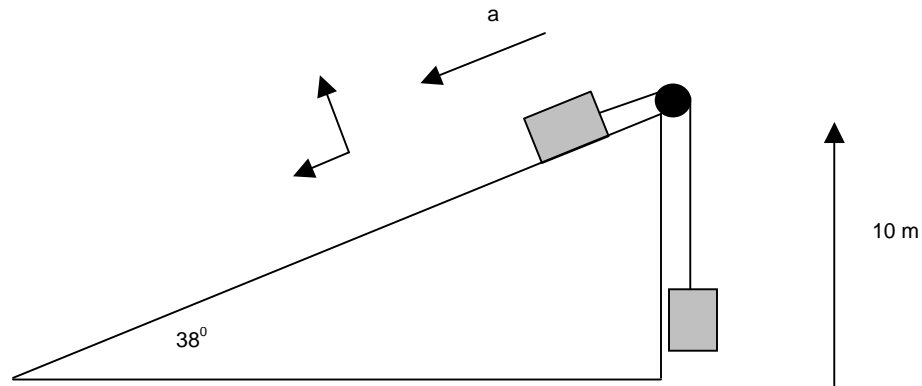


PHYS 211 Quiz #3

Please write your name on the back. Be sure to show all of your calculations.

A 15 kg block slides down a rough surface ($\mu_k=0.20$). It is released from rest at the top of an incline (38° to the horizontal) at a height 10 meters. It is attached via a light cord over a frictionless, mass less pulley to another free-hanging block of mass 1 kg. What is the speed of the system when the mass on the incline reaches the bottom?



$$\sum F_x = m_1 g \sin \theta - T - \mu_k m_1 g \cos \theta = m_1 a$$

$$\sum F_y = T - m_2 g = m_2 a$$

$$\sum F_y = N - m_1 g \cos \theta = 0$$

$$\therefore m_2 g + m_2 a = m_1 g \sin \theta - \mu_k m_1 g \cos \theta - m_1 a \rightarrow a = \frac{(m_1 \sin \theta - \mu_k m_1 \cos \theta - m_2)g}{m_1 + m_2} = 3.6 \text{ m/s}^2$$

$$v = \sqrt{2(3.6 \text{ m/s}^2)(16.2 \text{ m})} = 10.8 \text{ m/s}$$