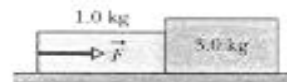


Physics 101-Rec
Quiz # 4

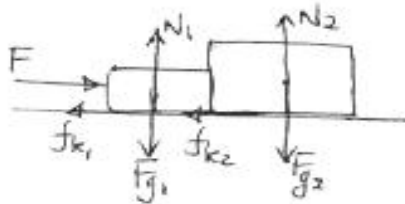
Instructor: Dr. Mekki

Name: Key Id#: _____ Sect.#: _____

In the figure $F = 20 \text{ N}$. The coefficient of kinetic friction between the 1.0 kg mass and the floor is 0.2 , while that of the 3.0 kg block is 0.25 .



(a) What is the acceleration of the two blocks?



$$\sum F_x = F - f_{k1} - f_{k2} = (m_1 + m_2)a$$

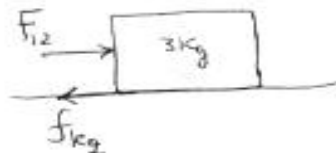
$$f_{k1} = \mu_k N_1 = \mu_k m_1 g$$

$$f_{k2} = \mu_k N_2 = \mu_k m_2 g$$

$$\Rightarrow F - \mu_k m_1 g - \mu_k m_2 g = (m_1 + m_2)a \Rightarrow a = \frac{F - \mu_k m_1 g - \mu_k m_2 g}{m_1 + m_2}$$

$$\Rightarrow a = \frac{10.69}{4} = \boxed{2.67 \text{ m/s}^2}$$

(b) What is the force of 1.0 kg block on the 3.0 kg block?



$$\sum F_x = F_{12} - f_{k2} = m_2 a$$

$$\Rightarrow F_{12} = f_{k2} + m_2 a = \mu_k m_2 g + m_2 a$$

$$= 7.35 + 3 \times 2.67 = \boxed{15.36 \text{ N}}$$