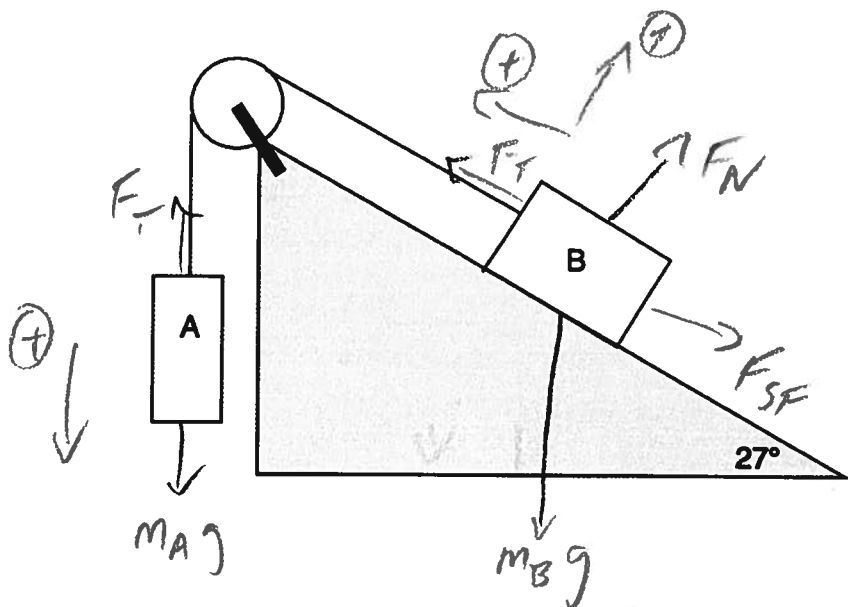


### Physics 10154 - Quiz 4F

The coefficient of static friction between block B and the surface is 0.533. The coefficient of kinetic friction between block B and the surface is 0.356.

Block A has a mass of 7.50 kg. Block B has a mass of 12.0 kg.

Does the system move if it is released from rest?  
If no, what is the force of static friction acting on block B?  
If yes, what is the system's acceleration?



At rest:

$$F_T = m_A g = 73.5 \text{ N}$$

$$m_B g \sin 27^\circ = 53.4$$

Since  $F_T$  larger on block B,  $F_{SF}$  points  $\rightarrow$

$$B: \sum F_\perp = F_N - m_B g \cos 27^\circ \Rightarrow F_N = 104.8 \text{ N}$$

$$\sum F_{\parallel} = F_T - m_B g \sin 27^\circ - F_{SF} = 0$$

$$\Rightarrow F_{SF} = 73.5 - 53.4 = 20.1 \text{ N}$$

$$F_{SF, \text{MAX}} = \mu_s F_N = (0.533)(104.8) = 55.9$$

Since  $F_{SF} (20.1) < F_{SF, \text{MAX}} (55.9)$ ,

block does not move +  $F_{SF} = 20.1 \text{ N}$ ,  $\rightarrow$