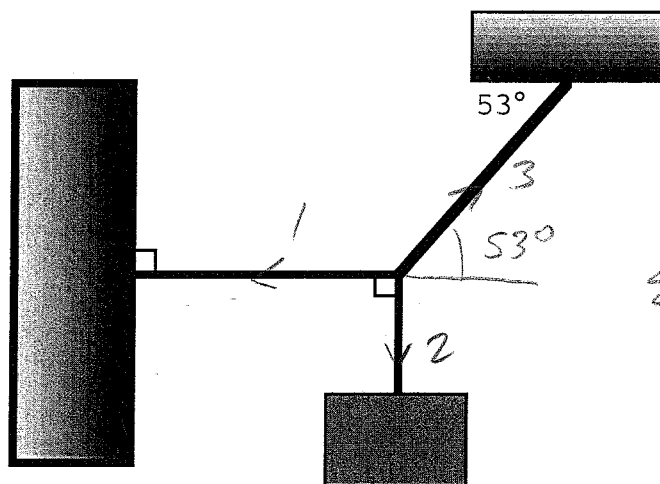


Physics 10154 - Exam #4A

Each problem is worth 50 points. Partial credit will be given provided you show all work and are solving parts of the problem correctly. Points will be deducted if you don't show your work (or if some parts are incorrect) even if you get the right answer. Clearly indicate your answer with a circle or box and remember to include correct units and significant figures.

1. A 456-Newton cargo crate is hanging from a zipline as shown. Find the tension in each of the three segments of cable.



$$\Sigma F_x = F_3 \cos 53 - F_1 = 0$$

$$\Sigma F_y = F_3 \sin 53 - F_2 = 0$$

$$F_2 = \boxed{456 \text{ N}}$$

$$\text{So } F_3 = \frac{456}{\sin 53}$$

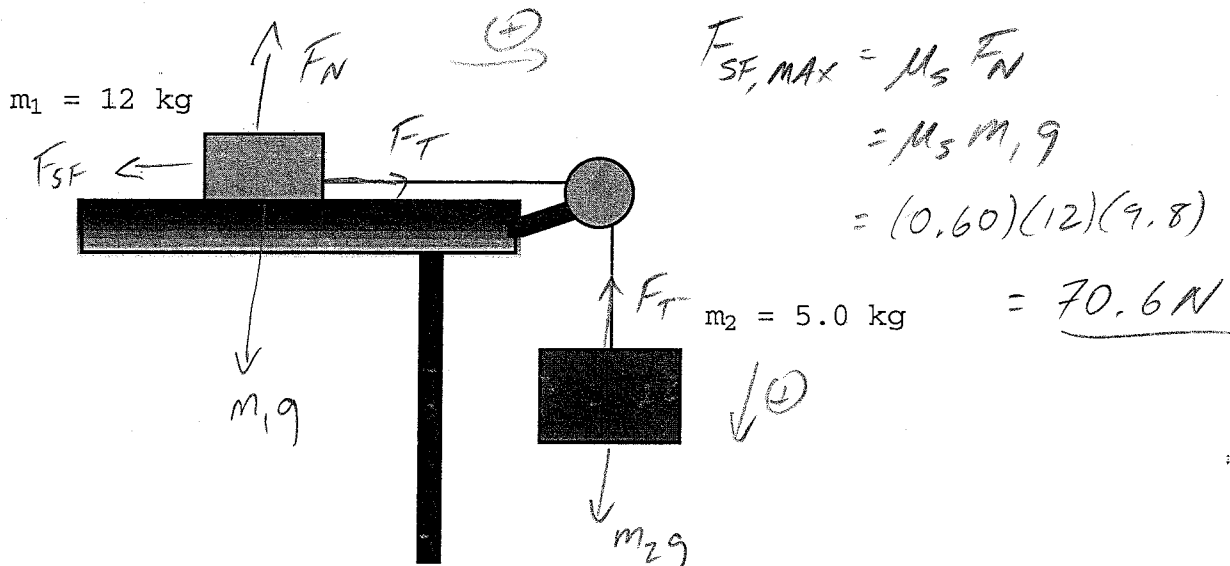
$$= \boxed{571 \text{ N}}$$

$$F_1 = F_3 \cos 53 = (571) \cos 53^\circ$$

$$= \boxed{344 \text{ N}}$$

2. The system below is released from rest. The coefficient of static friction between mass 1 and the table is 0.60. The coefficient of kinetic friction between mass 1 and the table is 0.35.

- Does it move? Justify your answer.
- If it moves, find the acceleration.
- If it doesn't move, find the force of static friction acting on mass 1.



$$\begin{aligned} \Sigma F_1 &= F_T - F_{SF} = 0 \\ \Sigma F_2 &= m_2 g - F_T = 0 \end{aligned} \quad \left. \begin{array}{l} \\ \end{array} \right\} F_T = m_2 g = 49 \text{ N}$$

so $F_{SF} = 49 \text{ N}$

Since $F_{SF} < F_{SF, MAX}$
 $49 < 70.6$
 System doesn't move