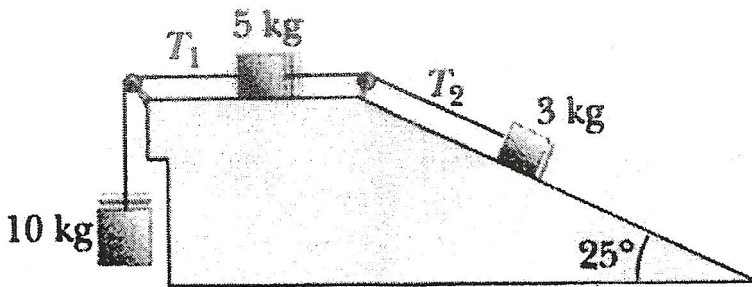


Newton's Laws
Acceleration Practice Problem

Directions: Complete the following problem in your group. Remember to show all of your work in order to receive full credit. Be sure to include all of the units, givens, and original equations used in each problem.

$\mu_k = .25$

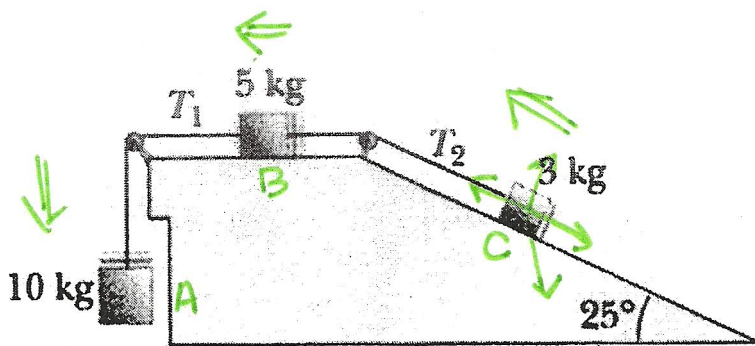
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$$T_1 = 98 - 10a$$

$$T_1 = 98 - 10(3.7 \text{ m/s}^2)$$

$$T_1 = 61 \text{ N}$$

$$T_2 = 3a + 19.086$$

$$T_2 = 3(3.7) + 19.086$$

$$T_2 = 30.186 \text{ N}$$

A

$$F_g = m(9.8 \text{ m/s}^2)$$

$$F_g = (10 \text{ kg})(9.8 \text{ m/s}^2)$$

$$F_g = 98 \text{ N}$$

B

$$F_N = F_g$$

$$F_N = m(9.8 \text{ m/s}^2)$$

$$F_N = (5 \text{ kg})(9.8 \text{ m/s}^2)$$

$$F_N = 49 \text{ N}$$

$$F_f = \mu_k F_N$$

$$F_f = (.25)(49 \text{ N})$$

$$F_f = 12.25 \text{ N}$$

$$F_{\text{net}} = T_1 - T_2 - F_f$$

$$m_B a = T_1 - T_2 - 12.25 \text{ N}$$

$$(5 \text{ kg})a = T_1 - T_2 - 12.25$$

C

$$F_g = m(9.8 \text{ m/s}^2)$$

$$F_g = (3)(9.8 \text{ m/s}^2)$$

$$F_g = 29.4 \text{ N}$$

$$F_N = F_{gy}$$

$$F_N = 29.4 \cos 25$$

$$F_N = 26.645 \text{ N}$$

$$F_f = \mu F_N$$

$$F_f = (.25)(26.645 \text{ N})$$

$$F_f = 6.66136 \text{ N}$$

$$F_{\text{net}} = T_2 - F_{gx} - F_f$$

$$m_C a = T_2 - F_g \sin 25 - 6.66$$

$$3a = T_2 - 12.42 - 6.66$$

$$3a = T_2 - 19.086$$

$$T_2 = 3a + 19.086$$

$$5a = (98 - 10a) - (3a + 19.086) - 12.25$$

$$5a = 98 - 10a - 3a - 19.086 - 12.25$$

$$18a = 66.6636 \text{ N}$$

$$a = 3.7 \text{ m/s}^2$$