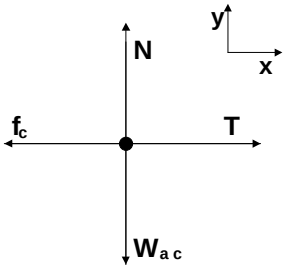
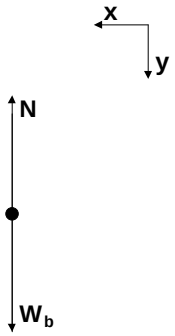
25. Blocks *A* and *B* have weights of 44 N and 22 N respectively.

(a) What is the minimum weight (block *C*) that must be placed on A to keep it from sliding, if μ_s between A and the table is 0.20.

(b) Block C suddenly is lifted off A. What is the acceleration of block A, if μ_k between A and the table is 0.15?

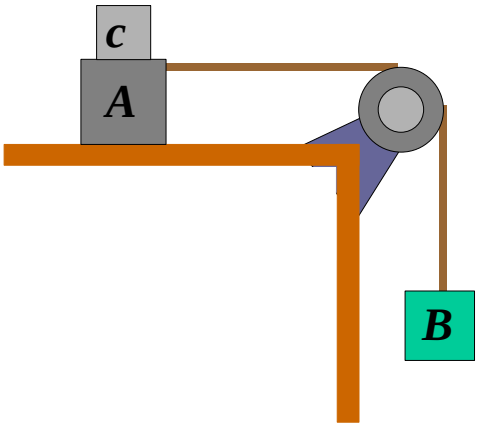
Free Body Diagram





$f_{s=m_s N}$

$f_{s=m_s N}$



$\sum F_x = ma_x$

$T - f_s = W_{ac} a_x$

$T - m_s N = W_{ac} a_x$

$a = 0$

$T = m_s N$

$T = (0.20)(110N)$

$T = 22N$

$\sum F_{y=ma_y}$

$W_b - T = \frac{W_b}{g} a_y$

$a = 0$

$W_b = T$

$W_b = m_s N$

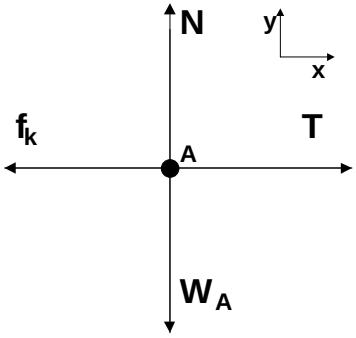
$22N = (0.20)N$

$N = 110N$

$N = W_{ac}$

$110N = 44N + W_c$

$a) \underline{W_c = 66N}$



$\sum F_x = ma_x$

$T - f_k = \frac{W_a}{g} a_x$

$T - m_k N = \frac{W_a}{g} a_x$

$N - W_a = 0$

$N = W_a$

$(T - m_k N) + (W_b - T) = \frac{W_{ab}}{g} a$

$W_b - m_k W_a = \frac{W_{ab}}{g} a$

$\frac{g(W_b - m_k W_a)}{W_{ab}} = a$

$\frac{(9.8 m/s^2)(22N - (0.15)(44N))}{44N + 22N} = a$

$a = 2.287 m/s^2$

$b) \underline{a \approx 2.3 m/s^2}$