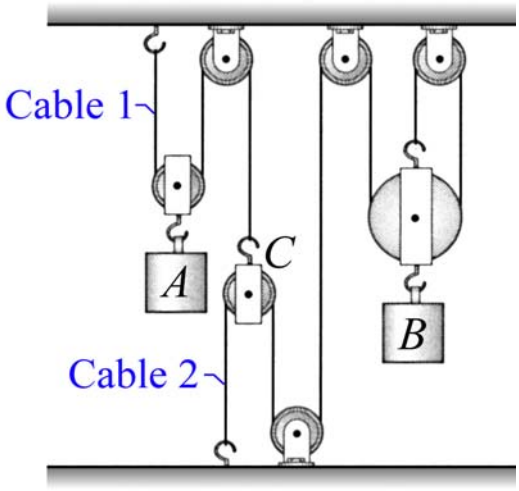
MEEG 2013 Quiz #2.m10

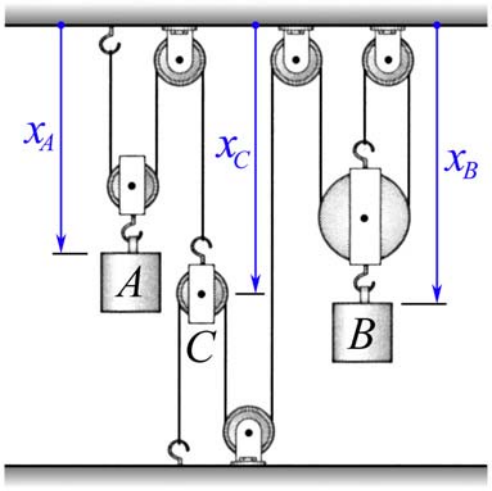
In the system shown, cylinder B of mass $m_B = 60$ kg moves with $\mathbf{a}_B = 0.8\ \text{m/s}^2 \downarrow$. Determine ($a$) the mass m_A of cylinder A, (b) the tensions T_1 and T_2 in cables 1 and 2, respectively.



$4x_A + 3x_B = k \qquad 4a_A + 3a_B = 0$

$\mathbf{a}_B = 0.8\ \text{m/s}^2 \downarrow \qquad a_B = +0.8\ \text{m/s}^2$

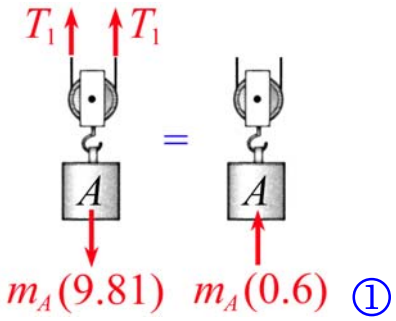
$a_A = -0.6\ \text{m/s}^2 \qquad \mathbf{a}_A = 0.6\ \text{m/s}^2 \uparrow$ ①



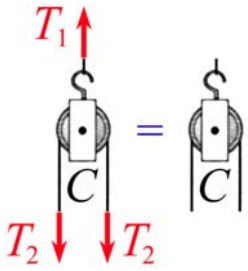
A: $\quad 2T_1 - m_A(9.81) = m_A(0.6)$

C: $\quad T_1 - 2T_2 = 0$

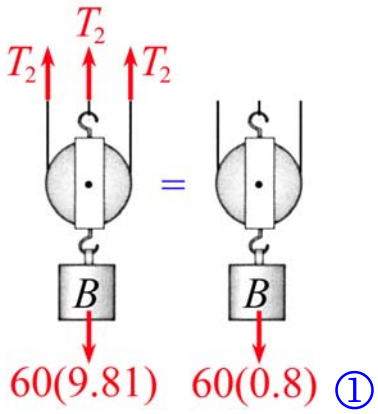
B: $\quad 3T_2 - 60(9.81) = -60(0.8)$ ③



①



①



①

$m_A = 69.2$ kg $\qquad T_1 = 360$ N $\qquad T_2 = 180.2$ N ③