**Given:** $m_A = 12 \text{kg}, m_B = 6 \text{kg}, \quad m_s = 0.12$

**Find:** Smallest value of $P$ for equilibrium

**Note:** Pulley can freely rotate

Impending motion: Block A $\downarrow$ Block B $\uparrow$

**Free-Body Diagrams**

$N = P$

$F = F_A N$

$W_A = m_A g$

$F = F_B N$

$W_B = m_B g$

$\sum F_y = 0: T_A + 2F_A - W_A = 0$

$T_A + 2F_A - m_A g = 0$

$T_A = m_A g - 2F_A$

$\sum F_y = 0: T_B - F_B - W_B = 0$

$T_B - F_B - m_B g = 0$

$T_B = m_B g + F_B$

But, $T_A = T_B$

$m_A g - 2F_A = m_B g + F_B$

$(m_A - m_B) g = 3m_s N$

$(12 \text{kg} - 6 \text{kg}) g = 3(0.12) N$

$N = \frac{60}{0.36} = 166.67 g = 166.67(9.81 \text{m/s}^2) = 163.5 N$

Since $P = N$, we have $P = 163.5 N$