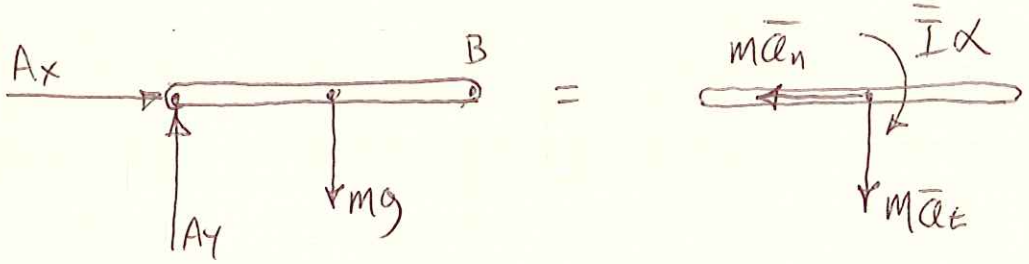
PROB. 16-84

FIND a_B, A_x, A_y



$\Sigma F_x = ma_x$: $A_x = m\bar{a}_n = 0$ SINCE $a_n = r\omega^2 = 0$

$\Sigma F_y = ma_y$: $a_y - mg = -m\bar{a}_t = -m\left(\frac{L}{2}\right)\alpha$

$A_y = m\left[g - \left(\frac{L}{2}\right)\alpha\right]$

$\Sigma M_A = \Sigma (M_A)_{EFF}$ $\circlearrowleft$: $-\left(\frac{L}{2}\right)mg = -\bar{I}\alpha - \left(\frac{L}{2}\right)m\bar{a}_t$

$\bar{I} = \frac{1}{12}mL^2$, $\bar{a}_t = \left(\frac{L}{2}\right)\alpha$

$\left(\frac{L}{2}\right)mg = \left(\frac{1}{12}mL^2\right)\alpha + \left(\frac{L}{2}\right)m \cdot \left(\frac{L}{2}\right)\alpha$

$\alpha \cdot mL^2\left(\frac{1}{12} + \frac{1}{4}\right) = \left(\frac{L}{2}\right)mg$

$$\boxed{\alpha = \frac{3}{2}\left(\frac{g}{L}\right)}$$

$a_B = r\alpha = L\left[\frac{3}{2}\left(\frac{g}{L}\right)\right]$ $\boxed{= \frac{3}{2}g \downarrow}$

$A_y = m\left[g - \left(\frac{L}{2}\right)\alpha\right] = m\left[g - \left(\frac{L}{2}\right)\cdot\frac{3}{2}\left(\frac{g}{L}\right)\right]$

$$\boxed{A_y = \frac{1}{4}mg \uparrow}$$