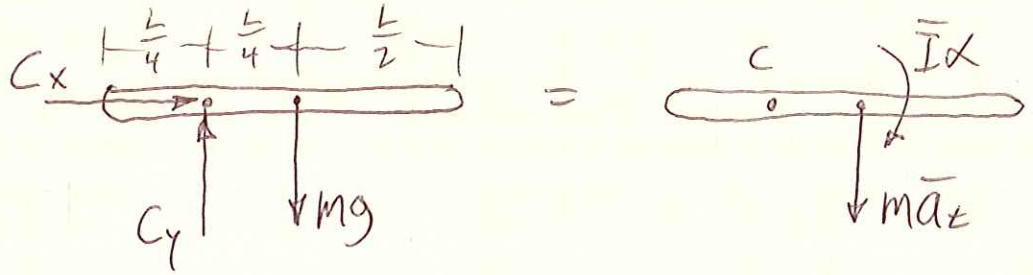
PROB. 16-85

FIND a_B, C_x, C_y



$\Sigma F_x = ma_x$: $\boxed{C_x = 0}$

$\Sigma F_y = ma_y$: $C_y - mg = -ma_t = -m\left(\frac{L}{4}\right)\alpha$

$C_y = m\left[g - \left(\frac{L}{4}\right)\alpha\right]$

$\Sigma M_C = \Sigma (M_C)_{EFF}$ $+\circlearrowleft$: $-\left(\frac{L}{4}\right)mg = -\left(\frac{L}{4}\right)ma_t - \bar{I}\alpha$

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

$\alpha \cdot mL^2\left(\frac{1}{16} + \frac{1}{12}\right) = \left(\frac{1}{4}\right)mLg \Rightarrow \boxed{\alpha = \frac{12}{7}\left(\frac{g}{L}\right)}$

$a_B = r\alpha = \left(\frac{3L}{4}\right)\left(\frac{12}{7}\cdot\frac{g}{L}\right) \boxed{= \frac{9}{7}g \downarrow}$

$C_y = m\left[g - \left(\frac{L}{4}\right)\left(\frac{12}{7}\cdot\frac{g}{L}\right)\right]$

$\boxed{C_y = \left(\frac{4}{7}\right)mg}$