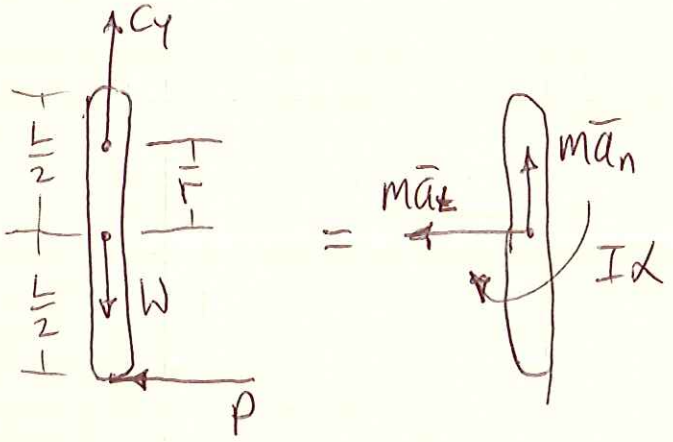
PROB. 16-79

$L = 0.9^m$, $m = 4^{kg}$, $P = 75^N$, FIND $\bar{r}$ FOR $C_x = 0$, FIND α



$\Sigma F_x = ma_x : -P = -m\bar{a}_t$

$P = m\bar{r}\alpha$, $\boxed{\bar{r} = \frac{P}{m\alpha}}$

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

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

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

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

$\alpha = \frac{6P}{mL} = \frac{6(75^N)}{(4^{kg})(0.9^m)} = \boxed{125\ \frac{RAD}{s^2}\ \curvearrowleft}$

$\bar{r} = \frac{(75^N)}{(4^{kg})(125\ \frac{RAD}{s^2})} = \boxed{0.15^m}$