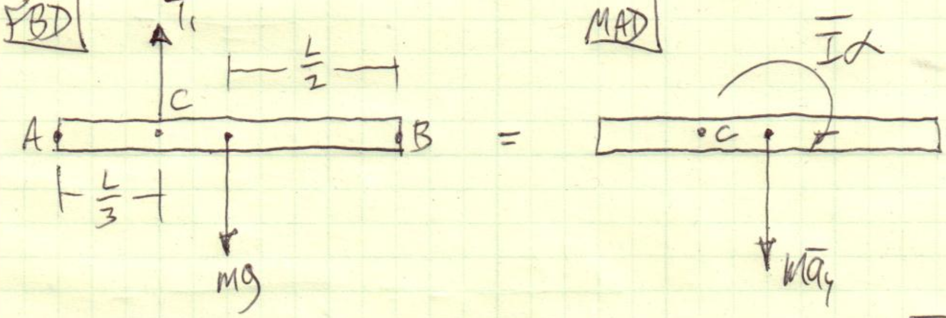
PROB. 16-64

FIND α, a_A, a_B



$$\Sigma F_y = m\bar{a}_y : \quad T_1 - mg = -m\bar{a}_y , \quad \bar{a}_y = g - \frac{T_1}{m}$$

$$\Sigma \vec{M}_G = \Sigma (\vec{M}_G)_{EFF} \quad +\circlearrowleft : \quad -\left(\frac{L}{6}\right) T_1 = -\bar{I}\alpha$$

$$T_1 = \frac{6\bar{I}\alpha}{L} = \frac{\frac{1}{12} mL^2 \cdot 6\alpha}{L} = \frac{1}{2} mL\alpha$$

FROM POINT C: $\bar{a}_y = r\alpha = \frac{L}{6} \cdot \alpha$

$$\left(\frac{L}{6}\alpha\right) = g - \frac{1}{m}\left(\frac{1}{2} mL\alpha\right)$$

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

$$\boxed{T_1} = \frac{1}{2} mL\left(\frac{3}{2} \cdot \frac{g}{L}\right) \boxed{= \frac{3}{4} mg}$$

$$\boxed{\bar{a}_y =} \; g - \frac{T_1}{m} = g - \frac{1}{m}\left(\frac{3}{4} mg\right) \boxed{= \frac{1}{4} g} \downarrow$$

$$\boxed{\vec{a}_A =} \; -\bar{a}_y + r\alpha = -\frac{1}{4} g + \left(\frac{L}{2}\right) \cdot \left(\frac{3}{2}\right)\left(\frac{g}{L}\right) \boxed{= \frac{1}{2} g \uparrow}$$

$$\boxed{\vec{a}_B =} -\bar{a}_y - r\alpha = -\frac{1}{4} g - \left(\frac{L}{2}\right) \cdot \frac{3}{2}\left(\frac{g}{L}\right) = \boxed{-g \downarrow}$$