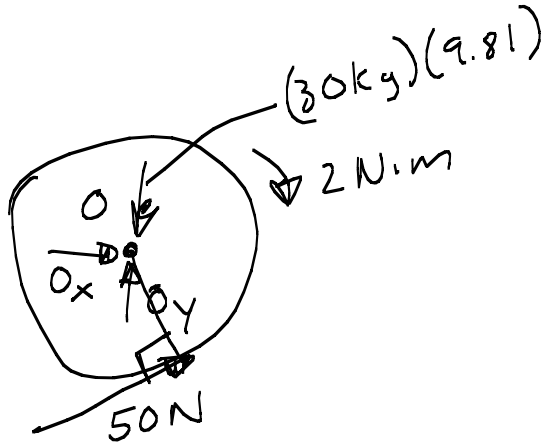
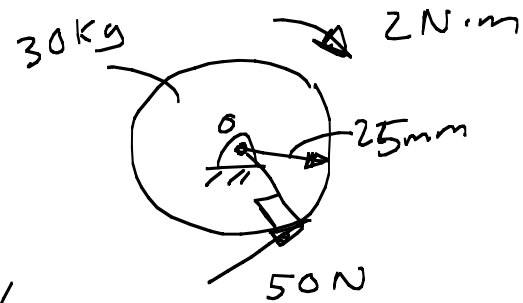


Problem 4

$$k_o = 0.15\text{m}$$

Determine: How long the torque must be applied to increase the rotational speed from 4 rad/s to 15 rad/s



$$I_o \alpha$$
$$I_o = m k_o^2$$

$$(+\sum M_o = I_o \alpha$$

$$2\text{ N}\cdot\text{m} - (50\text{ N})(0.025) = \left[(30\text{ kg})(0.15\text{ m})^2 \right] \alpha$$

$$\alpha = 1.11\text{ rad/s}^2$$

$$\omega = \omega_0 + \alpha_c t$$

$$15 \text{ rad/s} = 4 \text{ rad/s} + (1.11 \text{ rad/s}^2) t$$

$$t = 9.90 \text{ sec}$$