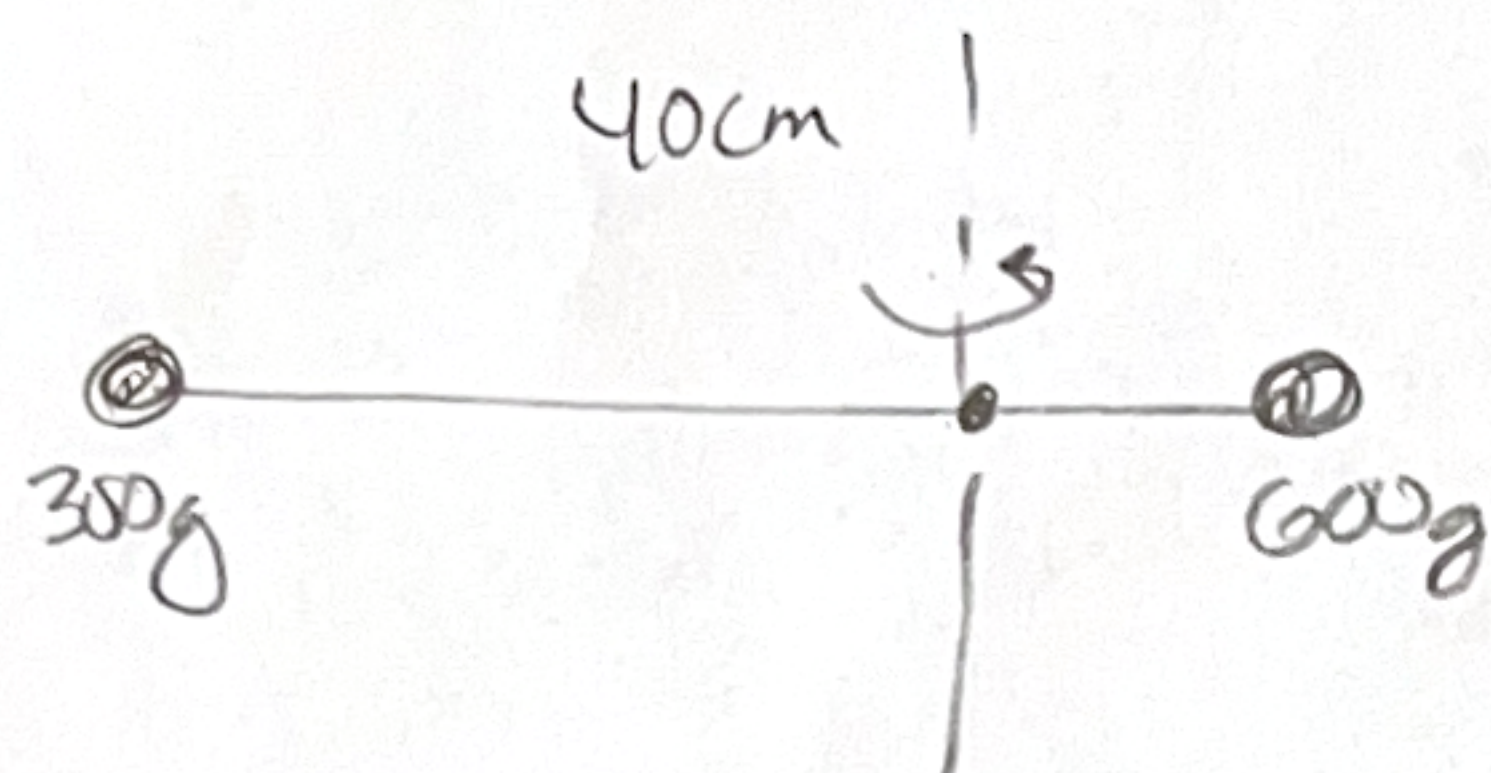


p. 332 #49



$$\omega = 100 \text{ rpm} = \left(\frac{2\pi \text{ rad}}{1 \text{ rev}} \right) \left(\frac{1 \text{ min}}{60 \text{ s}} \right) = 10.47 \text{ rad/s}$$

Find K

Find x_{cm} :

$$x_{cm} = \frac{m_1 x_1 + m_2 x_2}{M_1 + m_2}$$

$$= \frac{(300 \text{ g})(0) + (600 \text{ g})(.4 \text{ m})}{(300 \text{ g} + 600 \text{ g})}$$

$$= \boxed{.27 \text{ m}} \text{ from } 300 \text{ g object}$$

Find I:

$$m_1 = 300 \text{ g}$$

$$r_1 = .27 \text{ m}$$

$$m_2 = 600 \text{ g}$$

$$r_2 = .40 \text{ m} - .27 \text{ m} = .13 \text{ m}$$

$$I = m_1 r_1^2 + m_2 r_2^2$$

$$= (.3 \text{ kg})(.27 \text{ m})^2 + (.6 \text{ kg})(.13 \text{ m})^2$$

$$= .02187 + .01014$$

$$= \boxed{.032 \text{ kg} \cdot \text{m}^2}$$

Find kinetic energy:

$$K = \frac{1}{2} I \omega^2$$

$$= \frac{1}{2} (.032 \text{ kg} \cdot \text{m}^2) (10.47 \text{ rad/s})^2$$

$$= \boxed{1.8 \text{ J}}$$