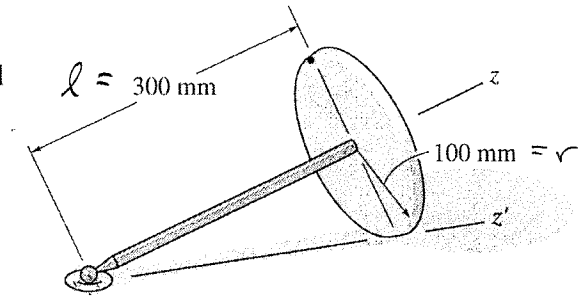


21-15.

Determine the moment of inertia of both the 1.5-kg rod and 4-kg disk about the  $z'$  axis.



$$I_z = 0 + \frac{1}{2} m_d r^2 = 0.02 \text{ kg}\cdot\text{m}^2$$

$$I_x = I_y = \frac{1}{3} m_r l^2 + \frac{1}{4} m_d r^2 + m_d l^2 = 0.415 \text{ kg}\cdot\text{m}^2$$

all products are zero:  $I_{xy} = I_{xz} = I_{yz} = 0$

$$\hat{u} = \sin\theta \hat{i} + \cos\theta \hat{k}$$

$$I_{z'} = I_{xx} u_x^2 + I_{yy} u_y^2 + I_{zz} u_z^2$$

$$\underbrace{-2I_{xy} u_x u_y - 2I_{yz} u_y u_z - 2I_{xz} u_x u_z}_{=0}$$

$$I_{z'} = I_x \sin^2\theta + I_z \cos^2\theta = 0.0595 \text{ kg}\cdot\text{m}^2$$

