



$$T_1 - m_1 g = -m_1 a_1$$

$$T_2 - m_2 g = m_2 a_2$$

$$\rightarrow T_1 - m_1 g = -m_1 R_1 \alpha \quad (1)$$

$$\rightarrow T_2 - m_2 g = m_2 R_2 \alpha \quad (2)$$

$$(3) \quad \sum \tau = T_1 R_1 - T_2 R_2 = I \alpha$$

$$a = R \alpha$$

Now have 3 equations w/ 3 unknowns
so substitute (1) and (2) into (3)
for T_1 and T_2 to get:

$$(-m_1 R_1 \alpha + m_1 g) R_1 - (m_2 R_2 \alpha + m_2 g) R_2 = I \alpha$$

$$\alpha = \frac{(m_1 R_1 - m_2 R_2) g}{(m_1 R_1^2 + m_2 R_2^2 + I)}$$

$$\alpha = \frac{((1 \text{ kg})(0.3 \text{ m}) - (0.6 \text{ kg})(0.2 \text{ m}))(9.8 \frac{\text{m}}{\text{s}^2})}{((1 \text{ kg})(0.3 \text{ m})^2 + (0.6 \text{ kg})(0.2 \text{ m})^2 + 1.7 \text{ kg m}^2)}$$

$$\boxed{\alpha = 1 \text{ rad/s}^2}$$

$$\text{then } T_1 = m_1 g - m_1 R_1 \alpha = (1 \text{ kg})(9.8 \text{ m/s}^2) - (1 \text{ kg})(0.3 \text{ m})(1 \frac{\text{rad}}{\text{s}^2}) = \boxed{9.5 \text{ N}}$$

$$T_2 = m_2 g + m_2 R_2 \alpha = (0.6 \text{ kg})(9.8 \text{ m/s}^2) + (0.6 \text{ kg})(0.2 \text{ m})(1 \frac{\text{rad}}{\text{s}^2}) = \boxed{6 \text{ N}}$$