

Determine the torque applied to a hoop that is rotated about its central axis of symmetry if $I = 1.50 \text{ kg m}^2$ and the hoop accelerates from rest to 10.0 rad/s in 10.0 s .

$$\tau = I\alpha$$

$$\omega = \omega_0 + \alpha t$$

$$\alpha = \frac{\omega - \omega_0}{t}$$

$$= \frac{10.0 \text{ rad/s} - 0}{10.0 \text{ s}}$$

$$= 1.0 \text{ rad/s}^2$$

$$\tau = (1.50 \text{ kg m}^2) 1.0 \text{ rad/s}^2$$

$$= \boxed{1.50 \text{ kg m}^2/\text{s}^2}$$