



HW # 10
Solution

$$\vec{\tau} = \vec{r} \times \vec{F}$$

$$\tau = r \cdot F \cdot \sin \theta$$

$$\tau_1 = r \cdot F \cdot \sin 0^\circ = 0$$

$$\tau_2 = -r \cdot F \cdot \sin 40^\circ = -3.285 \text{ N}\cdot\text{m}$$

$$\tau_3 = r \cdot F \cdot \sin 90^\circ = 2.975 \text{ N}\cdot\text{m}$$

Net torque $\tau_1 + \tau_2 + \tau_3 = -0.31 \text{ N}\cdot\text{m}$ clockwise torque.

10.2



$$r = 0.108 \text{ m} \cdot M = 0.18 \text{ kg}$$

$$(a) K = \frac{1}{2} M V^2 + \frac{1}{2} I \omega^2 = Mgh$$

$$\frac{1}{2} M (r\omega)^2 + \frac{1}{2} M r^2 \omega^2 = Mgh$$

$$\omega = \frac{\sqrt{gh}}{r} = \frac{\sqrt{9.8 \times 0.75}}{0.108} = 33.9 \text{ rad/s}$$

$$(b) V = \omega \cdot r = 33.9 \times 0.108 = 2.71 \text{ m/s}$$