

$$\begin{aligned}
 1. \quad \sum \vec{\tau} &= \vec{\tau}_1 + \vec{\tau}_2 \\
 &= -17.5 + 17.36 \\
 &= -0.14 \text{ N}\cdot\text{m} \\
 &= \underline{\underline{0.14 \text{ Nm [CW]}}}
 \end{aligned}$$

$$\begin{aligned}
 \vec{\tau}_1 &= -(35)(0.5) \\
 &= -17.5 \text{ N}\cdot\text{m} \\
 \vec{\tau}_2 &= (62)(0.28) \\
 &= 17.36 \text{ N}\cdot\text{m}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad \sum \vec{\tau} &= \vec{\tau}_1 + \vec{\tau}_2 \\
 &= -4.05 + 3.38 \\
 &= \underline{\underline{-0.67 \text{ N}\cdot\text{m}}} \\
 &= 0.67 \text{ N}\cdot\text{m [CW]}
 \end{aligned}$$

$$\begin{aligned}
 \vec{\tau}_1 &= -(4.5)(0.9) \\
 &= -4.05 \text{ N}\cdot\text{m} \\
 \vec{\tau}_2 &= (1.3)(0.9 + 1.7) \\
 &= 3.38 \text{ N}\cdot\text{m}
 \end{aligned}$$

$$\begin{aligned}
 3. \quad \sum \vec{\tau} &= \vec{\tau}_1 + \vec{\tau}_2 \\
 &= -454.7 + 315 \\
 &= -139.7 \text{ N}\cdot\text{m} \\
 &= \underline{\underline{1.4 \times 10^2 \text{ N}\cdot\text{m [CW]}}}
 \end{aligned}$$

$$\begin{aligned}
 \vec{\tau}_1 &= -(175)(\sin 60^\circ)(3) \\
 &= -454.7 \text{ N}\cdot\text{m} \\
 \vec{\tau}_2 &= (210)(\sin 30^\circ)(3) \\
 &= 315 \text{ N}\cdot\text{m}
 \end{aligned}$$

$$4. a) \sum \vec{\tau} = 0 \\ = \vec{\tau}_1 + \vec{\tau}_2$$

$$\vec{\tau}_1 = \vec{F}g \cdot 0.4 \\ = -(175)(9.8)(0.4) \\ = -686 \text{ N}\cdot\text{m}$$

$$\vec{\tau}_2 = \vec{F}(2.3)$$

$$0 = -686 + 2.3\vec{F}$$

$$686 = 2.3\vec{F}$$

$$\vec{F} = \underline{\underline{298 \text{ N [up]}}}$$

$$b) \sum \vec{\tau} = 0 \\ = \vec{\tau}_1 + \vec{\tau}_2$$

$$\vec{\tau}_1 = (50)(9.8)(0.8) \\ = +392 \text{ N}\cdot\text{m}$$

$$\vec{\tau}_2 \left\{ \begin{array}{l} -\vec{F}(1.2 - 0.8) = -0.4\vec{F} \\ 0 = 392 - 0.4\vec{F} \\ \vec{F} = 980 \text{ N [down]} \\ @ 0.4 \text{ m from } \Delta \end{array} \right.$$

$$0 = 392 - 0.4\vec{F}$$

$$\vec{F} = 980 \text{ N [down]}$$

@ 0.4 m from Δ

$$-\vec{F}(1.2 + 0.8) = -2.0\vec{F}$$

$$0 = 392 - 2.0\vec{F}$$

$$\vec{F} = \frac{392}{2}$$

$$= \underline{\underline{196 \text{ N [up]}}}$$