

Pg. 203 11-15 all

$$\textcircled{1} F = \frac{35 \text{ N}\cdot\text{m}}{(0.25 \text{ m})(\sin 90)} = 140 \text{ N}$$

$$\textcircled{2} 550 = F \cdot L$$
$$\frac{550}{135} = \frac{135 \cdot L}{135} = 0.407 \text{ m}$$

$$\textcircled{3} T = F \cdot r \cdot \sin \theta$$
$$\frac{32.4}{232 \cdot 0.234} = \frac{232 \cdot 0.234 \cdot \sin \theta}{232 \cdot 0.234}$$
$$\sin \theta = 0.596817$$
$$\theta = \sin^{-1} 0.596817$$
$$\theta = 36.6^\circ$$

$$\textcircled{4} T = F \cdot r \cdot \sin \theta$$
$$T = 65(9.8)(18) \sin 55 = 93.92 \text{ N}\cdot\text{m}$$

$$\textcircled{5} T = 65(9.8)(18)(\sin 90) = 114.66 \text{ N}\cdot\text{m}$$

Vertical 0 N-m

$$\textcircled{1} \overset{\text{rotational acceleration}}{\alpha} = \frac{\Delta \omega}{\Delta t} \overset{\text{Angular velocity}}{\frac{3.5 - 1.5}{9.5}} = 0.21 \text{ rad/s}^2$$

$$\textcircled{2} \text{ Convert rpm to rad/s } \left(\frac{45 \text{ rev}}{1 \text{ min}} \right) \left(\frac{2\pi \text{ rad}}{1 \text{ rev}} \right) \left(\frac{1 \text{ min}}{60 \text{ s}} \right) = 4.71 \text{ rad/s}$$
$$V = r \cdot \omega (0.065 \text{ m})(4.71 \text{ rad/s}) = 0.306 \text{ m/s}$$

$$\textcircled{3} \quad d = r\theta$$

$$r = \frac{d}{\theta} = \frac{3.2\text{m}}{82\text{rad}} = 0.039\text{m}$$

$$C = 2\pi r = 2\pi(0.039\text{m}) = 0.245\text{m}$$

$$\textcircled{4} \quad \tau = Fr \cdot \sin \theta$$

$$\tau = (85\text{N})(0.258\text{m})(\sin 60^\circ)$$

$$\tau = 18.99\text{N}\cdot\text{m}$$

$$\textcircled{5} \quad \tau = Fr \cdot \sin \theta$$

$$\tau = (25\text{N})(0.45\text{m})(\sin 90^\circ)$$

$$\tau = 11.25\text{N}\cdot\text{m} \text{ counter-clockwise}$$