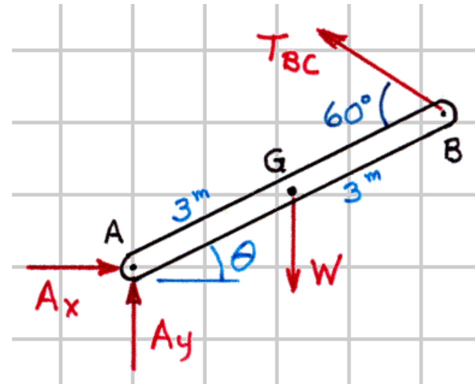
1-72

$$W = 250(9.81) = 2452.50 \text{ N}$$

(a) From a free-body diagram of the post *AB*, the equations of equilibrium give



$$\rightarrow \Sigma F_x = 0: \qquad A_x - T_{BC}\cos(60° - \theta) = 0$$

$$\uparrow \Sigma F_y = 0: \qquad A_y + T_{BC}\sin(60° - \theta) - W = 0$$

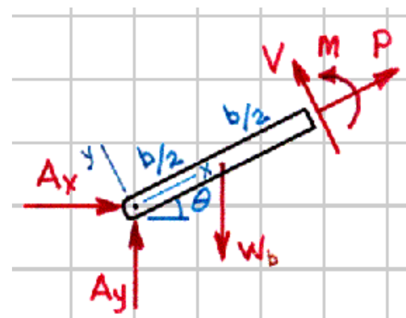
$$\circlearrowleft \Sigma M_B = 0: \qquad 6(T_{BC}\sin 60°) - (3\cos\theta)W = 0$$

$$T_{BC} = \left[\frac{(2452.50)(3\cos\theta)}{6\sin 60°}\right] \text{ N}$$

$$A_x = \left[T_{BC}\cos(60° - \theta)\right] \text{ N}$$

$$\left[A_y = 2452.50 - T_{BC}\sin(60° - \theta)\right] \text{ N}$$

Next, draw a free-body diagram of the lower portion of *ABC*. The weight of this portion is proportional to its length



$$W_b = \frac{Wb}{L} = \frac{2452.50b}{6} = (408.75b) \text{ N}$$

Then the equations of equilibrium give

$$\text{Z } \Sigma F_x = 0: \qquad P + A_x\cos\theta + A_y\sin\theta - W_b\sin\theta = 0$$

$$\text{^ } \Sigma F_y = 0: \qquad V - A_x\sin\theta + A_y\cos\theta - W_b\cos\theta = 0$$

$$\circlearrowleft \Sigma M_{cut} = 0: \qquad M + W_b\left[(b/2)\cos\theta\right] + A_x(b\sin\theta) - A_y(b\cos\theta) = 0$$

$$M = \left[A_y(b\cos\theta) - A_x(b\sin\theta) - 204.375b^2\cos\theta\right] \text{ N}\cdot\text{m} \text{ ....}\textbf{Ans.}$$

$$P = \left[(408.75b - A_y)\sin\theta - A_x\cos\theta\right] \text{ N } \text{.....}\textbf{Ans.}$$

$$V = \left[(408.75b - A_y)\cos\theta + A_x\sin\theta\right] \text{ N } \text{.....}\textbf{Ans.}$$