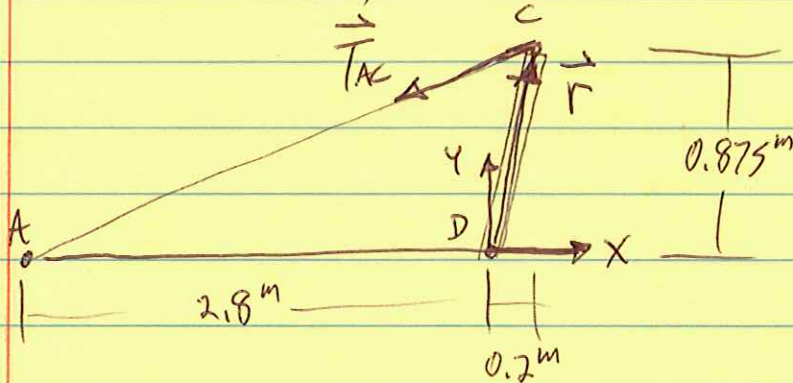


①

PROB. 3.12

$$M_D = 960 \text{ N}\cdot\text{m}, \quad d = 2.80 \text{ m}, \quad \text{FIND } T_{AC}$$



$$\text{LOCATE POINTS: } A(-2.8, 0) \text{ m}, \quad C(0.2, 0.875) \text{ m}$$

$$\vec{T}_{AC}: \quad dx = x_A - x_C = -2.8 - (0.2) = -3.0 \text{ m}$$

$$dy = y_A - y_C = 0 - 0.875 = -0.875 \text{ m}$$

~~$$F_x = F \frac{dx}{d}$$~~

$$d = \sqrt{3^2 + 0.875^2} = 3.125 \text{ m}$$

$$F_x = F \frac{dx}{d} = T_{AC} \left(\frac{-3}{3.125} \right) = -0.96 T_{AC}$$

$$F_y = F \frac{dy}{d} = T_{AC} \left(\frac{-0.875}{3.125} \right) = -0.28 T_{AC}$$

$$\vec{T}_{AC} = (-0.96 T_{AC}) \hat{i} + (-0.28 T_{AC}) \hat{j} \text{ N}$$

$$\vec{r} = (dx) \hat{i} + (dy) \hat{j} = (0.2) \hat{i} + (0.875) \hat{j} \text{ m}$$

$$\vec{M}_D = \vec{r} \times \vec{T}_{AC}$$

$$\vec{M}_D = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0.2 & 0.875 & 0 \\ -0.96 T_{AC} & -0.28 T_{AC} & 0 \end{vmatrix}$$

$$\vec{M}_D = [(0.2)(-0.28 T_{AC}) - (0.875)(-0.96 T_{AC})] \hat{k}$$

$$\vec{M}_D = (0.784 T_{AC}) \hat{k} \text{ N}\cdot\text{m} = (960) \hat{k} \text{ N}\cdot\text{m}$$

$$T_{AC} = 1224 \text{ N}$$