

$$\vec{T}_{AD} = \frac{T_{AD}}{7} (2\hat{i} + 3\hat{j} - 6\hat{k}) \text{ [kN]}$$

$$\vec{T}_{CD} = \frac{T_{CD}}{3} (-2\hat{i} - \hat{j} - 2\hat{k}) \text{ [kN]}$$

$$\vec{T}_{BD} = \frac{1.5}{6.5} (1.5\hat{i} - 2\hat{j} - 6\hat{k}) \text{ [kN]}$$

$$\vec{F} = 6\hat{k} \text{ [kN]}; \vec{W} = -W\hat{k} \text{ [kN]}$$

$$\sum F_x = \frac{2}{7} T_{AD} - \frac{2}{3} T_{CD} + \frac{(1.5)^2}{6.5} = 0$$

$$\sum F_y = \frac{3}{7} T_{AD} - \frac{1}{3} T_{CD} - \frac{2(1.5)}{6.5} = 0$$

$$\sum F_z = -\frac{6}{7} T_{AD} - \frac{2}{3} T_{CD} - \frac{6(1.5)}{6.5} + 6 - W = 0$$

Resolvamos el sistema

$$\underline{T_{AD} = 2.22 \text{ kN}; T_{CD} = 1.47 \text{ kN}; W = 1.73 \text{ kN}}$$

$$2.- \vec{r}_{C/B} = 6\hat{j} - \hat{k} \text{ [m]}$$

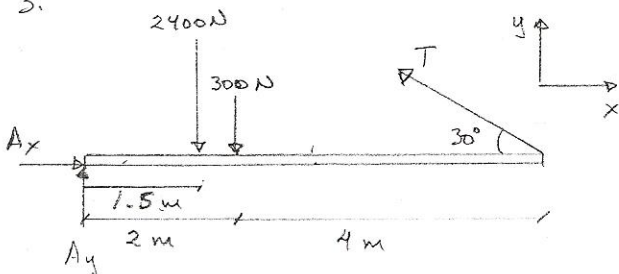
$$\vec{F} = 30\hat{j} - 40\hat{k} \text{ [N]}$$

$$\vec{M}_B = \vec{r}_{C/B} \times \vec{F} = -210\hat{i} \text{ [N}\cdot\text{m]}$$

$$\hat{u}_{AB} = \frac{1}{\sqrt{13}} (2, 0, -3)$$

$$\vec{M}_{AB} = -64.01\hat{i} + 96.92\hat{k} \text{ [N}\cdot\text{m]}$$

3.-



$$\sum F_x = A_x - \frac{\sqrt{3}}{2} T = 0$$

$$\sum F_y = A_y - 2700 + \frac{1}{2} T = 0$$

$$\sum M_A = -1.5(2400) - 2(300) + 6\left(\frac{1}{2} T\right) = 0$$

$$\underline{T = 1400 \text{ N}; A_x = 1212.43 \text{ N}; A_y = 2000 \text{ N}; A = 2338.8 \text{ N}}$$

$$4.- \bar{x} = \frac{x_1 m_1 + x_2 m_2}{m_1 + m_2}$$

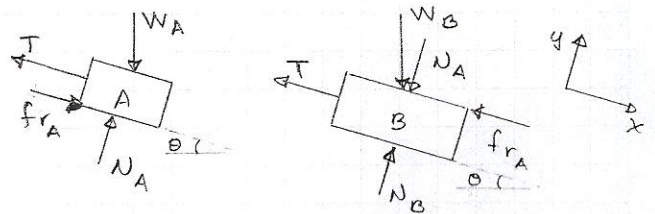
Como la densidad es constante

$$\bar{x} = \frac{x_1 \rho_1 V_1 + x_2 \rho_2 V_2}{\rho_1 V_1 + \rho_2 V_2}$$

$$\rho_2 = \frac{x_1 V_1 - \bar{x} V_1}{x_1 V_2 - x_2 V_2} \quad y \quad V_1 = V_2$$

$$\rho_2 = \left(\frac{x_1 - \bar{x}}{\bar{x} - x_2} \right) \rho_1; \quad \underline{\rho_2 = 13333 \text{ kg/m}^3}$$

5.-



Bloque A

$$\sum F_x = -T + f_{rA} + W_A \sin \theta = 0 \dots (1)$$

$$\sum F_y = N_A - W_A \cos \theta = 0 \rightarrow N_A = W_A \cos \theta$$

$$f_{rA} = \mu N_A$$

Bloque B

$$\sum F_x = -T - f_{rB} + W_B \sin \theta = 0 \dots (2)$$

$$\text{de (1)} \quad T = \mu W_A \cos \theta + W_A \sin \theta$$

$$\text{de (2)} \quad T = -\mu W_A \cos \theta + W_B \sin \theta$$

$$\Rightarrow 2\mu W_A \cos \theta = (W_B - W_A) \sin \theta$$

$$\tan \theta = \frac{2\mu W_A}{W_B - W_A}$$

$$\tan \theta = 0.6$$

$$\underline{\theta = 30.96^\circ}$$