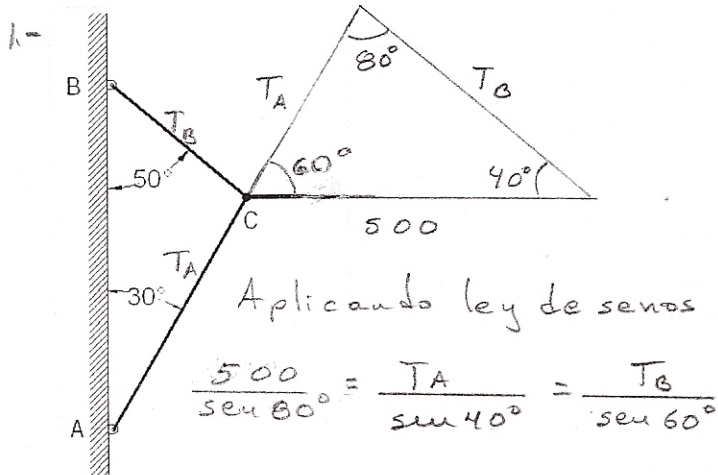


SOLUCIÓN: PRIMER EXAMEN FINAL COLEGIADO
ESTÁTICA

2014-1

Matufino



Aplicando ley de senos

$$\frac{500}{\sin 80^\circ} = \frac{T_A}{\sin 40^\circ} = \frac{T_B}{\sin 60^\circ}$$

$$T_A = 326.21 \text{ N}, T_B = 440.05 \text{ N}$$

2.- $\vec{F} = -30\hat{i} + 120\hat{j} + 40\hat{k} \text{ [N]}$

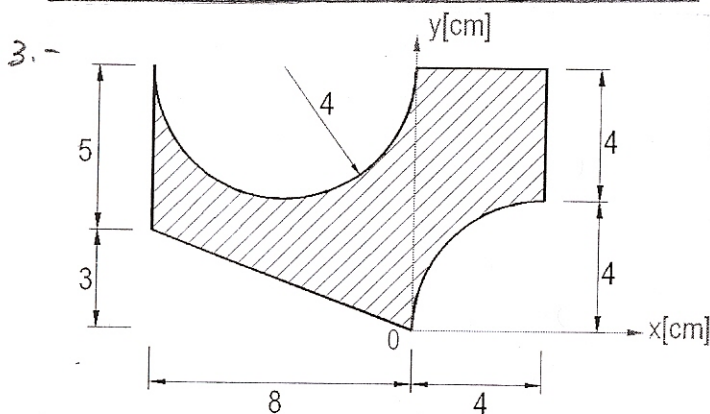
Con respecto al origen

$$\vec{r} = (3, 0, 0)$$

$$\vec{M}_O = \vec{r} \times \vec{F} = -120\hat{j} + 360\hat{k} \text{ [N.m]}$$

$$\hat{O}_{OA} = \frac{1}{\sqrt{153}} (3, 12, 0)$$

$$\vec{M}_{OA} = -28.23\hat{i} - 112.94\hat{j} \text{ [N.m]}$$

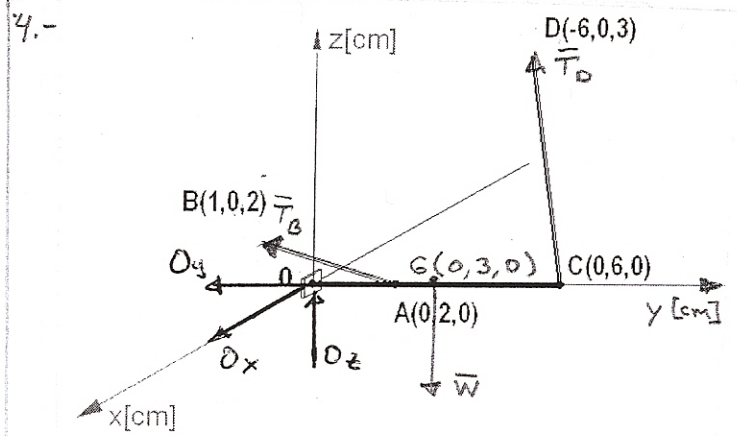


Considerando un rectángulo de 12x8 cm

$$\bar{x} = \frac{-2(96) - 4(-25.13) - 8.33(-12) + 2.30(-12.56)}{96 - 25.13 - 12 - 12.56}$$

$$\bar{y} = \frac{4(96) + 6.30(-25.13) + 1(-12) + 1.69(-12.56)}{46.30}$$

$$\bar{x} = -1.22 \text{ cm}, \bar{y} = 4.15 \text{ cm}$$



$$\sum F_x = \frac{1}{3} T_B - \frac{2}{3} T_D + O_x = 0$$

$$\sum F_y = -\frac{2}{3} T_B - \frac{2}{3} T_D - O_y = 0$$

$$\sum F_z = \frac{2}{3} T_B + \frac{1}{3} T_D + O_z - 130 = 0$$

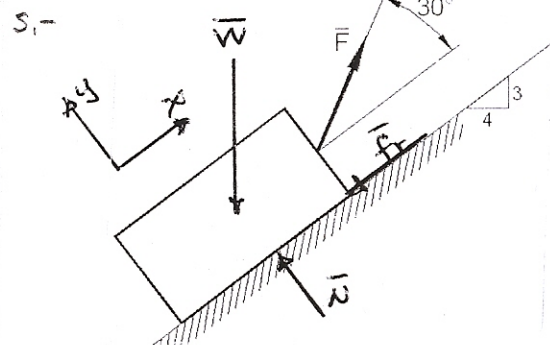
$$\sum M_{xx} = \frac{4}{3} T_B + 2 T_D - 390 = 0$$

$$\sum M_{zz} = -\frac{2}{3} T_B + 4 T_D = 0$$

Resolviendo el sistema

$$T_B = 233.88 \text{ [N]}; T_D = 38.98 \text{ [N]}$$

$$O_x = -51.97 \text{ [N]}; O_y = 181.91 \text{ [N]}; O_z = -38.91 \text{ [N]}$$



$$\sum F_x = \frac{\sqrt{3}}{2} F - f_r - \frac{3}{5} W = 0$$

$$\sum F_y = N - \frac{4}{5} W + \frac{1}{2} F = 0$$

$$N = 6 \text{ [N]} \text{ y } f_r = \mu N = 5.32 \text{ [N]}$$

$$\mu = 0.88$$