

1. $F = G \frac{M_1 M_2}{d^2}$

$F = G \frac{(5.98 \times 10^{24})(1.9 \times 10^{27})}{(6.287 \times 10^{11})^2}$

$\therefore F = 2.874 \times 10^{28} \text{ G N}$

2. $\vec{P} = 900 \vec{E}_{0A} = 900 \left(\frac{i+4j+8k}{9} \right)$

$\vec{P} = 100i + 400j + 800k \text{ N}$

$\vec{Q} = 1400 \vec{E}_{0B} = 1400 \left(\frac{-2i+3j+6k}{7} \right)$

$\vec{Q} = -400i + 600j + 1200k \text{ N}$

$\vec{R} = \vec{P} + \vec{Q} = -300i + 1000j + 2000k$

$\therefore |\vec{R}| = 2256.10 \text{ N}$

$\theta_{xx} = \arccos \frac{-300}{2256.10} = 97.64^\circ$

$\theta_{yy} = \arccos \frac{1000}{2256.10} = 63.69^\circ$

$\theta_{zz} = \arccos \frac{2000}{2256.10} = 27.56^\circ$

3. $\vec{M}_0^R = (10i - 5j) \times (-0.6Ri - 0.8Rj)$

$\vec{M}_0^R = -11Rk = -220k$

$-11R = -220 \Rightarrow R = 20 \text{ N}$

$\therefore \vec{R} = -12i - 16j \text{ N}$

$\vec{F}_1 + \vec{F}_2 + \vec{F}_3 + \vec{F}_4 + \vec{F}_5 = \vec{R}$

$-20i - 10j + \vec{F}_3 + \vec{0} = -12i - 16j$

$\therefore \vec{F}_3 = 8i - 6j \text{ N}$

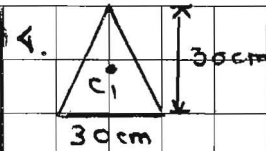
$\vec{M}_0^{SA} = (a_j) \times (-20i) + (-4i) \times (-10j)$

$+ (-j) \times (8i - 6j) - 32k = -220k$

$\vec{M}_0^{SA} = (20a + 16)k = -220k$

$20a + 16 = -220 \Rightarrow a = -11.8 \text{ m}$

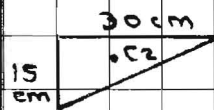
$\therefore P(a, -11.8) \text{ m}$ es un punto del soporte de \vec{F}_1



$A_1 = 450 \text{ cm}^2$

$\bar{x}_1 = 15 \text{ cm}$

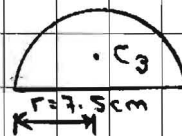
$\bar{y}_1 = 25 \text{ cm}$



$A_2 = 225 \text{ cm}^2$

$\bar{x}_2 = 10 \text{ cm}$

$\bar{y}_2 = 10 \text{ cm}$



$A_3 = 88.357 \text{ m}^2$

$\bar{x}_3 = 15 \text{ cm}$

$\bar{y}_3 = 18.183 \text{ cm}$

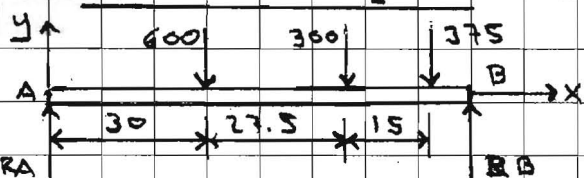
$A = 586.643 \text{ m}^2$

$Q_x = 11893.404 \quad Q_y = 7674.645$

$\therefore \bar{x}_c = 13.082 \text{ cm}; \bar{y}_c = 20.273 \text{ cm}$

5. $\vec{F} = -600j - 300j - 375j$

a) $\vec{F} = -1275j \text{ N}$



$+600(30) + 300(57.5) + 375(72.5) = 1275d$

b) $d = 48.97 \text{ cm}$ a partir de A

$\sum F_y = 0; R_A + R_B - 1275 = 0 \quad \text{--- (1)}$

$\sum M_A = 0; R_B(80) - 600(30) - 300(57.5) - 375(72.5) = 0$

c) $R_B = 780.46 \text{ N}$

de (1): c) $R_A = 494.54 \text{ N}$

6. Bloque A: $\sum F_y = 0; N = W_A$

$\sum F_x = 0; T - MWA; T = 0.5 \text{ N}$

Bloque B: $\sum F_x = 0; W_B - T = 0$

$\therefore W_B = 0.5 \text{ N}$