PAUTA C2.1 P2 PRIMAVERA 2009

$P_x = 10^5$ N
$P_y = 2 \cdot 10^5$ N
$P_z = -3 \cdot 10^5$ N
$D = 0{,}03$ m
$d_x = 0{,}7$ m
$d_y = 0{,}5$ m

σ PUNTO A

$$\sigma_{N/A} = \frac{P_x}{A} = \frac{4P_x}{\pi D^2} = \frac{4 \cdot 10^5}{\pi\, 0{,}03^2} = 1{,}4147 \cdot 10^8 \ \frac{N}{m}$$

2 ptos

$$\sigma_{M/A} = \frac{-M_y}{I} = \frac{-P_y \cdot d_x \cdot D/2}{I} = \frac{-32 P_y d_x}{\pi D^3}$$

$$\sigma_{M/A} = \frac{-32 \cdot 2 \cdot 10^5 \cdot 0{,}7}{\pi\, 0{,}03^3} = -5{,}2816 \cdot 10^{10} \left[\frac{N}{m^2}\right]$$

2 pts

$$\sigma_{TOTAL/A} = \sigma_{N/A} + \sigma_{M/A} = 1{,}4147 \cdot 10^8 - 5{,}2816 \cdot 10^{10}$$

$$\boxed{\sigma_{TOTAL/A} = -5{,}2674 \cdot 10^{10} \left[\frac{N}{m^2}\right]}$$

1 pto

σ PUNTO D

$$\sigma_{N/D} = \frac{P_x}{A} = 1{,}4147 \cdot 10^8 \left[\frac{N}{m^2}\right] \leftarrow 1 \text{ pto.}$$

$$\sigma_{M/Dz} = \frac{-M_y}{I} = \frac{-32 P_z \cdot d_z}{\pi D^3} = \frac{32 \cdot 3 \cdot 10^5 \cdot 0{,}7}{\pi (0{,}03)^3} = 7{,}9223 \cdot 10^{10} \left[\frac{N}{m^2}\right]$$

$$\sigma_{M/Dx} = \frac{M_x Y}{I} = \frac{+32 \cdot P_x \cdot d_z}{\pi D^3} = \frac{32 \cdot 10^5 \cdot 0{,}5}{\pi\, 0{,}03^3} = 1{,}88628 \cdot 10^{10}$$

2 ptos

2 ptos

$$\boxed{\sigma_{TOTAL/D} = \sigma_{M/Dz} + \sigma_{M/Dx} + \sigma_{N/D} = 9{,}822273 \cdot 10^{10} \left[\frac{N}{m^2}\right]} \leftarrow 1 \text{ pto.}$$

τ PUNTO A

$$\tau_{V/A} = \frac{4V}{3A} = \frac{16P_z}{3\pi D^2} = -\frac{16\,3\,10^5}{3\pi\,0{,}03^2} = -5{,}6588\cdot10^8\ \frac{N}{m} \quad \leftarrow 2\text{ ptos.}$$

$$\tau_{T/A} = \frac{T_r}{J} = \frac{T\cdot16}{\pi D^3} = -\frac{P_y\cdot dz\cdot16}{\pi D^3} = -\frac{2\cdot10^5\cdot0{,}5\cdot16}{\pi\cdot0{,}03^3}$$

$$\tau_{T/A} = -1{,}8863\cdot10^{10}\left[\frac{N}{m}\right] \quad \} \ 2\text{ ptos.}$$

$$\tau_{TOTAL/A} = \tau_{V/A} - \tau_{T/A} = -1{,}942871\cdot10^{10}\left[\frac{N}{m^2}\right] \quad \leftarrow 1\text{ pto.}$$

τ PUNTO D

$$\tau_{V/D} = \frac{4V}{3A} = \frac{16P_y}{3\pi D^2} = \frac{16\cdot2\cdot10^5}{3\cdot\pi\cdot0{,}03^2} = 3{,}7726\cdot10^8\ \frac{N}{m^2}$$

$\leftarrow$ 2 ptos

$$\tau_{T/D} = \frac{T_r}{J} = \frac{16T}{\pi D^3} = \frac{16P_y\,dz}{\pi D^3}$$

$$\tau_{T/D} = 1{,}8863\cdot10^{10}\left[\frac{N}{m^2}\right] \quad \} \ 1\text{ pto.}$$

$$\tau_{TOTAL/D} = \tau_{V/D} + \tau_{T/D} = 1{,}92403\cdot10^{10}\left[\frac{N}{m^2}\right] \quad \leftarrow 1\text{ pto}$$

Ptos Totales = 20