

3.

$$\sigma_x = \sigma_t = \frac{pd}{4t} = \frac{2.4 \times 10^6 \times 0.12}{4 \times 0.0025} = 28.8 \times 10^6 \text{ N/m}^2$$

$$\sigma_x = \underline{28.8 \text{ MPa}}$$

$$\sigma_y = \sigma_\theta = \frac{pd}{2t} = \underline{57.6 \text{ MPa}}$$

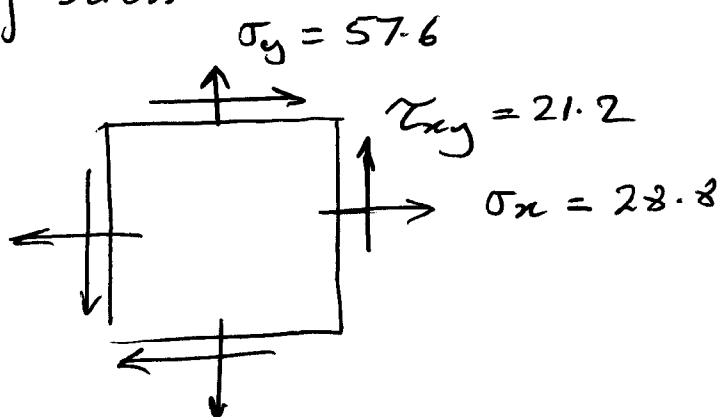
Torsional shear stress τ_{xy} given by :

$$\tau \cdot \pi D t \cdot \frac{D}{2} = M_T$$

$$\therefore \tau = \frac{2M_T}{\pi D^2 t} = \frac{2 \times 1.2 \times 10^3}{\pi \times 0.12^2 \times 0.0025}$$

$$\tau_{xy} = \underline{21.2 \text{ MPa}}$$

Components of Stress
(MPa)



Principal planes defined by ϕ given by:

$$\tan 2\phi = \frac{2\tau_{xy}}{\sigma_x - \sigma_y}$$