Remarks: See §5.4.3, example 2, pages 350 till 355
See §6.2, pages 415 till 426
See §6.3.1, pages 427 till 437

Answer:

a. $\tau = 6,25\ \text{N/mm}^2$

b. $\tau_{\text{max}} = 2,5\ \text{N/mm}^2$

c. $\tau_{\text{max}} = 8,75\ \text{N/mm}^2$

d. $\sigma_{\text{max}} = 25,6\ \text{N/mm}^2$

Explanation:

Loads in cross-section A:
$M_\text{t} = 15,7\ \text{kNm}$; $V = 15,7\ \text{kN}$; $M = 31,4\ \text{kNm}$; $N = 0$

Cross-section properties:
$I_p = 160\pi \times 10^6\ \text{mm}^4$, $I = \frac{1}{2} I_\text{p} = 80\pi \times 10^6\ \text{mm}^4$;
$A_\text{m} = 40\pi \times 10^3\ \text{mm}^2$
For half-section: $S^\text{a} = z^\text{a} \cdot A^\text{a} = \dfrac{2R}{\pi} \cdot \pi R t = 800 \times 10^3\ \text{mm}^3$

a. $\tau = \dfrac{M_t r}{I_\text{p}} = \dfrac{(15,7 \times 10^6\ \text{Nmm})(200\ \text{mm})}{160\pi \times 10^6\ \text{mm}^4} = 6,25\ \text{N/mm}^2$, of

$$\tau = \frac{M_\text{t}}{2A_\text{m} t} = \frac{15,7 \times 10^6\ \text{Nmm}}{2 \times (40\pi \times 10^3\ \text{mm}^2)(10\ \text{mm})}$$

b. On the vertical line of symmetry $\tau = 0$.
The maximum shear stress is at the height of the normal centre:

$$\tau_{\text{max}} = \frac{VS^\text{a}}{b^\text{a} I} = \frac{(15,7 \times 10^3\ \text{N})(800 \times 10^3\ \text{mm}^3)}{(20\ \text{mm})(80\pi \times 10^6\ \text{mm}^4)} = 2,5\ \text{N/mm}^2$$

c. At the left side of the tube the shear stress due to shear force and torsional moment act in the same direction:
$\tau_{\text{max}} = 6,25\ \text{N/mm}^2 + 2,5\ \text{N/mm}^2 = 8,75\ \text{N/mm}^2$.

d. $\sigma_{\text{max}} = \dfrac{(31,4 \times 10^6\ \text{Nmm})(205\ \text{mm})}{80\pi \times 10^6\ \text{mm}^4} = 25,6\ \text{N/mm}^2$
Tension in the upper side and compression in the lower side.