Remarks: See §5.4.3, pages 345 till 355
See §6.3.1, pages 427 till 437
See §6.4, example 5, pages 458 till 460

Answers:

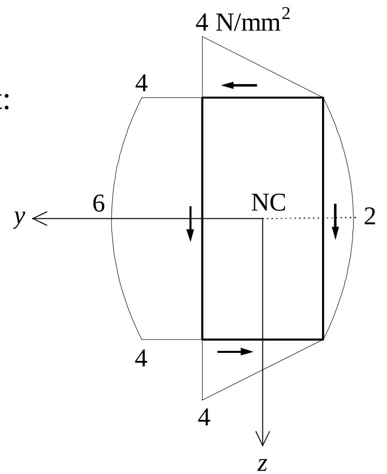
a. $V_z = 48$ kN
$M_t = 5,76$ kNm

c. $\tau_{\text{max;flange}} = 2\text{ N/mm}^2$
$\tau_{\text{max;}web} = 4\text{ N/mm}^2$

d. $\tau = 2\text{ N/mm}^2$

e. See the figure to the right:

f. $\tau_{\text{max}} = 6\text{ N/mm}^2$



Explanation:

b. units in mm:

$$I_{zz} = 2\left\{\tfrac{1}{12}\times 18\times 400^3 + 200\times 18\times 200^2\right\} = 480\times 10^6\text{ mm}^4$$

c. The shear stress in the flanges varies linearly; maximum in the corner:

$$\tau_{\text{max}} = \frac{(48\times 10^3\text{ N})(720\times 10^3\text{ mm}^3)}{(2\times 18\text{ mm})(480\times 10^6\text{ mm}^4)} = 2\text{ N/mm}^2$$

The shear stress in the webs varies parabolic; maximum at $z = 0$:

$$\tau_{\text{max}} = \frac{(48\times 10^3\text{ N})(1440\times 10^3\text{ mm}^3)}{(2\times 18\text{ mm})(480\times 10^6\text{ mm}^4)} = 4\text{ N/mm}^2$$

d. The shear stress is constant and the same for webs and flanges (Bredt):

$$\tau = \frac{5,76\times 10^6\text{ Nmm}}{2\times(400\times 200\text{ mm}^2)(18\text{ mm})} = 2\text{ N/mm}^2$$

f. $\tau_{\text{max}} = 6\text{ N/mm}^2$; at the height of the NC, in the left web.