Remarks: See §5.5, example 1, pages 368 till 374

Answers:

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

$\tau_{\text{max;}web} = 5\ \text{N/mm}^2$

d. $R_{\text{flange}} = 2,4\ \text{kN}$

$R_{web} = 11,2\ \text{kN}$

e. 64,3 mm left from the web

f. On the symmetric axis(*y*-as), 64,3 mm left from the web.

Explanation:

c. The shear stress in the bottom and top flanges varies linearly :

$$\tau_{\text{max}} = \frac{(11,2\times10^3\ \text{N})(360\times10^3\ \text{mm}^3)}{(16\ \text{mm})(126\times10^6\ \text{mm}^4)} = 2\ \text{N/mm}^2$$

The shear stress distribution in the web is parabolic:

$$\tau_{\text{max}} = \frac{(11,2\times10^3\ \text{N})(450\times10^3\ \text{mm}^3)}{(8\ \text{mm})(126\times10^6\ \text{mm}^4)} = 5\ \text{N/mm}^2$$

$\tau_{corner} = 4\ \text{N/mm}^2$ (‘flow-in’ = ‘flow-out’)

d $R_{\text{flange}} = \tfrac{1}{2}(150\ \text{mm})(2\ \text{N/mm}^2)(16\ \text{mm}) = 2{,}4\ \text{kN}$

$R_{web} = (300\ \text{mm})(8\ \text{mm})\left\{\tfrac{2}{3}(1\ \text{N/mm}^2) + (4\ \text{N/mm}^2)\right\} = 11,2\ \text{kN}$

e. The shear forces in the flange form a couple:

$R_{\text{flange}} \times h = 0,72\times10^6\ \text{Nmm}$

The line of action of the shear force is found at a distance e left from the web

$$e = \frac{0,72\times10^6\ \text{Nmm}}{11,2\times10^3\ \text{N}} = 64,3\ \text{mm}$$