Remarks: See §4.8, pages 198 till 203

Answers:

a. $N = -27$ kN
$M_y = -0,81$ kNm
$M_z = +2,43$ kNm

b. $\sigma_{topleft} = -17,5$ N/mm^2
$\sigma_{topright} = -2,5$ N/mm^2
$\sigma_{bottomleft} = -2,5$ N/mm^2
$\sigma_{bottomright} = +12,5$ N/mm^2

d. The equation for the neutral axis: $3y - z + (30 \text{ mm}) = 0$

Explanation:

$A = 10,8 \times 10^3$ mm^2; $I_{yy} = 3,24 \times 10^6$ mm^4;
$I_{zz} = 29,16 \times 10^6$ mm^4

a. $M_y = Ne_y = (-27 \text{ kN})(+0,030 \text{ m}) = 0,81$ kNm
$M_z = Ne_z = (-27 \text{ kN})(-0,090 \text{ m}) = +2,43$ kNm

b. $\sigma(y,z) = \frac{N}{A} + \frac{M_y y}{I_{yy}} + \frac{M_z z}{I_{zz}}$

After working this out:

$\sigma(y,z) = -(2,5 \text{ N/mm}^2) - (0,25 \text{ N/mm}^3) \times y + (83,33 \times 10^{-3} \text{ N/mm}^3) \times z$

d. The equation of the neutral axis comes from $\sigma(y,z) = 0$