

Remarks: See §2.2.1, pages 19 till 21
 See §2.3, pages 24 till 26
 See §2.6, pages 34 onwards

Hint:

The truss is symmetric about the point of application of the force. It is therefore sufficient to calculate for truss members (1) to (5).

Answers:

a. $\sigma^{(1)} = -90 \text{ N/mm}^2$
 $\sigma^{(2)} = 0$
 $\sigma^{(3)} = +150 \text{ N/mm}^2$
 $\sigma^{(4)} = -120 \text{ N/mm}^2$
 $\sigma^{(5)} = -180 \text{ N/mm}^2$

b. $\varepsilon^{(1)} = -1,29 \text{ ‰}$
 $\varepsilon^{(2)} = 0$
 $\varepsilon^{(3)} = +2,15 \text{ ‰}$
 $\varepsilon^{(4)} = -1,71 \text{ ‰}$
 $\varepsilon^{(5)} = -2,57 \text{ ‰}$

c. $\Delta\ell^{(1)} = -2,7 \text{ mm}$
 $\Delta\ell^{(2)} = 0$
 $\Delta\ell^{(3)} = +7,5 \text{ mm}$
 $\Delta\ell^{(4)} = -4,8 \text{ mm}$
 $\Delta\ell^{(5)} = -5,4 \text{ mm}$

Explanation:

$N^{(1)} = -135 \text{ kN}$
 $N^{(2)} = 0$
 $N^{(3)} = +225 \text{ kN}$
 $N^{(4)} = -180 \text{ kN}$
 $N^{(5)} = -270 \text{ kN}$