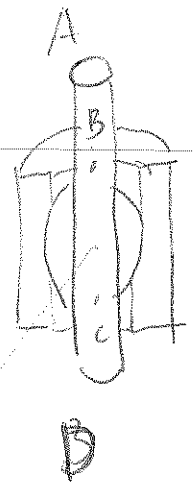
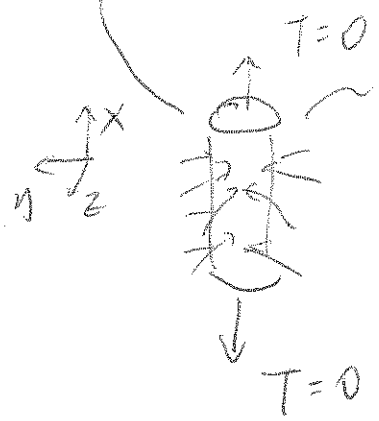
9.55



BC is under hydrolic pressure

600 psi

find elongation and radial displacement



under hydrolic pressure

$$\Delta L = \varepsilon_x L$$

$$= \left(\frac{\sigma_x}{E} - \frac{\nu\sigma_y}{E} - \frac{\nu\sigma_z}{E}\right)L$$

$$= \left(\frac{\sigma_x}{E} + \frac{\nu P}{E} + \frac{\nu P}{E}\right)L$$

$$= \frac{1}{E}\left(\sigma_x + 2\nu P\right)L$$

($\sigma_x = 0$)

$$= 5.13 \times 10^{-3}\ \text{in}$$

radial displacement:

$$\varepsilon_r = \frac{\sigma_r}{E} - \nu\frac{\sigma_x}{E} - \nu\frac{\sigma_r}{E}$$

($\sigma_x = 0$)

$$\Delta r = D \cdot \varepsilon_r = 5.73 \times 10^{-4}\ \text{in}$$