Circumferential stress $= \frac{pd}{2t}$ ..

$$\sigma_\theta = \frac{1.8 \times 10^6 \times 0.2}{2 \times 0.003} = \underline{60 \times 10^6 \text{ N/m}^2}$$

longitudinal strain

$$\varepsilon_L = \frac{1}{E}(\sigma_L - \nu\sigma_\theta) = 0$$

$$\therefore \quad \sigma_L = \nu\sigma_\theta$$

$$= 0.32 \times 60 = \underline{19.2 \text{ MN/m}^2}$$

Circumferential strain

$$\varepsilon_\theta = \frac{1}{E}(\sigma_\theta - \nu\sigma_L) = \frac{\sigma_\theta}{E}(1-\nu^2)$$

$$= \frac{60 \times 10^6}{69 \times 10^9}(1 - 0.32^2)$$

$$= \underline{7.8 \times 10^{-4}} \quad (780 \text{ microstrain})$$

Now $\varepsilon_\theta = \dfrac{\text{change in circumference}}{\text{original circumference}}$

$$= \frac{\pi(D + \delta D) - \pi D}{\pi D} = \frac{\delta D}{D}$$

$$\therefore \varepsilon_\theta = \frac{\text{change in diameter}}{\text{original diameter}}$$