2.

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

where $\sigma_\theta = \frac{pd}{2t}$ and $\sigma_L = \frac{pd}{4t}$

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

$$\therefore \quad \varepsilon_\theta = \frac{pd}{2tE}\left(1 - \frac{\nu}{2}\right)$$

$$\text{and} \quad \varepsilon_L = \frac{pd}{2tE}\left(\frac{1}{2} - \nu\right)$$

Now $\varepsilon_\theta = 4\varepsilon_L$

$$\left(1 - \frac{\nu}{2}\right) = 4\left(\frac{1}{2} - \nu\right)$$

$$\therefore \quad \nu = \frac{2}{7} = \underline{0.286}$$

b) $\varepsilon_L = 150 \times 10^{-6} = \frac{p \times 5}{2 \times .02 \times 207 \times 10^9}\left(\frac{1}{2} - .286\right)$

$$p = \frac{150 \times 10^{-6} \times 2 \times 0.02 \times 207 \times 10^9}{5 \times 0.214}$$

$$= \underline{1.16 \times 10^6 \ N/m^2}$$