

Answers of Problems 6

6.1

(1) $\sigma_1 = \frac{13}{5} p_0$

(2) $\varepsilon_\theta = \frac{8p_0}{5E} (1 - \nu^2)$

6.2

(1) $\sigma_r = -\frac{7}{27} p, \quad \sigma_\theta = \frac{25}{27} p, \quad \tau_{r\theta} = 0$

(2) $\varepsilon_\theta = \frac{-7 - 25\nu}{27E} p$

6.3

(1) $\varepsilon_r = \frac{P}{3E} \left\{ (1 - \nu) - (1 + \nu) \frac{4R^2}{r^2} \right\}, \quad \varepsilon_\theta = \frac{P}{3E} \left\{ (1 - \nu) + (1 + \nu) \frac{4R^2}{r^2} \right\}$

(2) $\sigma_r = \frac{P}{3} \left(1 - \frac{4R^2}{r^2} \right), \quad \sigma_\theta = \frac{P}{3} \left(1 + \frac{4R^2}{r^2} \right)$

(3) $\alpha = 2$

6.3

(1) $\varepsilon_r = \frac{P}{3E} \left(-\frac{5}{4} - \nu \frac{13}{4} \right), \quad \varepsilon_\theta = \frac{P}{3E} \left(\frac{13}{4} + \nu \frac{5}{4} \right)$

(2) $\sigma_\theta = \frac{13P}{12}, \quad \sigma_z = 0$