

Answers to Selected Problems: Part II, Chapter 1

1.1

2. Yes

3. One of the equations of equilibrium is not satisfied.

4. $\mathbf{b} = \begin{bmatrix} -3x_2 \\ -x_3 \\ -x_1 \end{bmatrix}$

5. $\mathbf{a} = \begin{bmatrix} \frac{40}{3}x_1(2-x_1^2) \\ \frac{40}{3}x_2(2-x_2^2) \\ \frac{40}{3}x_3(2-x_3^2) - 9.81 \end{bmatrix}$

1.2

1. $\varepsilon_{xx} = 3A, \quad \varepsilon_{yy} = 2Axy, \quad \varepsilon_{xy} = \frac{1}{2}A(-1+y^2), \quad \omega_z = \frac{1}{2}A(y^2+1)$

2. $u_x = \frac{1}{2}\alpha x^2 + A - Cy, \quad u_y = 2\alpha x + B + Cx, \quad \omega_z = \alpha + C$

3. $u_x = \frac{1}{2}Ax^2y + C_3 - C_4y, \quad u_y = \frac{1}{3}Ay^3 + Ax^2 - \frac{1}{6}Ax^3 + C_2 + C_4x,$
 $\omega_z = Ax - \frac{1}{8}Ax^2 + C_4$

1.3

1. $\varepsilon_{xx} = Ay, \quad \varepsilon_{yy} = 2Ay, \quad \varepsilon_{xy} = \frac{1}{2}Ax, \quad \omega_z = \frac{1}{2}Ax, \quad \frac{A}{2} \left[3y \pm \sqrt{x^2 + y^2} \right]$