$$= \frac{3290 \text{ N} + 76{,}800 \text{ N}}{\left(1.56 \times 10^{-3}\right)\left(970 \text{ mm}^2\right)\left(1 \text{ m}/1000 \text{ mm}\right)^2} = 52.9 \times 10^9 \text{ N/m}^2 = 52.9 \text{ GPa} \quad (7.69 \times 10^6 \text{ psi})$$

(c) Finally, it is necessary to determine the moduli of elasticity for the fiber and matrix phases. This is possible assuming Equation 6.5 for the matrix phase—i.e.,

$$E_m = \frac{\sigma_m}{\varepsilon_m}$$

and, since this is an isostrain state, $\varepsilon_m = \varepsilon_c = 1.56 \times 10^{-3}$. Thus

$$E_m = \frac{\sigma_m}{\varepsilon_c} = \frac{5.38 \times 10^6 \text{ N/m}^2}{1.56 \times 10^{-3}} = 3.45 \times 10^9 \text{ N/m}^2$$

$$= 3.45 \text{ GPa} \quad (5.0 \times 10^5 \text{ psi})$$

The elastic modulus for the fiber phase may be computed in an analogous manner:

$$E_f = \frac{\sigma_f}{\varepsilon_f} = \frac{\sigma_f}{\varepsilon_c} = \frac{215 \times 10^6 \text{ N/m}^2}{1.56 \times 10^{-3}} = 1.38 \times 10^{11} \text{ N/m}^2$$

$$= 138 \text{ GPa} \quad (20 \times 10^6 \text{ psi})$$