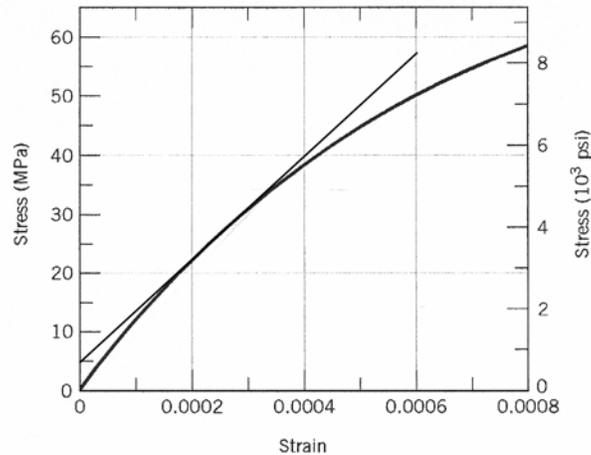


6.10 (a) This portion of the problem asks that the tangent modulus be determined for the gray cast iron, the stress-strain behavior of which is shown in Figure 6.22. In the figure below is shown a tangent draw on the curve at a stress of 25 MPa.



The slope of this line (i.e.,  $\Delta\sigma/\Delta\varepsilon$ ), the tangent modulus, is computed as follows:

$$\frac{\Delta\sigma}{\Delta\varepsilon} = \frac{57 \text{ MPa} - 0 \text{ MPa}}{0.0006 - 0} = 95,000 \text{ MPa} = 95 \text{ GPa} \quad (13.8 \times 10^6 \text{ psi})$$

(b) The secant modulus taken from the origin is calculated by taking the slope of a secant drawn from the origin through the stress-strain curve at 35 MPa (5,000 psi). This secant modulus is drawn on the curve shown below:

