

Exercise 10-9

$$\frac{F}{A} = Y \frac{\Delta l}{l_0} \quad \therefore \frac{mg}{A} = Y \frac{\Delta l}{l_0}$$

$$\text{Given: } \frac{\Delta l}{l_0} = 6.50 \times 10^{-3} \% = 6.50 \times 10^{-3} \times \frac{1}{100} = 6.50 \times 10^{-5}$$

$$\therefore \frac{(10.0 \text{ kg})(9.80 \text{ m/s}^2)}{1.40 \times 10^{-4} \text{ m}^2} = Y (6.50 \times 10^{-5})$$

$$\therefore Y = 1.08 \times 10^{10} \text{ N/m}^2$$