

31.1. Solve: From Table 30.1, the resistivity of carbon is $\rho = 3.5 \times 10^{-5} \Omega \text{ m}$. From Equation 31.3, the resistance of lead from a mechanical pencil is

$$R = \frac{\rho L}{A} = \frac{\rho L}{\pi r^2} = \frac{(3.5 \times 10^{-5} \Omega \text{ m})(0.06 \text{ m})}{\pi(0.35 \times 10^{-3} \text{ m})^2} = 5.5 \Omega$$