

Question #70147, Physics / Electric Circuits

A 1.0 kg bar of copper is drawn into 0.50 mm diameter wire. Calculate

- a) The length of the wire
- b) The electrical resistance of the wire.
- Density of copper = $8.96 \times 10^3 \text{ kg m}^{-3}$
 - Resistivity of copper = $1.68 \times 10^{-8} \Omega \text{ m}$

Solution

$$\text{a) } L = \frac{m}{\rho \times \frac{\pi d^2}{4}} = \frac{1.0}{8.96 \times 10^3 \times \frac{\pi \times 0.00050^2}{4}} = 568.4 \text{ m}$$

$$\text{b) } R = \frac{\rho L}{\frac{\pi d^2}{4}} = \frac{1.68 \times 10^{-8} \times 568.4}{\frac{\pi \times 0.00050^2}{4}} = 48.6 \Omega$$

Answer provided by <https://www.AssignmentExpert.com>