

Answer on question #59052, Physics / Electric Circuits

Question A nicrome wire is 1.0m long and 1.0mm² in cross-sectional area. It carries a current of 4.0 A when a potential difference of 2 V is applied between its ends. Calculate the conductivity of the wire.

$$2 M(\Omega \cdot m)^{-1}$$

$$4 k(\Omega \cdot m)^{-1}$$

$$2 m(\Omega \cdot m)^{-1}$$

$$4 (\Omega \cdot m)^{-1}$$

Solution Resistance of this wire is

$$R = \frac{U}{I} = \frac{2}{4} = 0.5 \Omega$$

Resistivity then is

$$\rho = \frac{A}{l} R = \frac{1 \cdot 10^{-6}}{1} 2 = 0.5 \cdot 10^{-6} \Omega \cdot m$$

Conductivity is reverse to it

$$\sigma = \frac{1}{\rho} = 2 \cdot 10^6 (\Omega \cdot m)^{-1}$$