

Answer on Question #73953-Physics-Other

A copper conductor of resistivity $\rho = 1.72 \times 10^{-8} \Omega\text{m}$ having a current density $J = 2.54 \times 10^6 \text{ Am}^{-2}$. Calculate the electric field in the copper. What is the potential difference between the two points a and b, 100m apart?

Solution

The electric field in the copper is

$$E = \rho J = (1.72 \cdot 10^{-8})(2.54 \cdot 10^6) = 0.0437 \frac{V}{m}.$$

The potential difference between the two points a and b is

$$V = Ed = 0.0437(100) = 4.37 \text{ V}.$$

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