

38. Od bakrenog štapa mase 1.5 kg želi se napraviti žica otpora 250 Ω. Kolika je duljina žice ako je električna otpornost bakra $1.7 \cdot 10^{-8} \Omega \text{ m}$, a gustoća bakra $8.9 \cdot 10^3 \text{ kg/m}^3$?
 A. 232 m B. 318 m C. 1.57 m D. 2.38 m E. 5.62 m

$$m = 1,5 \text{ kg}$$

$$R = 250 \Omega$$

$$\rho_{\text{Cu}} (\text{otpornost bakra}) = 1,7 \cdot 10^{-8} \Omega \text{ m}$$

$$\rho (\text{gustoća}) = 8.9 \cdot 10^3 \text{ kg/m}^3$$

$$l (\text{duljina žice}) = ?$$

|a

površina presjeka S l = duljina žice

|b

$$V = \text{volumen štapa} = L \cdot S$$

$$\rho = \frac{m}{V} \quad \Rightarrow \quad V = \frac{m}{\rho}$$

$$V = \frac{1,5 \text{ kg}}{8,9 \cdot 10^3 \text{ kg/m}^3} = 1,685 \cdot 10^{-4} \text{ m}^3$$

$$S = \frac{V}{l} = \frac{1,685 \cdot 10^{-4}}{l}$$

|c

$$R = \rho_{\text{Cu}} \cdot \frac{l}{S}$$

$$250 = 1,7 \cdot 10^{-8} \cdot \frac{l}{S}$$

$$250 = 1,7 \cdot 10^{-8} \cdot \frac{l}{\frac{1,685 \cdot 10^{-4}}{l}}$$

$$250 = 1,7 \cdot 10^{-8} \cdot \frac{l^2}{1,685 \cdot 10^{-4}}$$

$$250 = l^2 \cdot 1,008910^{-4} \quad \Rightarrow \quad l^2 = 2477946,278$$

$$l = \sqrt{2477946,278} = 1574 \text{ m} = 1,574 \text{ km}$$