Question#19748

A 100 m long wire with a cross-sectional area of 4 mm2 has a resistance of 6 ohms. What is the resistivity of the material of the wire in Ωm?

Solution:

Let:

$R = 6\,ohms$

$l = 100\,m$

$A = 4\,mm^2 = 4 * 10^{-6}\,m^2$

$\rho - ?$

The electrical resistivity ρ is defined as:

$$\rho = R\frac{A}{\ell},$$

where

R is the resistance
ℓ is the length of the piece of material.
A is the cross-sectional area.

$$\boldsymbol{\rho = 6 * \frac{4*10^{-6}}{100} = 2,4 * 10^{-7}\ \Omega/m}$$

Answer: $\boldsymbol{2,4 * 10^{-7}\ \Omega/m}$