

Answer on Question #77396 - Physics - Electric Circuits

Calculate the resistance of 1km long copper wire of radius 1mm

Solution:

The resistance of wire

$$R = \rho \frac{l}{S},$$

where ρ - resistivity of the material (for copper is 0.017 Ohm*mm²/m at the temperature of 20 °C);

l - length of wire;

$S = \pi r^2$ - cross-sectional area of wire, where r - radius of wireⁱ.

$$R = 0.017 \frac{1000}{3.14 \cdot 1^2} = 5.41 \text{ Ohm.}$$

Answer: 5.41 Ohm at the temperature of 20 °C

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