TOPIC

Electricity and Magnetism – Section XI – Question 7

QUESTION

A wire at 20°C has a resistance of 500Ω. The average temperature coefficient of this wire is 0.002/°C. The total resistance in ohms at 60°C most nearly is

(A) 500
(B) 540
(C) 600
(D) 650

HINT

Resistance is represented with the capital letter R and it is measured in ohms (Ω).

$$R = \frac{\rho A}{l}$$

where

ρ is the resistivity of the material (Ω.m),
A is the cross sectional area (m^2) and
l is the length (m).

The resistivity of any conductive material is temperature dependent

$$\rho = \rho_0[1 + \alpha(T - T_0)]$$

Hence, resistance is also temperature dependent

$$R = R_0[1 + \alpha(T - T_0)]$$

where α is the temperature coefficient.

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