TOPIC
Electricity and Magnetism – Section XI – Question 2

QUESTION
The electrical resistance of a wire is

(A) proportional to the square of the length of the wire.
(B) inversely proportional to the resistivity of the wire material
(C) inversely proportional the square of the radius of the wire.
(D) inversely proportional to the circumference of the wire.

HINT
Since the resistance of the wire is given by

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

where

ρ = resistivity of the wire material,
L = length of wire,
A = cross-sectional area of wire.

SOLUTION

Since

$$A = \pi r^2$$

where

r = radius of the wire

$$R = \frac{\rho L}{\pi r^2}$$

So the resistance is inversely proportional to the square of the radius of the wire.

ANSWER
(C)

CONTRIBUTOR
Autar Kaw