

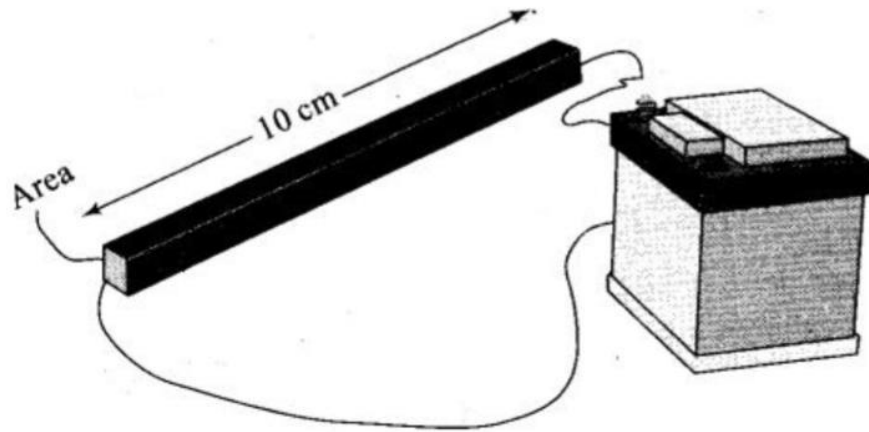
Q. 01 A metal rod of length 10 cm and a rectangular cross-section of 1 cm x 1/2 cm is connected to a battery across opposite faces. The resistance will be

- (a) maximum when the battery is connected across 1 cm x 1/2 cm faces
- (b) maximum when the battery is connected across 10 cm x 1 cm faces
- (c) maximum when the battery is connected across 10 cm x 1/2 cm faces
- (d) same irrespective of the three faces

Solution: (a)

Key concept: The resistance of a wire depends on various parameter, its area, material (resistivity) and length (length of the rod). Here, the metallic rod behaves as a wire.

Relationship between resistance and various parameter is given by $R = \rho l/A$.



The resistance of a wire is given by

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

For greater value of R , l must be higher and A should be lower and it is possible only when the battery is connected across $1 \text{ cm} \times \left(\frac{1}{2}\right) \text{ cm}$ (area of cross-section A).