

Easy

Assistant Engineer (Electrical), Class 2025

Building Department

Calculate the conduction current density when the resistivity of a material with an electric field of 5 units is 4.5 units.

A

22.5

B

4.5/5

C

5/4.5

Correct

D

9.5

Correct Answer: C

Full Detailed Explanation

Concept & Reasoning Resistivity tells us how strongly a material opposes conduction. Conductivity is its reciprocal, $\sigma = 1/\rho$. Therefore a finite electric field produces a conduction current density $J = \sigma E$. The correct numerical value follows directly from dividing the field intensity by resistivity; multiplying E by ρ would reverse the physical relationship. How to Solve It in the Exam Remember: resistivity in denominator, conductivity in numerator. Important Exam Point Do a dimensional/physical sense check: larger resistivity must reduce J for the same E . Related Revision Path This question sits in the revision path Electromagnetic Fields Conduction and Current Density Point Form of Ohm's Law.

Open live question on website:

<https://sarkariresultout.com/pyq/question/gpsc-ae-electrical-q151-conduction-current-density/>