

65. The electric field points towards lower values of potential (see Eq. 25-40) so \vec{E} is directed towards point B (which we take to be the \hat{i} direction in our calculation). Since the field is considered to be uniform inside the wire, then its magnitude is, by Eq. 25-42,

$$|\vec{E}| = \frac{|\Delta V|}{L} = \frac{50}{200} = 0.25 \text{ V/m} .$$

Using Eq. 27-11, with $\rho = 1.7 \times 10^{-8} \Omega \cdot \text{m}$, we obtain

$$\vec{E} = \rho \vec{J} \implies \vec{J} = 1.5 \times 10^7 \hat{i}$$

in SI units (A/m²).