

56. We find the drift speed from Eq. 27-7:

$$v_d = \frac{|\vec{J}|}{ne} = 1.5 \times 10^{-4} \text{ m/s} .$$

At this (average) rate, the time required to travel $L = 5.0 \text{ m}$ is

$$t = \frac{L}{v_d} = 3.4 \times 10^4 \text{ s} .$$