

CURRENT**PROBLEM**

A total charge of 55 mC passes through a cross-sectional area of a copper wire in 0.5 s. What is the current in the wire?

SOLUTION

Given: $\Delta Q = 5.5 \times 10^{-2} \text{ C}$ $\Delta t = 0.5 \text{ s}$

Unknown: $I = ?$

Choose the equation(s) or situation:

Use the equation for electric current, given on page 694.

$$I = \frac{\Delta Q}{\Delta t} = \frac{5.5 \times 10^{-2} \text{ C}}{0.5 \text{ s}} = \boxed{0.11 \text{ A}}$$

ADDITIONAL PRACTICE

1. A total charge of 76 C passes through a cross-sectional area of a copper wire in 19 s. What is the current in the wire?
2. A total charge of 114 μC passes through a cross-sectional area of an aluminum wire in 0.36 s. What is the current in the wire?
3. A total charge of 29 mC passes through a cross-sectional area of a nichrome wire in 11 s. What is the current in the wire?
4. If a current in a wire of a telephone is 1.4 A, how long would it take for 98 C of charge to pass a point in this wire?
5. If a current in a wire of a vacuum cleaner is 9.65 A, how long would it take for 30.9 C of charge to pass a point in this wire?
6. If a current in a wire of a blender is 7.8 A, how long would it take for 56 C of charge to pass a point in this wire?
7. A photocopy machine draws 9.3 A when it starts up. If the start-up time is 15 s, how much charge passes a cross-sectional area of the circuit in this time?
8. A computer draws 3.0 A when it starts up. If the start-up time is 2.0 min, how much charge passes a cross-sectional area of the circuit in this time?
9. A printer draws 0.70 A when it starts up. If the start-up time is 2.0 s, how much charge passes a cross-sectional area of the circuit in this time?
10. A space heater draws 5.6 A when it starts up. If the start-up time is 4.3 s, how much charge passes a cross-sectional area of the circuit in this time?