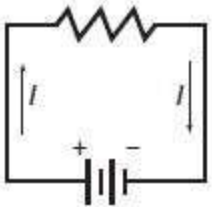
Chapter Assessment
Section 1 Current and Circuits: Mastering Concepts

48. A simple circuit consists of a resistor, a battery, and connecting wires.

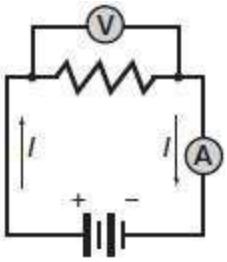
a. Draw a circuit schematic of this simple circuit.
b. How must an ammeter be connected in a circuit for the current to be correctly read?
c. How must a voltmeter be connected to a resistor for the potential difference across it to be read?

SOLUTION:

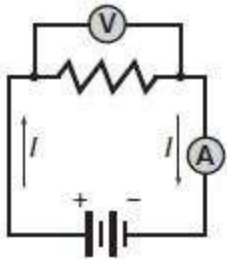
a.



b. The ammeter must be connected in series.

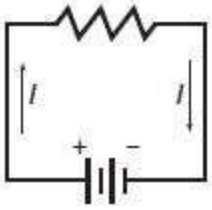


c. The voltmeter must be connected in parallel.

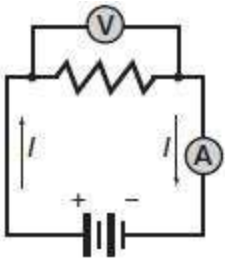


ANSWER:

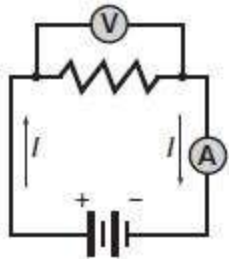
a.



b. The ammeter must be connected in series.



c. The voltmeter must be connected in parallel.



Chapter Assessment
Section 1 Currents and Circuits: Mastering Problems

52. Refer to **Figure 21** to answer the following questions. (Level 1)

a. What should the ammeter reading be?
b. What should the voltmeter reading be?
c. How much power is delivered to the resistor?
d. How much energy is delivered to the resistor per hour?

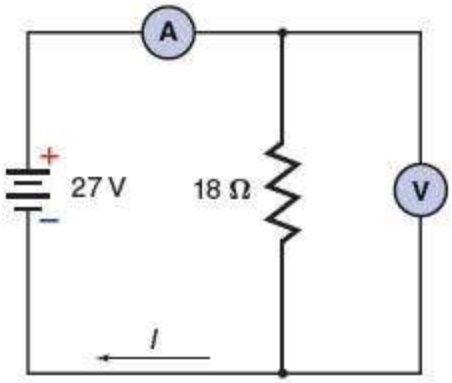


Figure 21

SOLUTION:

a.

$$I = V/R = \frac{27\ \text{V}}{18\ \Omega} = 1.5\ \text{A}$$

b. 27 V

c. $P = VI = (27\ \text{V})(1.5\ \text{A}) = 41\ \text{W}$

d. $E = Pt = (41\ \text{W})(3600\ \text{s}) = 1.5\times10^5\ \text{J}$

ANSWER:

a. $I = 1.5\ \text{A}$
b. 27 V
c. $P = 41\ \text{W}$
d. $E = 1.5\times10^5\ \text{J}$

Chapter Assessment: Applying Concepts

85. **Power Lines** Why can birds perch on high-voltage lines without being injured?

SOLUTION:

No potential difference exists along the wires, so there is no current through the birds' bodies.

ANSWER:

No potential difference exists along the wires, so there is no current through the birds' bodies.

86. **Describe** two ways to increase the current in a circuit.

SOLUTION:

Either increase the voltage or decrease the resistance.

ANSWER:

Either increase the voltage or decrease the resistance.

88. If the voltage across a circuit is kept constant and the resistance is doubled, what effect does this have on the circuit's current?

SOLUTION:

If the resistance is doubled, the current is halved.

ANSWER:

If the resistance is doubled, the current is halved.

89. What is the effect on the current in a circuit if both the voltage and the resistance are doubled? Explain.

SOLUTION:

No effect. *V* = *IR*, so

$I = \frac{V}{R}$,

and if the voltage and the resistance both are doubled, the current will not change.

ANSWER:

No effect. *V* = *IR*, so

$I = \frac{V}{R}$,

and if the voltage and the resistance both are doubled, the current will not change.