CHAPTER 17 Highlights

KEY IDEAS

Section 1 Electric Potential

- Electrical potential energy is energy that a charged object has because of its shape and its position in an electric field.
- Electric potential is electrical potential energy divided by charge.
- Only differences in electric potential (potential differences) from one position to another are useful in calculations.

Section 2 Capacitance

- The capacitance, C, of an object is the magnitude of the charge, Q, on each of a capacitor's plates divided by the potential difference, ΔV, between the plates.
- A capacitor is a device that is used to store electrical potential energy. The potential energy stored in a charged capacitor depends on the charge and the potential difference between the capacitor's two plates.

Section 3 Current and Resistance

- Current is the rate of charge movement.
- Resistance equals potential difference divided by current.
- Resistance depends on length, cross-sectional area, temperature, and material.

Section 4 Electric Power

- In direct current, charges move in a single direction; in alternating current, the direction of charge movement continually alternates.
- Electric power is the rate of conversion of electrical energy.
- The power dissipated by a resistor equals current squared times resistance.
- Electric companies measure energy consumed in kilowatt-hours.

Variable Symbols

Quantities	Units	Conversions
$PE_{electric}$ electrical potential energy	J joule	$= N \cdot m = kg \cdot m^2/s^2$
ΔV potential difference	V volt	$= J/C$
C capacitance	F farad	$= C/V$
I current	A ampere	$= C/s$
R resistance	Ω ohm	$= V/A$
P electric power	W watt	$= J/s$

KEY TERMS

electrical potential energy (p. 594)

electric potential (p. 596)

potential difference (p. 596)

capacitance (p. 602)

electric current (p. 608)

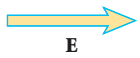
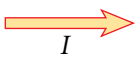
drift velocity (p. 611)

resistance (p. 612)

PROBLEM SOLVING

See **Appendix D: Equations** for a summary of the equations introduced in this chapter. If you need more problem-solving practice, see **Appendix I: Additional Problems.**

Diagram Symbols

Electric field	
Current	
Positive charge	
Negative charge