

## Chapter 19: DC Circuits

### Giancoli Text Sections

- 19-1 EMF and Terminal Voltage
- 19-2 Resistors in Series and in Parallel
- 19-4 EMFs in Series and in Parallel; Charging a Battery
- 19-5 Circuits Containing Capacitors in Series and in Parallel
- 19-6  $RC$  Circuits—Resistor and Capacitor in Series
- 19-7 Electric Hazards
- 19-8 Ammeters and Voltmeters

### Summary

Basic concepts of electric currents were covered in Chapter 18. Chapter 19 applies these concepts to circuits with combinations of resistors in series and parallel, circuits containing combinations of capacitors, and  $RC$  circuits. At the end of the chapter, devices for measuring current and potential difference in a circuit are discussed.

### Major Concepts

By the end of the chapter, you should understand each of the following and be able to demonstrate their understanding in problem applications as well as in conceptual situations.

- EMF
  - Terminal voltage
  - EMFs in series and parallel
- Resistors in series and parallel
- Capacitors in series and parallel
- $RC$  circuits
- Ammeters and voltmeters

## Formulas

FOR ALL CIRCUITS:

$$V = RI \quad I = V/R \quad R = V/I \quad q = CV$$

FOR SERIES CIRCUITS:

$$V = V_1 + V_2 + V_3 \text{ etc.}$$

$$R_{\text{eq}} = R_1 + R_2 + R_3$$

FOR PARALLEL CIRCUITS:

$$I = I_1 + I_2 + I_3 \text{ etc.}$$

$$\frac{1}{R_{\text{eq}}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

FOR CAPACITORS IN SERIES:

$$\frac{1}{C_{\text{eq}}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} \text{ etc.}$$

FOR CAPACITORS IN PARALLEL:

$$C_{\text{eq}} = C_1 + C_2 + C_3 \text{ etc.}$$