

Unit 12: Electric Circuits

Text:

Chapter 28: All sections of Chapter 28.

Chapter 29: Skip section 29-8.

Questions (p. 784)

21, 22

Exercises & Problems (p. 785-88)

#1: 1, 17, 26, 28, 32

#2: 44, 45, 49, 56, 57

Questions (p. 809)

4, 6

Exercises & Problems (p. 809-16)

#3: 1, 16, 26, 27, 32, 37, 39, 48

Vocabulary:

Ohm's Law, resistance, resistivity, superconductor, series, parallel, voltmeter, ammeter, current, amps, volts, ohms, equivalent resistance, circuit, short circuit, open circuit, galvanometer, internal resistance, emf, ideal battery

Math:

definitions:

$$I = \frac{\Delta Q}{\Delta t} \quad R = \frac{V}{I} \quad R = \rho \frac{L}{A}$$

derived formulas:

$$P = IV \quad R_{eq} = \sum R_i \quad \frac{1}{R_{eq}} = \sum \frac{1}{R_i}$$

skills:

no new math skills

Key Objectives:

- be able to correctly use and apply the formulas listed above in a variety of word problems.
- be able to explain what happens to current and voltage in series and parallel circuits.
- be able to correctly interpret a circuit diagram.
- be able to correctly use ammeters and voltmeters in a circuit.
- be able to compare and contrast an ammeter and a voltmeter.
- given a random circuit, be able to solve for any missing variables (V, I, R).
- be able to calculate the equivalent resistance for a random circuit of resistors.
- be able to explain what is meant by "Ohm's Law" and to describe why some things obey it and others do not.
- be able to explain what happens to electrons and energy in a circuit.
- be able to explain how and why most material's resistance have a temperature dependence.
- be able to compare and contrast an insulator, conductor and superconductor.
- be able to apply the law of conservation of charge to a circuit.
- be able to apply the law of conservation of energy to a circuit.
- given a circuit made of identical light bulbs, be able to predict the relative brightness of each bulb, and to predict relative sizes of currents and potential differences.