

Chapter 20-21 Test Review

Chapter Summary

20.1. Current

- Define electric current, ampere
- Describe the direction of charge flow in conventional current.

20.2. Ohm's Law: Resistance and Simple Circuits

- Calculate voltages, currents, or resistances with Ohm's law.
- Describe a simple circuit.

20.3. Resistance and Resistivity

- Use resistivity to calculate the resistance of specified configurations of material.

20.4. Electric Power and Energy

- Calculate the power dissipated by a resistor and power supplied by a power supply.
- Calculate the cost of electricity under various circumstances.

21.1. Resistors in Series and Parallel

- Draw a circuit with resistors in parallel and in series.
- Calculate the voltage drop of a current across a resistor using Ohm's law.
- Contrast the way total resistance is calculated for resistors in series and in parallel.
- Explain why total resistance of a parallel circuit is less than the smallest resistance of any of the resistors in that circuit.
- Calculate total resistance of a circuit that contains a mixture of resistors connected in series and in parallel.

Key Equations

$$I = \frac{\Delta Q}{\Delta t}$$

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

$$R_{\text{eq series}} = \sum_{i=1}^n R_i$$

$$\frac{1}{R_{\text{eq parallel}}} = \sum_{i=1}^n \frac{1}{R_i}$$

$$R = \frac{\rho L}{A}$$

$$P = IV = \frac{V^2}{R} = I^2R$$

Multiple Choice (Approx 15-20)

- Units for the parameters in the key equations and electrical usage
- Find equivalent resistance
- Figure out what happens to equivalent resistance when a third resistor is added to two existing resistors (in series and in parallel)
- Ohm's Law
- Identify the direction of current in a circuit
- Relationship between resistance, resistivity, cross-sectional area and length of a conductor and how a change in any of these parameters affects current
- Relationship of total current and individual currents through resistors (in series and in parallel)
- Relationship between power supply voltage and potential drop across resistors (in series and in parallel)

Problems (Approx 5-8)

- Practice problems in class
- Finding the cost to run an appliance or light for a month given power, time and cost of energy
- Calculating current through resistors in series, parallel or a combination
- Calculating the power dissipated as heat in a resistor in series, parallel or a combination
- Calculate current given the resistivity and dimensions of a conductor and the potential difference across the conductor

Apply Kirchoff's rules to find currents and their directions in a complex circuit with more than one battery.