

11.7: End of Chapter Key Terms

Definition: Electricity

- **Electric Charge:** A property of subatomic particles that causes them to experience a force when placed in an electric field; measured in coulombs (C).
- **Electric Current:** The flow of electric charge through a conductor; measured in amperes (A).
- **Voltage (Electric Potential):** The difference in electric potential energy per unit charge between two points; measured in volts (V).
- **Resistance:** The opposition to the flow of electric current through a conductor; measured in ohms (Ω).
- **Conductor:** A material that allows the flow of electric charge, typically metals like copper and aluminum.
- **Insulator:** A material that resists the flow of electric charge, such as rubber, glass, and plastic.
- **Semiconductor:** A material with electrical conductivity between that of a conductor and an insulator, used in electronic devices.
- **Ohm's Law:** A law stating that the current (I) through a conductor between two points is directly proportional to the voltage (V) across the two points and inversely proportional to the resistance (R); expressed as $V = IR$.
- **Series Circuit:** An electric circuit in which components are connected end-to-end so that the current flows through each component in turn.
- **Parallel Circuit:** An electric circuit in which components are connected across common points or junctions, providing multiple paths for the current.
- **Direct Current (DC):** Electric current that flows in one direction only.
- **Alternating Current (AC):** Electric current that periodically reverses direction.
- **Power:** The rate at which electrical energy is transferred by an electric circuit; measured in watts (W).
- **Capacitor:** An electrical component used to store energy electrostatically in an electric field, consisting of two conductive plates separated by an insulating material.
- **Inductor:** An electrical component that stores energy in a magnetic field when electric current flows through it, typically a coil of wire.
- **Electric Field:** A field around a charged particle that exerts a force on other charged particles.
- **Electromotive Force (EMF):** The energy provided per charge by an energy source, such as a battery or generator; measured in volts (V).
- **Coulomb's Law:** A law stating that the force between two charged objects is directly proportional to the product of their charges and inversely proportional to the square of the distance between them.
- **Electric Potential Energy:** The energy a charged particle has due to its position in an electric field.
- **Circuit Breaker:** An automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit.
- **Fuse:** A safety device consisting of a strip of wire that melts and breaks an electric circuit if the current exceeds a safe level.
- **Grounding:** The process of connecting an electrical circuit to the Earth to ensure safety by preventing buildup of voltages that could cause electric shocks.
- **Short Circuit:** A low-resistance connection between two points in an electric circuit, allowing an excessive current to flow.
- **Superconductor:** A material that can conduct electricity without resistance when cooled to very low temperatures.
- **Electrolysis:** A process that uses an electric current to drive a non-spontaneous chemical reaction.
- **Kirchhoff's Laws:** Two rules regarding the conservation of current and voltage in electrical circuits: Kirchhoff's Current Law (KCL) states that the total current entering a junction equals the total current leaving; Kirchhoff's Voltage Law (KVL) states that the sum of the electrical potential differences around any closed circuit is zero.
- **Transformers:** Electrical devices that transfer electrical energy between two or more circuits through electromagnetic induction, used to increase or decrease voltage levels.
- **Resistor:** An electrical component that limits or regulates the flow of electrical current in an electronic circuit.
- **Electric Power:** The rate at which electrical energy is transferred by an electric circuit, typically expressed as the product of current and voltage ($P = IV$).

- **Electromagnetic Induction:** The production of an electromotive force across a conductor when it is exposed to a varying magnetic field.
- **Faraday's Law:** A law stating that the induced electromotive force in any closed circuit is equal to the negative of the time rate of change of the magnetic flux through the circuit.
- **Lenz's Law:** A law stating that the direction of an induced current is such that it will oppose the change in magnetic flux that produced it.
- **Electrical Conductivity:** The measure of a material's ability to conduct an electric current.
- **Dielectric:** An insulating material that can be polarized by an electric field, increasing a capacitor's ability to store charge.
- **Electrostatic Force:** The force between two charges at rest, described by Coulomb's Law.
- **Ampere:** The unit of electric current in the International System of Units (SI), equivalent to one coulomb per second.
- **Volt:** The unit of electric potential difference and electromotive force in the International System of Units (SI), equivalent to one joule per coulomb.
- **Ohm:** The unit of electrical resistance in the International System of Units (SI), equivalent to one volt per ampere.
- **Watt:** The unit of power in the International System of Units (SI), equivalent to one joule per second.

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