Chapter 10 Summary

10.1 Exploring Static Charges

Key Concepts

- A static charge (static electricity) is an electric charge that tends to stay on the surface of an object.
- A static charge can be generated by friction when objects rub together.
- Protons are positively charged, and electrons are negatively charged.
- Particles that carry electric charges can be neither created nor destroyed.
- Any net charge on a solid object results from the exchange of electrons with another object.
- A neutral object has the same number of protons and electrons. An object with an excess of electrons has a negative charge. An object with a deficit of electrons has a positive charge.
- Different materials hold on to their electrons with different strengths.
- In electrical insulators, such as non-metals, electrons cannot move easily from one atom to another.
- In electrical conductors, such as metals, electrons can move easily from one atom to another.
- A ground is a conductor that allows the transfer of electrons to Earth, thus eliminating the charge on an object.

10.2 Charging by Contact and by Induction

Key Concepts

- An electroscope detects the presence of an electric charge.
- An object that is charged by contact has the same type of charge as the charging object.
- There are three laws of electric charges: like charges repel; opposite (unlike) charges attract; neutral objects and charged objects are attracted to each other.
- An electric force between two objects is transmitted by an electric field.
- An induced charge separation is the movement of electrons in a substance, caused by the electric field of a nearby charged object, without direct contact between the substance and the object.

10.3 Charges at Work

Key Concepts

- A lightning rod is attached to the highest part of a building and connected to the ground. It reduces the likelihood of a lightning strike and protects buildings.
- An electrostatic precipitator removes unwanted dust particles and liquid droplets from a flow of gas.
- A Van de Graaff generator is used to generate very large charges.
- Selenium, a light-sensitive element, is used in copiers, printers, and scanners.
- A radiation dosimeter detects and measures radiation.