Chapter 12 Summary

12.1 Electricity at Home

Key Concepts

- Electrical energy is always generated from another source of energy.
- In direct current, charged particles travel through a circuit in only one direction. In alternating current, electrons move back and forth in a circuit.
- Alternating current is generated when a magnet and a coil of wire are moved relative to each other.
- Alternating current can be transmitted at high potential difference over long distances, with only a small loss of electrical energy.
- Transformers can increase (step up), or decrease (step down) voltage, but they only work with alternating current.
- Circuit breakers and fuses are safety devices that limit the current to appliances and wall outlets in your home.

12.2 Using Electrical Energy Wisely

Key Concepts

- The electrical power of an appliance is the rate at which it uses electrical energy. The practical unit for electrical power is the kilowatt (kW).
- The electrical energy that is used by an appliance is calculated by multiplying its power rating (in kW) by the amount of time that it is used (in hours, h). The practical unit of electrical energy is the kilowatt-hour (kW·h).
- The cost of electrical energy is calculated by multiplying the amount of energy that is used (in kW·h) by the price (in ¢/kW·h).
- Smart meters allow a utility company to charge a different amount for each kW·h of energy that is used at different times of the day.
- The electricity that is consumed by any appliance or device when it is turned off is called the phantom load.
- The efficiency of an electrical device is the ratio of useful energy output to total energy input, or useful output to total input, expressed as a percentage.

12.3 Meeting the Demand for Electricity

Key Concepts

- Base load is the continuous minimum demand for electrical power. It is met using large generators that run on the least expensive fuels.
- Intermediate load and peak load are met by using smaller generators that can be turned on and off quickly.
- Ontario obtains most of its electrical energy from nuclear, hydroelectric, and fossil fuel-burning stations.
- The rate that is charged for electricity changes when the cost of the fuel that is used to generate the electricity changes.

12.4 Sustainable Sources of Electricity

Key Concepts

- Renewable sources of energy can be renewed within a reasonably short time period.
- In Ontario, the renewable energy sources that contribute to electrical energy are wind, hydroelectric, and solar energy.
- Solar photovoltaic cells are semiconductor materials that generate a direct current when light shines on them.
- Biomass energy refers to the generation of electricity from plant and animal matter.