

Chapter 21 Magnetism

Section 21.3 Electrical Energy Generation and Transmission

(pages 642–647)

This section describes how electricity is generated and transmitted for human use. A description of how generators and transformers function is given.

Reading Strategy (page 642)

Sequencing As you read the section, complete the flowchart to show how a step-up transformer works. Then make a similar flowchart for a step-down transformer. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Step-up Transformers



Generating Electric Current (pages 642–643)

1. Is the following sentence true or false? A magnetic field can be used to produce an electric current. _____
2. Circle the letter for the name of the process of generating a current by moving an electrical conductor relative to a magnetic field.
 - a. electromagnetic force
 - b. electromagnetic field
 - c. electromagnetic induction
 - d. electromagnetic conduction
3. Electrical charges can easily flow through materials known as _____.
4. Why is the discovery of electromagnetic induction significant? _____

5. According to Faraday’s law, electric current can be induced in a conductor by _____.
6. Is the following sentence true or false? Moving a magnet relative to a coil of wire induces a current in the wire if the coil is part of a complete circuit. _____

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Generators (pages 643–644)

7. A generator converts _____ energy into _____ energy.
8. Circle the letter that best describes how most of the electrical energy used in homes and businesses is produced.
 - a. with DC generators
 - b. using AC generators at large power plants
 - c. with small magnets moving inside coils
 - d. by rotating a magnetic field around a coil of wire
9. Is the following sentence true or false? In an alternating current produced by an AC generator, the flow direction of charges switches back and forth. _____
10. Circle the letter of each sentence that is true about generators.
 - a. Small generators can produce enough electricity for a small business.
 - b. DC generators produce current that flows back and forth.
 - c. Small generators are available for purchase by the public.
 - d. Most modern power plants use DC generators.

Transformers (pages 644–645)

11. A device that increases or decreases voltage and current of two linked AC circuits is called a(n) _____.
12. How does a transformer change voltage and current? _____

13. Why are transformers necessary for home electrical service? _____

14. Is the following sentence true or false? To prevent overheating wires, voltage is decreased for long-distance transmission.

15. How is voltage calculated in a transformer? _____

16. Is the following sentence true or false? A step-down transformer decreases voltage and increases current. _____

Electrical Energy for Your Home (pages 646–647)

17. Name at least three sources used to produce electrical energy in the United States. _____

18. A device with fanlike blades that can convert energy from various sources into electrical energy is called a(n) _____.