

Section 22.2 Using Electric Energy

In your textbook, read about energy transfer on pages 601–603.

Answer the following questions. Show your calculations.

1. A 9.0-V battery is connected to a lightbulb with a resistance of $100\ \Omega$. What is the power delivered to the light bulb?

2. A source of potential difference of 110 V is used to operate a heater with a resistance of $220\ \Omega$. How much energy is consumed in a 24-h day?

3. Why does a resistor heat up when an electric current flows through it?

4. List at least five appliances designed to convert electric energy into thermal energy.

5. Is it OK to connect a 100-V toaster to a 220-V circuit? Why or why not? Explain.

For each description on the left, write the letter of the matching term on the right.

- | | |
|--|---------------|
| _____ 6. converts kinetic energy to electric energy | a. heater |
| _____ 7. designed to convert electric energy to thermal energy | b. battery |
| _____ 8. converts electric energy to kinetic energy | c. solar cell |
| _____ 9. designed to convert electric energy to light energy | d. generator |
| _____ 10. converts light energy to electric energy | e. lamp |
| _____ 11. converts chemical energy to electric energy | f. motor |

In your textbook, read about the transmission of electric energy transfer on pages 603–604.

Circle the letter of the choice that best completes the statement or answers the question.

12. The formula for power loss in a wire is _____.
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|---------------|---------------|
| a. $P = IR^2$ | c. $P = I^2R$ |
| b. $P = IR$ | d. $P = RV$ |
13. In the transmission of electric energy, some power is lost to thermal energy. Electrical engineers call this unwanted thermal energy the _____.
- | | |
|-----------------------|-----------------------|
| a. joule heating loss | c. output voltage |
| b. resistance | d. long-distance line |
14. The purpose of increasing the voltage when transmitting electric power over long distances is to _____.
- | | |
|---------------------------------|-----------------------------|
| a. decrease joule heating loss | c. increase current in wire |
| b. decrease resistance of wires | d. increase kilowatt-hours |
15. The kilowatt-hour is a unit of _____.
- | | |
|------------|--------------|
| a. current | c. potential |
| b. energy | d. power |
16. A 60-W lightbulb illuminated day and night for 30 days consumes _____ of energy.
- | | |
|-------------|---------------------------|
| a. 43.2 J | c. 1800 kWh |
| b. 43.2 kWh | d. 1.5×10^{12} J |
17. If a family's electric bill is \$74.00 per month and the cost of electricity is \$0.12 per kWh, how much electricity does the family use per month?
- | | |
|------------|--------------------------|
| a. 8.9 kWh | c. 620 kWh |
| b. 270 kWh | d. 620×10^2 kWh |