

Chapter 6

CHAPTER TEST

● Using Thermal Energy

I. Testing Concepts

In the blank at the left, write the letter of the term or phrase that completes each statement or answers the question.

- C 1. Refrigerators and air conditioners are examples of _____.
a. heat pumps b. heat engines c. heat movers d. solar collectors
- b 2. Wind and ocean currents are formed by _____.
a. radiation b. convection c. conduction d. condensation
- b 3. A material that reduces the flow of heat by conduction, convection, and radiation is _____.
a. a conductor b. an insulator c. a solar collector d. a radiator
- d 4. All of the following are good conductors of heat EXCEPT _____.
a. silver b. copper c. aluminum d. air
- a 5. Of the following, the insulation that is most resistant to heat flow is rated _____.
a. R-40 b. R-20 c. R-10 d. R-1
- C 6. The process by which engine fuels burn is _____.
a. radiation b. convection c. combustion d. insulation
- ad 7. Through which of the following will convection most likely occur? _____.
a. solids and liquids b. solids and gases c. solids d. liquids and gases
- a 8. Gasoline and diesel engines are _____.
a. internal combustion engines c. heat pumps
b. external combustion engines d. heat movers
- d 9. The transfer of energy that does not require matter is _____.
a. combustion b. conduction c. convection d. radiation
- b 10. Solar collectors are parts of _____.
a. passive solar heating systems c. internal combustion engines
b. active solar heating systems d. external combustion engines
- C 11. Energy from the sun travels to Earth as _____.
a. mechanical energy c. radiant energy
b. chemical energy d. combustion
- C 12. Of the following, the best insulator would be _____.
a. silver b. copper c. air d. iron
- a 13. A device that heats your home by transferring thermal energy from a region of low temperature to a region at a higher temperature is a _____.
a. heat mover b. radiator c. conductor d. heat engine
- d 14. A device that converts thermal energy into mechanical energy is a _____.
a. heat mover b. radiator c. conductor d. heat engine

Chapter 6 Test (continued)

- b 15. The effectiveness of insulation is rated with _____.
 a. a convection value c. a temperature value
 b. an R-value d. a solar value
- a 16. The inside surfaces of the glass inside vacuum bottles are coated with aluminum to prevent heat loss by _____.
 a. radiation b. combustion c. convection d. solar energy
- c 17. Compared to the efficiency of a gasoline engine, a diesel engine is _____.
 a. one-fourth as efficient c. twice as efficient
 b. one-half as efficient d. four times as efficient
- d 18. Which of the following is the correct sequence of strokes in a four-stroke engine?
 a. intake, power, compression, exhaust c. compression, intake, exhaust, power
 b. intake, exhaust, compression, power d. intake, compression, power, exhaust
- b 19. Some hydroelectric plants use the _____ energy of the tides to generate electricity.
 a. chemical b. mechanical c. nuclear d. thermal
- d 20. An ocean thermal energy conversion (OTEC) heat engine uses _____ to drive a turbine to generate electricity.
 a. cold deep water to vaporize a high boiling-point fluid
 b. moving surface water
 c. ocean winds
 d. warm surface water to vaporize low boiling-point fluid

II. Understanding Concepts

Identify each step of the four-stroke gasoline engine described. Write your answer in the space provided.

- exhaust 4. 1. Waste products of burned fuel are forced out of the cylinder.
- power 3. 2. Combustion of the fuel forces the piston downward.
- intake 1. 3. A fuel-air mixture enters the cylinder.
- compression 2. 4. A piston moves upward, squeezing the fuel-air mixture into a smaller space.

Complete the following in the space provided.

5. List the steps of a four-stroke engine in the correct sequence beginning with the fuel-air mixture entering the cylinder. intake, compression, power, exhaust

Skill: Making Tables

6. Use the following terms to complete the table below comparing three kinds of engines.

burns fuel internal combustion external combustion has spark plugs

Gasoline	Diesel	Steam
burns fuel	burns fuel	burns fuel
internal	external	external
spark plugs		

Chapter 6 Test (continued)

Match each home-heating system in Column II to its description in Column I. Write the correct letter in the space provided.

Column I

Column II

- 1 f 7. fan moves warm air
- e 8. pump circulates a liquid to a radiator
- b 9. large windows on south side of building
- d 10. hot vapor is forced through radiators
- a 11. large tank for storing water heated by the sun
- c 12. gives uniform warmth

- a. active solar
- b. passive solar
- c. electrical
- d. steam
- e. hot water
- f. forced air

Skill: Concept Mapping

13. In a cycle concept map explaining the steps in one cycle of a four-stroke engine, which stroke would be placed between the intake stroke and the power stroke? compression

Skill: Using Variables, Constants, and Controls

You are going to conduct an experiment to find out if aluminum or black cloth is a better insulator.

14. What will be the variables in your experiment? type of material: alum. or black cloth
15. How will you set up a control? set up identical experiment away from sunlight

III. Applying Concepts

Writing Skills

Answer the following questions on the lines provided.

1. Why are OTEC plants located in tropical and subtropical regions? There are differences between temp. of surface + deeper ocean water needed to operate the OTEC heat engines (20°C)
2. How does the combustion of fuel in a diesel engine differ from the combustion of fuel in a gasoline engine? Diesels don't use spark plugs
3. If you were going to wrap your hot-water heater with insulation to prevent heat from escaping into the air, would you place the side of the insulation with the foil next to the tank or away from the tank? Why? next to the tank so that heat would be reflected back into tank.

Chapter 6 Test (continued)

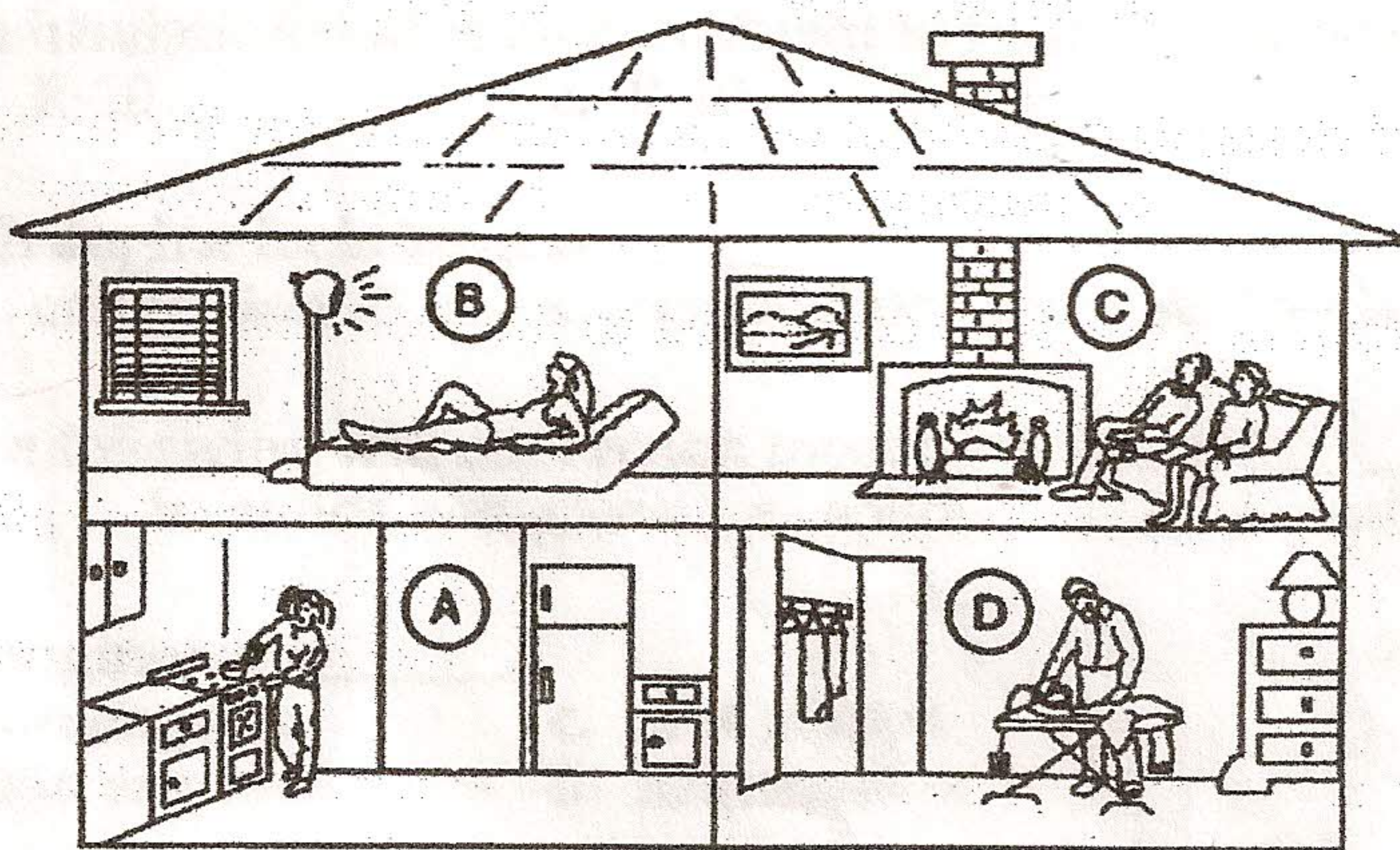
4. A well-insulated house should have insulation with an R-value of at least R-19 in the walls and an R-value of R-30 to R-44 in the ceilings. Why is a higher R-value needed in the ceilings?

Heat rises thus more heat would escape through ceiling

5. Why do the pipes in a steam-heating system need to be insulated?

Helps to keep steam in pipes from cooling down + condensing before reaching the desired destination

Use the figure below to answer questions 6–10. In the blank at the left, write the letter of the term or phrase that completes each statement or answers the question.



- c 6. How will the heat from the pot in room A move to its handle?
a. convection b. radiation c. conduction d. both a and b
- d 7. Thermal energy is transferred to the sunbather in room B by _____.
a. convection b. radiation c. conduction d. both a and b
- a 8. Where does most of the heat provided by the fire in room C go?
a. up the chimney b. into the room c. to the people d. none of these
- d 9. In room C, thermal energy is transferred to the people by _____.
a. convection b. conduction c. radiation d. both a and c
- b 10. In room D, the thermal energy of the iron is transferred to the clothes by _____.
a. convection b. conduction c. radiation d. none of these