

CHAPTER REVIEW

The Kinetic-Molecular Theory of Matter

SECTION 1 REVIEW

1. What idea is the kinetic-molecular theory based on?
2. What is an ideal gas?
3. State the five basic assumptions of the kinetic-molecular theory.
4. How do gases compare with liquids and solids in terms of the distance between their molecules?
5. What is the relationship between the temperature, speed, and kinetic energy of gas molecules?
6. a. What is diffusion?
b. What factors affect the rate of diffusion of one gas through another?

Liquids

SECTION 2 REVIEW

7. What is a fluid?
8. What is surface tension?
9. Give two reasons why evaporation is a crucial process in nature.

Solids

SECTION 3 REVIEW

10. List six properties of solids, and explain each in terms of the kinetic-molecular theory of solids.
11. List four common examples of amorphous solids.
12. List and describe the four types of crystals in terms of the nature of their component particles and the type of bonding between them.

Changes of State

SECTION 4 REVIEW

13. Using **Figure 14**, estimate the approximate equilibrium vapor pressure of each of the following at the specified temperature.
 - a. water at 80°C
 - b. diethyl ether at 20°C
 - c. ethanol at 60°C
14. a. What is sublimation?
b. Give two examples of common substances that sublime at ordinary temperatures.
15. What is meant by the normal freezing point of a substance?
16. Explain how the attractive forces between the particles in a liquid are related to the equilibrium vapor pressure of that liquid.
17. Explain the relationship between atmospheric pressure and the actual boiling point of a liquid.
18. Explain the relationship between the molar enthalpy of fusion of a solid and the strength of attraction between that solid's particles.

PRACTICE PROBLEMS

19. a. The molar enthalpy of vaporization for water is 40.79 kJ/mol . Express this enthalpy of vaporization in joules per gram.
b. The molar enthalpy of fusion for water is 6.009 kJ/mol . Express this enthalpy of fusion in joules per gram.
20. Calculate the molar enthalpy of vaporization of a substance given that 0.433 mol of the substance absorbs 36.5 kJ of energy when it is vaporized.
21. Given that a substance has a molar mass of 259.0 g/mol and a 71.8 g sample of the substance absorbs 4.307 kJ when it melts,
 - a. calculate the number of moles in the sample.
 - b. calculate the molar enthalpy of fusion.
22. a. Calculate the number of moles in a liquid sample of a substance that has a molar enthalpy of fusion of 3.811 kJ/mol , given that the sample releases 83.2 kJ when it freezes.
b. Calculate the molar mass of this substance if the mass of the sample is 5519 g .