

Chemistry—Ch. 13-14 Practice Problems

SECTION 13.1 THE NATURE OF GASES

1. Explain why there is no gas pressure inside a vacuum.
2. How would the reading on a barometer change if you were to take one on a trip from Los Angeles to Lake Tahoe, which is at a much higher altitude?
3. The height of a column of mercury in a barometer is 754.3 mm. What is the atmospheric pressure in atm? In kPa?
4. How does the average kinetic energy of the helium atoms in a balloon change as the helium gas is heated from  $-100.0^{\circ}\text{C}$  to  $73^{\circ}\text{C}$ ?

SECTION 13.2 THE NATURE OF LIQUIDS

1. In general, how do the intermolecular attractions between particles in a gas compare with those between particles in a liquid?
2. An open beaker is about half filled with water. How can a dynamic equilibrium be established between the water and the vapor forming above its surface?
3. Explain how the following description is an analogy for evaporative cooling: If the fastest runner is removed from a race, the average speed of the remaining runners will be lower.
4. The normal boiling point of ethanol is  $78.5^{\circ}\text{C}$ . The normal boiling point of water is  $100^{\circ}\text{C}$ . At  $75^{\circ}\text{C}$ , which liquid, ethanol or water, has the greater vapor pressure? Explain.

SECTION 13.3 THE NATURE OF SOLIDS

1. Give an example of a crystalline solid. What is a crystal?

SECTION 13.4 CHANGES OF STATE

To answer the following questions, refer to the phase diagram shown in Figure 13.15 of your textbook.

1. How does the melting point of water change as the pressure increases?
2. What does the line separating the solid phase from the vapor phase represent?
3. What does the line separating the liquid phase from the vapor phase represent?
4. What is the vapor pressure of liquid water at  $100^{\circ}\text{C}$ ?

SECTION 14.1 THE PROPERTIES OF GASES

1. Using kinetic theory, explain why a tire is more likely to blow out during a trip in the summer than during one in the winter.

SECTION 14.2 THE GAS LAWS

1. The volume of a gas at 155.0 kPa changes from 22.0 L to 10.0 L. What is the new pressure if the temperature remains constant?