CHAPTER REVIEW

For more practice, go to the Problem Bank in Appendix D.

The Atom: From Philosophical Idea to Scientific Theory

SECTION 1 REVIEW

1. Explain each of the following in terms of Dalton's atomic theory:
   a. the law of conservation of mass
   b. the law of definite proportions
   c. the law of multiple proportions

2. According to the law of conservation of mass, if element A has an atomic mass of 2 mass units and element B has an atomic mass of 3 mass units, what mass would be expected for compound AB? for compound A_2B_3?

The Structure of the Atom

SECTION 2 REVIEW

3. a. What is an atom?
   b. What two regions make up all atoms?

4. Describe at least four properties of electrons that were determined based on the experiments of Thomson and Millikan.

5. Summarize Rutherford's model of the atom, and explain how he developed this model based on the results of his famous gold-foil experiment.

6. What number uniquely identifies an element?

Counting Atoms

SECTION 3 REVIEW

7. a. What are isotopes?
   b. How are the isotopes of a particular element alike?
   c. How are they different?

8. Copy and complete the following table concerning the three isotopes of silicon, Si. (Hint: See Sample Problem A.)

Isotope	Number of protons	Number of electrons	Number of neutrons
Si-28			
Si-29			
Si-30			

9. a. What is the atomic number of an element?
   b. What is the mass number of an isotope?
   c. In the nuclear symbol for deuterium, $^{2}_{1}H$, identify the atomic number and the mass number.

10. What is a nuclide?

11. Use the periodic table and the information that follows to write the hyphen notation for each isotope described.
   a. atomic number = 2, mass number = 4
   b. atomic number = 8, mass number = 16
   c. atomic number = 19, mass number = 39

12. a. What nuclide is used as the standard in the relative scale for atomic masses?
   b. What is its assigned atomic mass?

13. What is the atomic mass of an atom if its mass is approximately equal to the following?
   a. $\frac{1}{3}$ that of carbon-12
   b. 4.5 times as much as carbon-12

14. a. What is the definition of a *mole*?
   b. What is the abbreviation for *mole*?
   c. How many particles are in one mole?
   d. What name is given to the number of particles in a mole?

15. a. What is the molar mass of an element?
   b. To two decimal places, write the molar masses of carbon, neon, iron, and uranium.

16. Suppose you have a sample of an element.
   a. How is the mass in grams of the element converted to amount in moles?
   b. How is the mass in grams of the element converted to number of atoms?

PRACTICE PROBLEMS

17. What is the mass in grams of each of the following? (Hint: See Sample Problems B and E.)
   a. 1.00 mol Li
   b. 1.00 mol Al
   c. 1.00 molar mass Ca
   d. 1.00 molar mass Fe
   e. 6.022×10^{23} atoms C
   f. 6.022×10^{23} atoms Ag

18. How many moles of atoms are there in each of the following? (Hint: See Sample Problems C and D.)
   a. 6.022×10^{23} atoms Ne
   b. 3.011×10^{23} atoms Mg
   c. 3.25×10^{5} g Pb
   d. 4.50×10^{-12} g O