Name _____ Date _____ Class _____

10.1 THE MOLE: A MEASUREMENT OF MATTER

Section Review

Objectives

- Relate Avogadro's number to a mole of a substance
- Calculate the mass of a mole of any substance
- Describe methods of measuring the amount of something
- Compare and contrast the atomic mass of an element and its molar mass

Vocabulary

- mole (mol)
- Avogadro's number
- representative particle
- molar mass

Key Equations

- moles = representative particles $\times \dfrac{1 \text{ mole}}{6.02 \times 10^{23} \text{ representative particles}}$
- representative particles = moles $\times \dfrac{6.02 \times 10^{23} \text{ representative particles}}{1 \text{ mole}}$

Part A Completion

Use this completion exercise to check your knowledge of the terms and your understanding of the concepts introduced in this section. Each blank can be completed with a term, short phrase, or number.

Chemists relate units of counting, of mass, and of volume to a single quantity called the ___1___. The number of representative particles in a mole of a substance is ___2___.

To find the mass of a mole of a compound, scientists add together the ___3___ of the atoms making up the compound. When you substitute the unit *grams* for amu, you obtain the ___4___ of the compound. There are ___5___ representative particles in a mole of any substance.

1. _____

2. _____

3. _____

4. _____

5. _____

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Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

_____ **6.** A mole of a pure substance contains 6.02×10^{23} atoms.

_____ **7.** The representative particle of a compound is the molecule.

_____ **8.** A mole of CCl_4 is composed of one atom of carbon and four atoms of chlorine.

_____ **9.** A mole of carbon atoms has a mass approximately three times as great as the mass of a mole of helium atoms.

_____ **10.** The molar mass of nitrogen gas is 14.0 g.

Part C Matching

Match each description in Column B to the correct term in Column A.

Column A	Column B
_____ **11.** Avogadro's number	**a.** the atoms, molecules, or ions present in a substance
_____ **12.** molar mass	**b.** 6.02×10^{23}
_____ **13.** mole	**c.** the mass of one mole of a substance
_____ **14.** representative particles	**d.** SI unit that measures the amount of a substance

Part D Problems

Solve the following problems in the space provided. Show your work.

15. How many moles of Pb is 9.3×10^{15} atoms of Pb?

16. What is the molar mass of ethane, C_2H_6?

17. Find the mass of 3.65×10^{-2} mol K_2SO_4.

18. How many representative particles are in 2.5 mol H_2O_2?

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