THE MOLE CONCEPT

1. Several words in our language are used to represent number of things. For example:

   The word pair represents the number _____

   The word dozen represents the number _____

   The word score represents the number _____

   The word gross represents the number _____.

2. In Chemistry the word mole represents the number 6.02×10^{23}.

   A mole of thingies is 6.02×10^{23} thingies. Just as a dozen nails means _____ nails, a mole of nails means 6.02×10^{23} nails.

   A mole of atoms is _____atoms, a mole of molecules is _____ molecules.

3. We must specify what we are counting. A mole of cars requires 1 mole of engines, but rides on _____ moles of wheels. A mole of tricycles requires _____ moles of wheels. A mole of anything is 6.02×10^{23} of those things. The number 6.02×10^{23} is called Avogadro's Number.

4. Avogadro's Number of dollars is 6.02×10^{23} dollars and has _____ pennies.

5. Suppose that a cargo short has 6 pockets and one zipper. A mole of shorts requires _____ moles of pockets and _____ mole of zippers.

6. A mole of gold atoms contains _____ gold atoms. If we had 12.04×10^{23} gold atoms, we would have _____ moles of gold atoms.

7. One atom of isotope ^{12}C has a mass of 12 amu. If an element is one-third the mass of carbon, its atomic mass is approximately _____ times the mass of ^{12}C.

8. 12.01 amu is the mass listed for the atomic mass of carbon. This means that a mole of carbon atoms has a mass of 12.01 g. Avogadro's Number of helium atoms has a mass of 4.00 g.

9. The atomic mass of hydrogen is 1.008 amu and the atomic mass of oxygen is 16.00 amu. There are _____ oxygen atoms in a mole of oxygen atoms. A mole of oxygen atoms is _____ g.

10. The atomic mass is given in amu or simply u. The molar mass is the mass in grams of Avogadro's Number of atoms or molecules. The mass of one mole of N atoms is 14.0 g and the mass of one mole of CO_2 molecules is 44.0 g.

11. The atomic mass of F atom is 19.0 amu. The molar mass of F atoms is 19.0 g.

12. For any element, the mass of a mole of atoms is equal to the atomic mass expressed in grams. A mole of S atoms is 32.07 g, and a mole of Au atoms is 196.97 g.

13. 12.01 g is the mass of a mole of carbon atoms or _____ carbon atoms.

14. A molar mass means that a mole _____.

15. A mole of helium atoms has a mass of _____g. There are _____ helium atoms in a mole.