MY MOLE MONTAGE

I. The Mole and Avogadro's Number

The mole defined:

The mole (_____) is a _____ unit for the number of _____.
It is based on the number of atoms in 12 grams of Carbon-12, a number known as _____.

1 mol = _____

Representative particles are _____, _____, _____, or _____.

1 mol Cu = _____

1 mol Na^+ = _____

1 mol LiCl = _____

1 mol H_2O = _____

III. The Mole and Mass

Moles of different substances have same _____ of items different _____.

Molar mass defined:

The mass in grams of one mole of any element is <u>numerically</u> equal to its _____. The *atomic* mass of carbon is _____, and the *molar* mass of carbon is _____.

Molar mass of Na = _____

Molar mass of Cl = _____

Molar mass of O = _____

Molar mass of H = _____

II. Conversions: Moles to Particles and Particles to Moles

The relationship between the mole and Avogadro's number is a _____ _____ and may be written in two ways:

_____ _____

PRACTICE

① Find the number of atoms in 2.40 mol Cu.

_____ = _____ | _____ =

② How many formula units are in 2.90 mol NaCl?

_____ = _____ | _____ =

③ Find the number of moles in 1.55×10^{24} ions Ca^{2+}.

_____ = _____ | _____ =

④ How many moles are equivalent to 2.08×10^{24} molecules CO_2?

_____ = _____ | _____ =

IV. Moles of Compounds

_____ in a chemical formula indicate the number of _____ or the number of _____ of an element in the formula. _____ _____ are written to show the relationship between an individual element and its compound.

☒ mol element = _____

where ☒ = subscript for element in chemical formula

- In one molecule of H_2O, there are _____ atoms of H and _____ atom of O. Similarly, in one mole of H_2O, there are _____ moles of H and _____ mole of O. The ratio of hydrogen to water is _____:_____.
- The conversion factor is _____ = _____.
  Conversion factors may be written as fractions:

  _____ _____

- Write two forms of the conversion factor showing the ratio of oxygen to water.

  _____ _____

- How many moles of hydrogen are in 2.75 moles of water?

  _____ = _____ =

- What is the mass (grams) of hydrogen in 2.75 moles of water?

  _____ = _____ =

V. Molar Mass of Compounds

The molar mass of a _____ is the sum of the masses of every particle making up the compound. Molar mass of each element is multiplied by _____ of that element (*think* _____) in compound. Element masses are then _____.

- Molar mass of water (H_2O)
  Hydrogen:

  Oxygen:

  _____ g H + _____ g O = _____ g H_2O per mole of H_2O (_____H_2O)

- Calculate the molar mass of the following elements and compounds.

1. N
2. N_2
3. NH_3
4. C
5. S
6. NaCl
7. NaOH
8. O_2
9. $C_6H_{12}O_6$
10. $(NH_4)_2S$