

**TEST 2 (of 3)**

**Show all of your work. Students should make use of the conversion factor method throughout and express their answers in scientific notation.**

- (a) What are the three fundamental particles from which atoms are built? What are their electric charges? Which of the particles constitute the nucleus of the atom? Which is the least massive of the three?

(b) How many of each of the fundamental particles are there in an atom of  $^{24}\text{Mg}$ ?
- In each case, decide which represents more mass: (circle your answer)

(a) 0.5 mol Na or 0.5 mol Si

(b) 9.0 g Na or 0.50 mol Na

(c) 10 atoms of Fe or 10 atoms of K
- How many electrons are in a calcium atom (Ca)? Does an atom of Ca gain or lose electrons when forming an ion? How many electrons are gained or lost by the atom? When Ca forms an ion, the ion has the same number of electrons as which one of the noble gases?
- Lithium has two stable isotopes:  $^6\text{Li}$  and  $^7\text{Li}$ . One of them has an abundance of 92.5 %, and the other has an abundance of 7.5 %. Knowing that the atomic mass of lithium is 6.941 which is the more abundant isotope? (circle your answer)
- The compound  $(\text{NH}_4)_2\text{SO}_4$  consists of two different polyatomic ions.

(a) What are the names and electric charges of these ions?

(b) What is the molar mass of this compound?
- Give the symbol, including the correct charge for each of the following ions:

(a) barium ion, (b) titanium (IV) ion, (c) sulfide ion, (d) sulfate ion
- Which of the following are not the correct formulas for ionic compounds? For those that are not, give the correct formula.

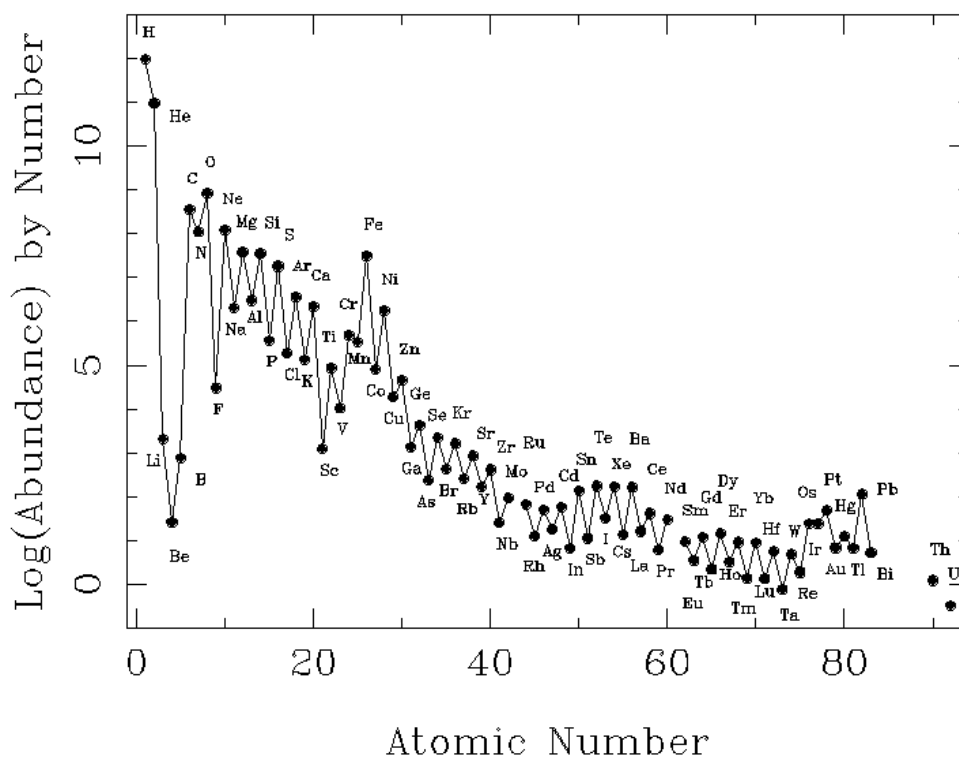
(a)  $\text{Ca}_2\text{O}$ , (b)  $\text{SrBr}_2$ , (c)  $\text{Fe}_2\text{O}_5$ , (d)  $\text{Li}_2\text{O}$
- Name the following molecular compounds:

(a)  $\text{NF}_3$ , (b)  $\text{HCl}_{(\text{aq})}$ , (c)  $\text{CO}$ , (d)  $\text{SO}_2$
- Name the following:

(a)  $\text{Pb}(\text{CO}_3)_2$ , (b)  $\text{NaNO}_3$ , (c)  $\text{HNO}_3$ , (d)  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$

10. The chart shown below is a plot of the relative abundance of elements 1 through 30 in the solar system.
- Which is the most abundant metal?
  - Which is the most abundant nonmetal?
  - Which is the most abundant metalloid?
  - Which is the most abundant transition metal?
  - What halogens are included on this plot and which is the most abundant?
  - Is there a relationship between abundance and atomic number?
  - Is there any difference between the relative abundance of an element of even atomic number and those with odd atomic numbers?

Logarithmic SAD Abundances:  $\text{Log}(H) = 12.0$



Take Home BONUS (email me your solution by the end of day today, worth 2 points)

In the 2 x 2 box shown here, each answer must be correct four ways: horizontally, vertically, diagonally, and by itself. Instead of words, use symbols of the elements. When the puzzle is complete, the four spaces will contain the overlapping symbols of ten elements. There is only one correct solution.

1	2
3	4

Horizontal

1-2: Two-letter symbol for a metal used in ancient times.

3-4: Two-letter symbol for a metal that burns in air and is found in group 5A.

Vertical

1-3: Two-letter symbol for a metalloid.

2-4: Two-letter symbol for a metal used in U.S. coins.

Single squares: all one-letter symbols

1. A colorful nonmetal.

2. Colorless gaseous nonmetal.

3. An element that makes fireworks green.

4. An element that has medicinal uses.

Diagonal

1-4: Two-letter symbol for an element used in electronics.

2-3: Two-letter symbol for a metal used with Zr to make wires for superconducting magnets.