**Isotope and Ions Practice Worksheet** Name: _____

**Part I: Isotopes**

1. Define an isotope.

2. What would happen if the number of protons were to change in an atom?

3. Another way to write isotopes is to write the name of the element then add the mass number after a dash, for example, $^{14}_{6}C$ is carbon-14. Why isn't the atomic number needed for this notation?

4. Here are three isotopes of an element: $_{6}^{12}C$ $_{6}^{13}C$ $_{6}^{14}C$
   a. The element is: _____
   b. The number 6 refers to the _____
   c. The numbers 12, 13, and 14 refer to the _____
   d. How many protons and neutrons are in the first isotope? _____
   e. How many protons and neutrons are in the second isotope? _____
   f. How many protons and neutrons are in the third isotope? _____

**Complete the following chart:**

| Isotope name | atomic # | mass # | # of protons | # of neutrons | # of electrons |
|---|---|---|---|---|---|
| 92 uranium-235 | | | | | |
| 92 uranium-238 | | | | | |
| 5 boron-10 | | | | | |
| 5 boron-11 | | | | | |

**Part II: Ions**

**Determine the charges on the following using the diagram above as a guide:**

1. An atom having lost two electrons _____
2. An atom having lost six electrons _____
3. An atom having gained one electron _____
4. An atom having gained three electrons _____
5. An atom having lost five electrons _____
6. An atom having gained two electrons _____
7. An atom having lost one electron _____
8. An atom having gained four electrons _____

**Ions Continued**

**Complete the following:**

1. For each of the positive ions listed in column 1, use the periodic table to find in column 2 the total number of electrons that ion contains. The same answer may be used more than once.

| | |
|---|---|
| ____ 1. $Al^{+3}$ | A. 2 |
| ____ 2. $Fe^{+3}$ | B. 10 |
| ____ 3. $Mg^{+2}$ | C. 21 |
| ____ 4. $Sn^{+2}$ | D. 23 |
| ____ 5. $Co^{+2}$ | E. 24 |
| ____ 6. $Co^{+3}$ | F. 25 |
| ____ 7. $Li^{+1}$ | G. 36 |
| ____ 8. $Cr^{+3}$ | H. 48 |
| ____ 9. $Rb^{+1}$ | I. 76 |
| ____ 10. $Pt^{+2}$ | J. 81 |

| Element/Ion | Atomic Number | Number of Protons | Number of Neutrons | Number of Electrons | Mass Number |
|---|---|---|---|---|---|
| $^{1}_{1}H$ | | | | | |
| $^{1}_{1}H^{+}$ | | | | | |
| $^{35}_{17}Cl^{-}$ | | | | | |
| $^{24}_{12}Mg^{2+}$ | | | | | |
| $^{108}_{47}Ag^{+}$ | | | | | |
| $^{32}_{16}S^{2-}$ | | | | | |
| | | 30 | | 28 | 66 |
| | 76 | | 114 | | |

**Answer the following questions:**

1. Define an ion.

2. a. How can you tell if an atom has a negative charge? What type of Ion is this?

b. How can you tell if an atom has a positive charge? What type of ion is this?