**3. “The Atom” homework questions (Physical Science)**

Name and date submitted (3 pts):

Instructions: Create space in the Word document below, and write or type your answers. Turn in your completed work as an email attachment.

(20 questions, 100 points total)

Atomic structure

1. What does the word ‘atomos’ mean?
2. What is an atom?
3. What is the difference between an atom and a molecule?
4. Describe the composition of the nucleus of the atom (what subatomic particles are in the nucleus?)
5. What is the meaning of “atomic number”?
6. What is the meaning of “atomic mass”?
7. Compare/contrast the three types of subatomic particles in terms of

location in the atom relative mass relative charge

Protons

Neutrons

Electrons

1. How many protons are in the nuclei of the following elements?
   1. Sulfur
   2. Hydrogen
   3. Phosphorus
   4. Chlorine
   5. Calcium
2. What is the atomic mass of
   1. Oxygen
   2. Aluminum
   3. Copper
   4. Gold

Isotopes

1. What is meant by “isotope”?
2. Determine the number of protons, neutrons, and electrons in each of the three isotopes of hydrogen

protons neutrons electrons

* 1. H-1
  2. H-2
  3. H-3

1. Determine the number of protons, neutrons, and electrons in carbon-14 (C-14)
   1. Protons
   2. Neutrons
   3. Electrons
2. Two isotopes of oxygen are oxygen-16 and oxygen-18. Determine the number of protons, neutrons, and electrons in each

protons neutrons electrons

* 1. O-16
  2. O-18

1. What is the basic atomic difference between isotopes of the same element?
2. If your chemistry grade is broken down so that 50% of it is based on tests, 25% on lab reports, 15% quizzes, and 10% homework, what is your weighted average score if your individual breakdown is as follows? tests=83, labs=94, quizzes=96, homework=95
3. Bromine-79 comprises 50.54% of naturally occurring bromine, and Bromine-81 comprises the other 49.46%. The mass of Br-79 is 78.9183 amu. The mass of Br-81 is 80.9163 amu. What is the atomic mass of naturally occurring bromine?
4. Element X has two naturally occurring isotopes. One isotope has a mass of 35.0 amu and comprises 75.4% by mass of the element. The other isotope has a mass of 37.0 amu.
   1. What is the atomic mass of element X?
   2. What is the name of element X?
5. Write isotopic notation for the atoms or ions that have these compositions
   1. 8 protons, 8 neutrons, 8 electrons [Example: 816O]
   2. 14 protons, 14 neutrons
   3. 1 proton, 1 neutron
   4. 80 protons, 120 neutrons
   5. 26 protons, 30 neutrons, 23 electrons (be careful)

Conservation of mass

1. State the law of conservation of mass
2. Compound Z is made by chemically combining elements X and Y. If only 4 grams of element Y were used to make 12 grams of compound Z, how many grams of element X were required?