Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_ #: \_\_\_\_\_\_\_\_

**Chemistry A Fall Final Exam Test Review - 2011**

**Unit 1 – Organizing Matter:**

**4A - Physical and Chemical Changes:**

* In a chemical change, do the atoms always trade partners to form new compounds?
* Give at least 4 examples of evidence of a chemical change.
* How is a physical change different from a chemical change?
* Give at least 5 examples of physical changes.

**4B - Properties of matter:**  Fill in the chart below.

|  |  |  |
| --- | --- | --- |
| **Property of Matter** | **Brief Definition** | **An object or objects that display the property.** |
| **Density** | The ratio of mass to volume. | High density: a chunk of lead.  Low density: a pillow. |
| **Viscosity** |  |  |
| **Buoyancy** |  |  |
| **Solubility** |  |  |
| **Elasticity** |  |  |
| **Hardness** |  |  |
| **Conductivity** |  |  |
| **Brittleness** |  |  |
| **Malleability** |  |  |

**4C - Phases of Matter :**

* Define the word compressibility.
* Define density, mass, and volume, and give the units of each.
* How are mass and density different?
* What are the 3 states of matter?
* What do the symbols (*l*) (*s*) (*g*) and (*aq*) stand for?
* Which state of matter is compressible?
* Which state of matter has a definite volume *and* takes the shape of its container?
* Which state is NOT compressible, does NOT take the shape of its container, but has a definite volume?

**4D – Classification of Matter:**

* What are the four classifications of matter?
* What is the difference between mixtures and pure substances? Which can be separated physically?
* What are the two different types of mixtures? How are they different?
* What are the two different types of pure substances? How are they different?
* What is the only type of matter that cannot be physically or chemically separated?

**Unit 2 – Atomic Structure and the Periodic Table:**

**5A: General Periodic Table History and Organization:**

* Who first developed the periodic table?
* How was the periodic table first organized (atomic number or atomic mass)?
* Who changed the organization of the periodic table? How did it change?
* How can you tell the difference between metals and nonmetals?
* How can you tell if something is a metalloid?
* Which atoms are the least likely to give up electrons? Which atoms are the most likely to give up electrons?
* What state (solid, liquid, or gas) are most elements in at room temperature?
* Which elements are liquids at room temperature? Which elements are gases at room temperature?
* What do the A and B represent on the periodic table?

**5B - Properties of the Chemical Families:**

* Why does it take more energy to remove an electron from fluorine than it does for cesium?
* Know all of the family names.
* Which family of the periodic table is the least reactive?
* Which groups contain soft metals?
* Which groups contain elements that have a silvery luster?
* Which group(s) have elements that form colorful compounds?
* How can you tell how many valence electrons a group has?
* What will be the charge of Li? \_\_\_\_\_\_ Cl? \_\_\_\_\_\_ N? \_\_\_\_\_\_ S? \_\_\_\_\_\_ B? \_\_\_\_\_\_ Mg? \_\_\_\_\_\_
* Which group does not form compounds?

**5C - Periodic Trends:**

* How do energy levels help determine size?
* Draw the trends for electronegativity, ionization energy, metallic character, and atomic size.
* *(Draw four mini periodic tables and then the arrows for each trend)*

*( (( ?*

* Which groups are the most reactive?
* Which element probably has the most metallic character? Which is the largest?

**6A - Development of Modern Atomic Theory:**

* What did Dalton add to atomic theory?
* What did Thomson discover with his cathode ray tube experiment?
* What happened to most of particles shot at the atom during his gold foil experiment? What did this tell him about the structure of the atom?
* What did Bohr discover about the electrons in an atom?
* What is the mass, charge, and location for a proton, neutron, and electron?
* What is the atomic symbol for Phosphorous?
* How many protons are in the nucleus of Neon (Ne)?
* What is the atomic mass of Calcium?
* To find the number of NEUTRONS in an atom’s nucleus, you subtract the \_\_\_\_\_\_\_\_\_from the \_\_\_\_\_\_\_\_\_ .
* Every atom of carbon has 6 protons. If two atoms of carbon have different masses, they have different numbers of neutrons. What are those two atoms with different number of neutrons (and mass) called?
* How many electrons does Aluminum have?
* What group number is the element Potassium (K) in? How many VALENCE ELECTRONS does K have?
* How many energy levels does Krypton have?

**6B - Electron Movement:**

* Do electrons have more energy on the first or second shell?
* Electrons move between levels. When energy is **added** to the atom, do the electrons move up or down?
* What do the lines on a bright-line spectra represent?
* How can you tell what elements are in a mixture based on the bright-line spectra?
* Look at the visible spectrum – ROYGBIV:

Which color has the highest frequency? Longest wavelength? Most energy?

**6E - Arrangement of Electrons:**

* How many electrons fit in the first energy level? Second energy level?
* How many valence electrons does each chemical family have?
* How do you draw a lewis dot structure? Draw ones for H, Al, O, F, and Ne.
* How many valence electrons do most atoms want? Are there exceptions? Why?
* Why do atoms become ions?
* What is the name for a positive ion? Negative ion?
* How many electrons will fluorine gain or lose? Oxygen? Lithium?
* What will the charge be on fluorine? Oxygen? Lithium?
* Where do electrons go when they become excited?

**Unit 3: Chemical Reactions and Bonding**

**General Bonding Questions:**

* Why do atoms bond?
* In which bonds are electrons shared? In which bonds does one atom lose electrons and one gain them?
* Do metals lose electrons in ionic bonds or gain them? Do nonmetals lose electrons or gain them?
* If an atom loses an electron is it positive or negative? Is it a cation or an anion? (Know both terms)
* What are the characteristics of covalent compounds?
* What are the characteristics of ionic compounds?
* Which type of compound is held together by an attraction between opposite charges?
* Which type of compound isheld together because the electrons are shared between the constituent atoms?
* Know what kind of bond results from the joining of:
  + A metal and a nonmetal
  + 2 metals
  + 2 nonmetals

**13A - Types of Reactions:** List the 5 types of chemical reactions. Write a “Hint” for how to identify each one.



*Practice:* Classify the following reactions:

* C10H8 + 12 O2 🡪 10 CO2 + 4 H2O \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* 8 Fe + S8 🡪 8 FeS \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* 2 H2O 🡪 2 H2 + O2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Mg + 2 H2O 🡪 Mg(OH)2 + H2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Pb(NO3)2 + 2 KI 🡪 PbI2 + 2 KNO3 \_\_\_\_\_\_\_

**13B - Predicting Products and Writing Chemical Formulas:**

* How does reaction type help you predict the products?
* What are the products of a single replacement?
* What are the products of a double replacement?
* What are the products of a combustion reaction?
* When do you use the criss-cross method?
* How does the charge affect a chemical formula?

*Practice:* Predict the products of these reactions:

* Au + HCl → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Ag2SO4 + AlCl3 → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* C8H18 + O2 → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Mg + O2 → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Zn + AgNO3 → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*More Practice:*  Write the chemical formula for the compound that is formed when each pair of ions combines:

* Mg and Cl \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Na and NO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Be and N \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Al and S \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* NH4 and SO4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Au+2 and F \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**13C - Naming Chemical Compounds:**

* ***Remember that you get to use a Naming Flowchart. Get familiar with it!***
* How can you tell how many elements are in a compound?
* How can you tell if a compounds includes a polyatomic ion?
* Where are the metals located on the periodic table? Nonmetals?
* What’s the difference between representative elements and transition metals?
* When do you need to add a Roman numeral to a name?
* When do you use “mono” in a name?

*\*For practice, name all of the compounds you formed in the previous section.*

**13D - Balancing Equations:**

* What are the steps for balancing an equation?
* What is the difference between a coefficient and a subscript?
* What numbers can you never change when you are balancing equations?
* If you balance an equation, and don’t put a coefficient before something, what is the implied coefficient?

Balance the following Reactions:

* \_\_\_\_\_\_Hf + \_\_\_\_\_N2 → \_\_\_\_\_\_Hf3N4
* \_\_\_\_\_\_Mg + \_\_\_\_\_\_H2SO4→ \_\_\_\_\_\_MgSO4 + \_\_\_\_\_\_\_H2
* \_\_\_\_\_\_\_C2H4 + \_\_\_\_\_\_O2 → \_\_\_\_\_\_\_CO2 + \_\_\_\_\_\_\_\_H2O
* \_\_\_\_\_\_\_Fe + \_\_\_\_\_\_O2 → \_\_\_\_\_\_Fe3O2

**13E - Molecular Geometry:**

* What are the steps for drawing a Lewis Dot Structure (NOT a symbol for an element, but the compound)?
* Draw and label the following shapes: tetrahedral, trigonal pyramidal, bent, and trigonal planar.

*Practice:* Draw Lewis Dot Structures for these compounds:

NH3 H2O CH4 SO3

What is the molecular geometry for each of the Lewis Dot Structures you just drew?