**Chemistry B- Final Exam 2018/2019**

**Chemical Bonding**

1. What types of elements form ionic bonds?
2. What types of elements form covalent bonds?
3. What group/family never forms any type of bond?
4. Know the difference between ionic and covalent bonds. What is happening with the electrons? Are they shared? Are they transferred?
5. What type of bond forms anions and cations? Which elements typically form the cation? The anion?
6. Are cations positive or negative?
7. Be able to draw the bonding between atoms (both ionic bonds and covalent bonds)
8. Be able to draw covalent bonds in which double or triple bonds are needed. Realize that in double bonds the atoms share 2 pairs of electrons and in triple bonds they share 3 pairs of electrons
9. Determine whether or not a covalently bonded molecule is polar or non-polar
10. Recognize that diatomic molecules are non-polar. What are some examples of diatomic molecules?
11. Realize that atoms bond for two main reasons:
    1. The need to fill their valence shell or at least have 8 electrons in it (Octet rule), except Hydrogen which only needs 2.
    2. Electric neutrality – want to have an overall neutral charge when bonded together
12. Recognize that electrostatic/Coulombic forces of attraction are what hold the cations and anions of ionic bonded atoms together. They also hold the “sea” of electrons in metallic bonds.
13. What are the characteristics of materials with metallic bonds? What are their physical properties? Alloys are examples of metallic bonds (steel etc.)
14. What type of bond causes properties like conductivity, solubility in water, and high melting points?
15. Be able to use oxidation numbers and the crisscross tactic to get the chemical formula. For example, Sodium (Na) gives away 1 electron so ends up being +1, Oxygen takes two electrons so ends up having -2 charge.

Na+1 O-2 crisscross numbers 🡪 Na2O for the chemical formula

**Nomenclature**

Naming/Writing Formulas – Look at your See, Think, Wonder sheets with the tables etc.

* Binary Ionic Compounds
* Ionic compounds with Polyatomic ions
* Binary Molecular Compounds
* Naming Compounds with varied oxidation states

**Chemical Reactions and Balancing Equations**

1. Be able to list some evidence that would let you know that a chemical reaction has occurred (Think about the labs we have done – what did you see? What happened?)
2. Know the basic parts of a chemical formula:

Reactants 🡪 Products

The arrow means “yields” or “produces” or “forms”. Recognize that bonds must be broken and new ones formed

1. Be able to classify chemical reactions as: Synthesis, Decomposition, Single displacement, Double displacement or Combustion
2. Combustion reactions require a little activation energy to get them going but they are exothermic reactions. Energy in the form of heat and light is released. What are the products of every combustion reaction? What do you need to burn the hydrocarbon?
3. The Law of Conservation of Matter and the Law of Conservation of Mass requires that chemical equations be balanced.
4. Make sure you can use coefficients to balance chemical reactions.
5. Know the difference between coefficients and subscripts
6. Be able to explain 3-5 ways a chemist can increase the rate of a chemical reaction
7. Recognize that if you don’t have enough of a reactant, you will get limited (or no) product forming. The reagent (or reactant) that affects how much product you get (your yield) is the limiting reagent.

**Moles, Molecules, and Math – oh my!**

1. Be able to use the Periodic Table to calculate molecular and formula masses
2. Be able to calculate the percent composition of each element in a compound or molecule (i.e. what % composition is Carbon in the molecule CO2?). Don’t forget you can always check your math by determining if the percent composition for each element adds up to 100%!
3. Recognize that the molecular mass, atomic mass, and formula mass are equal to the **molar mass** (number of grams/mol)
4. Be able to use conversion factors to calculate from grams to moles and from moles to grams
5. Recognize that 1 mol of any substance has 6.02 X 1023 particles (Avogadro’s number)
6. Be able to use conversion factors to convert from moles to particles or particles to moles using Avogadro’s number
7. Recognize that 1 mol of any gas at standard temperature and pressure has 22.4L
8. Be able to use conversion factors to convert moles of a gas into liters and liters into moles.
9. Be able to do more than 1 conversion factor to solve a problem. i.e. how many molecules are in 4.6L of a gas?

First you need to convert the liters into moles:

4.6L X 1 mol = 0.2 mols

22.4L (at STP)

Now convert moles to molecules:

0.2 mols X 6.02 X 1023 = **1.2 x 1023 molecules**

1 mol

**Stoichiometry**

1. Stoichiometry is the quantitative measure of reactants and products in chemical equations/reactions
2. Most reactions do not go to completion (Do not get all the product you expect). Why might this be the case? Give several reasons.
3. In a chemical reaction, how can you identify the limiting reactant? The excess reactant?
4. Be able to Calculate the percentage yield using the formula :

Actual yield in grams\_\_\_\_ x 100%

Theoretical yield in grams

Note – you must also be able to calculate the actual or theoretical yields if given the percentage etc.

1. Be able to perform mole to mole stoichiometry problems using molar ratios from chemical reactions
2. Be able to perform mole to mass and mass to mole stoichiometry problems
3. Be able to perform mass to mass stoichiometry problems
4. What if we are making a solution for an experiment? How do we calculate the molarity of the solution?

Solute – substance that is dissolved in the solution

Solvent – the substance in which the solute is dissolved

The Molarity of a solution = Mass of solute (in grams)

Volume of solution (in Liters)

\*Be able to calculate the molarity of a Solution

STUDY, STUDY, STUDY AND

GOOD LUCK 😊