Checklist for Exam 2 (2019)

Chapter 3. Formulas, Equations and Moles

- ❑ I recognize different ways molecules can be represented, including the ball-and stick model, the formula, the pressed-together-spheres model, and the atomic symbol and line model (Section 3.1)
- ❑ I can write and balance chemical equations. I use the link method to help balance harder equations. (Section 3.2)
- ❑ I can write an equation from the words for formulas. (Section 3.2 and Chapter 2 Nomenclature)
- ❑ I can calculate the molar mass of a compound. (Section 3.3)
- ❑ I can convert mass to moles and moles to mass for any substance. (Section 3.3)
- ❑ ***Go Moles!*** I can calculate the number of moles of a reagent needed to react completely with a given number of moles of another reagent. I can do the same starting with masses instead of moles. (mass of A → moles of A → moles of B → mass of B) (Section 3.3)
- ❑ I can calculate the theoretical yield of a product given the mass or moles of a reactant. I know that theoretical yield can be expressed in either moles or grams. (Section 3.3)
- ❑ I know the formula for percent yield. I can calculate percent yield given theoretical yield and actual yield, or given percent yield and theoretical yield, I can calculate actual yield. (Of course, usually, I will have to calculate theoretical yield when needed.) (Section 3.4)
- ❑ I can determine the limiting reagent. To do so, I must ***Go Moles!*** and then divide each by the coefficient and compare; the smaller number points to the LR. (Section 3.5)
- ❑ Once I've determined the limiting reagent, I can calculate how much (in moles or mass) of the other reagent is left over. This is like a theoretical yield calculation. (Section 3.5)
- ❑ I can determine the percent composition and empirical formula of a compound. (Section 3.6)
- ❑ I can use combustion analysis data to obtain the empirical formula of a compound containing carbon, hydrogen, and one other element. (Section 3.7)
- ❑ I can use the empirical formula and molar mass (by mass spectroscopy, for example) to determine the molecular formula of a compound. (Section 3.8)

Chapter 4. Reactions in Aqueous Solutions

- ❑ I know the definition of the concentration unit molarity (molar concentration = $moles_{solute}/V_{sol'n}$). This formula is often written as **M = n/V**. (Section 4.1)
- ❑ When the concentration and volume are known, I can calculate moles by rearranging the equation to give **n = MV**. (Section 4.1)
- ❑ I can do calculations involving dilutions using $M_{conc}V_{conc}=M_{dil}V_{dil}$. (Section 4.2)
- ❑ I can classify reactions by inspection as precipitation, acid-base neutralization, or oxidation-reduction, commonly called *redox*. (Section 4.4)

- ❑ I know that all ionic solids that dissolve dissociate 100% into ions and are thus strong electrolytes. Ionic solids that do not dissolve are non-electrolytes. (Section 4.3)
- ❑ I know that covalent molecular compounds are generally non-electrolytes. (So far we can't predict if they dissolve in water or not.) (Section 4.3)
- ❑ I can sketch what species is/are present in a beaker of an aqueous solution. (Section 4.3)
- ❑ I can write and balance chemical equations for precipitation reactions and acid-base reactions. I can then go on to write the ionic equation and the net ionic equation for these reactions. (Section 4.5)
- ❑ I know the Solubility Rules and can apply them to predict whether or not an ionic solid is soluble in water or not. (Section 4.6)
- ❑ I can use the Solubility Rules to predict if two aqueous solutions, when mixed, would produce a precipitate — and I can write the formula for the precipitate. (Section 4.6)
- ❑ I can use the Solubility Rules to suggest how an insoluble salt may be prepared. (Section 4.6)
- ❑ I know that acids are either strong or weak. I can identify an acid from its formula and can predict if it's strong or weak. Strong acids are strong electrolytes and weak acids are weak electrolytes. (Section 4.7)
- ❑ When both reagents are in solution, I must use n = MV for each one because I must work all stoichiometry problems in moles. (Sections 4.8 and 4.9)
- ❑ I can determine the volume of one reactant needed to react with a given volume of a second reactant. (Sections 4.8 and 4.9)

General skills:

- ❑ I know the ion flashcards and how to name ionic substances and acids. (Example problem: "What mass of ammonium phosphate is needed to…")
- ❑ Given a formula, I can classify compounds as ionic, covalent-molecular or acid.
- ❑ Given the name of an ionic or covalent-molecular compound or acid, I can write its formula. (Chapter 2), and visa versa (formula → name for ionics, covalent-moleculars and acids)
- ❑ I can do the "picture problems" — usually best done by rendering them into word problems.
- ❑ I can perform all of the calculations and problems we've seen on the in-class daily homework.
- ❑ I can answer questions about the demonstrations we have seen in class.