Chem CP Semester 1 Final Study Guide

Mr. Dangerfield

UNIT 1: Atomic Structure and Periodicity (ch. 1,2,3,11)

Ch. 2

1. Learn about the composition of matter
2. Learn the difference between elements and compounds
3. Define the three states of matter
4. Distinguish between physical and chemical *properties*
5. Distinguish between physical and chemical *changes*
6. Distinguish between mixtures and pure substances
7. Learn two methods of separating mixtures (distillation vs. filtration)

Ch. 3

1. What is Dalton's theory?
2. Understand and illustrate the Law of constant composition
3. Learn how a formula describes a compound's composition
4. Learn about the subatomic particles of an atom (proton, electron, neutron)
5. Understand Rutherford's experiment
6. Describe some important features of subatomic particles
7. Learn about the terms isotope, atomic number, and mass number
8. Learn the various features of the periodic table
9. Learn some of the properties of *metals, nonmetals and metalloids*
10. Describe the formation of ions from their parent atoms
11. Learn to name ions (cations and anions)
12. Predict which ion a given element forms by using the periodic table
13. Describe how ions combine to form neutral compounds

Ch. 11

1. Describe Rutherford's model of the atom
2. Explore the nature of electromagnetic radiation
3. See how atoms emit light
4. Understand how the emission spectrum of hydrogen demonstrates the "quantized" nature of energy
5. Learn about Bohr's model of the hydrogen atom
6. Understand how the electron's position is represented in the wave mechanical model

7. Learn about the shapes of the *s, p* and *d* orbitals
8. Review the energy levels and orbitals of the wave mechanical model of the atom
9. Learn about electron spin
10. Understand how the principal energy levels fill with electrons in atoms beyond hydrogen
11. Learn about valence electrons and core electrons
12. Learn about the electron configurations of atoms 1-18
13. Understand the general trends in properties in the periodic table

UNIT 2: Chemical Bonding and Structure (ch. 4,12)

Ch. 4

1. Name binary compounds of a metal and nonmetal (type I and II)
2. Name binary compounds containing only nonmetals (type III)
3. Summarize the naming of all types of binary compounds
4. Learn the names of common polyatomic ions
5. Learn to name compounds containing polyatomic ions
6. Learn how the anion composition determines an acid's name
7. Learn names for common acids
8. Learn to write the formula for a compound, given its name

Ch. 12

1. Learn about ionic and covalent bonds and explain how they are formed
2. Learn about the polar covalent bond
3. Understand the nature of bonds and their relationship to electronegativity
4. Understand bond polarity and how it is related to molecular polarity
5. Learn about stable electron configurations
6. Learn to predict the formulas of ionic compounds
7. Learn about the structures of ionic compounds
8. Understand factors governing ionic size
9. Learn to write Lewis structures
10. Learn to write Lewis structures for molecules with multiple bonds
11. Understand molecular structure and bond angles
12. Learn to predict molecular geometry from the number of electron pairs
13. Learn to apply the VSEPR model to molecules with double bonds

UNIT 3: Measurement and Stoichiometry (ch. 5,6,7,9)

Ch. 5

1. Show how very large or very small numbers can be expressed in scientific notation
2. Learn the English, metric, and SI systems of measurement
3. Use the metric system to measure length, volume and mass
4. Learn to indicate a measurement's uncertainty by using significant figures ("sig figs")
5. Learn how dimensional analysis ("what you have, what you want") can be used to solve problems
6. Learn the three temperature scales (F, C, K)
7. Define density (D=M/V)

Ch. 6

8. Understand the concept of average mass
9. Understand atomic mass
10. Understand the mole concept and Avogadro's number
11. Convert among moles, mass, and number of atoms (Stoichiometry- one and two step)
12. Understand the definition of molar mass
13. Learn to convert between moles and mass
14. Learn to calculate the mass percent of an element in a compound

Ch. 7

15. Learn the signals that show a chemical reaction has occurred
16. Identify the characteristics of a chemical reaction
17. Learn the information given by a chemical equation
18. Learn to write a balanced equation for a chemical reaction