

## Exam 2 Review Sheet for Wednesday, March 3 Exam Chem 1120, Spring 04, Robertson

Our exam will include material from parts of **chapters 13, 16, 17, and 18**. **Only material that I have covered in class, have assigned homework problems for or is mentioned on this review sheet will be tested.** Material from previous tests is also fair game, but will be given limited coverage. You always are responsible for knowing the table of monatomic and polyatomic ions. On Wednesday, you should be able to:

### Chapter 13 - Solutions

- Explain and work problems with Henry's Law. (Review)
- Define and work problems with molarity, molality, mole fraction, and weight and volume fractions. (Review)
- Define colligative properties. Explain why VP decreases and FP goes down and BP goes up when a nonvolatile solute is dissolved in a volatile solvent. Work problems with Raoult's Law as well as FP depression and BP elevation.
- Explain osmotic pressure and work problems. Define osmolarity. Give practical applications of osmotic pressure with reference to hypotonic, hypertonic, and isotonic solutions.
- Explain colloids and their relationship to solutions and suspensions. Give examples of names of types of colloids. Explain the light scattering of colloids and answers to such questions as "Why is cigarette smoke blue?"

### Chapter 16 - Kinetics

- Define kinetics and reaction rate. Determine the reaction rate in terms of the change in concentration of any reactant or product. Be able to determine graphically the instantaneous rate of a reaction.
- Explain the basic idea of collision theory for chemical reactions and the factors that affect reaction rate. This will include knowing terms such as reaction mechanism, elementary step, rate determining step, activation energy, catalyst (Homo and heterogeneous).
- Know the difference between the differential rate law and the integrated rate law. Be able to determine the order of a reaction from a rate law and vice versa.
- Determine the reaction order by the method of initial rates.
- Determine the reaction order by fitting to an integrated rate law of zero, 1<sup>st</sup> or 2<sup>nd</sup> order for A, 2A, 3A, etc. going to a product P. For the integrated rate law you must be able to use all equations relating to it. This includes the concept of half-life. You will be given the integrated rate law expressions for 0, 1<sup>st</sup> and 2<sup>nd</sup> order (A goes to P) on the test, but the order will not be identified. You should be able to derive the half-life equations.
- Explain the Arrhenius Equation for the specific rate constant "k". Be able to use this equation to determine the activation energy or the factor A for a reaction. This equation will not be given on the exam.

### Chapter 17

- Write reaction quotients and equilibrium constants for reactions. Answer questions concerning tendency of a reaction to occur, whether or not equilibrium has been established and in what direction the reaction will proceed if equilibrium has not been established. Solve problems using these constants.
- Be able to change  $K_c$  to  $K_p$  and vice versa.
- State Le Chatelier's Principle. Give examples. Tell how the reaction will shift if various stresses are put on it. Determine when the equilibrium constant itself will change as a function of that stress.

### Chapter 18

- Explain the reasons for attempting to classify substances as acids, bases, and salts. Explain the models of acid/base behavior from the viewpoint of Arrhenius and Bronsted-Lowry.
- Be able to use the BL theory to identify in a reaction acid, base, CA, CB.
- Name binary and ternary acids and their anions.
- Identify strong acids from weak acids, and strong bases from weak bases. Write appropriate chemical reactions for their ionization in water.