

Preview Sheet for Final Exam
Wednesday, December 21, 8:00 – 10:15 a.m., in Olin-Rice 350

Part 1: 60 points on acid-base chemistry and solubility

- Chapters 18 and 19 of Silberberg
- Lectures from 12/2 through 12/16
- Problem Set 10 (and the suggested study problems)
- Specific Topics:
 - Fundamental definitions (acid, base, autoionization, conjugate acid-base pairs)
 - Strong and weak acids: K_a , computing pH and other concentrations
 - Rationalizing acid strengths with Lewis structures
 - Not responsible for the periodic trends covered by Dr. Hollenbeck on 12/5
 - Strong and weak bases: structural trends, computing pH and other concentrations
 - Le Chatelier and percent ionization of an acid or a base
 - Hydrolysis; relationship between K_a and K_b
 - Not responsible for buffers, as covered by Dr. Stephens on 12/12
 - Polyprotic acids and polybasic species
 - Solubility calculations and effect of pH on solubility
- As always, in your studying, focus on your lecture notes and homework first, then look at the textbook. (See the course web page for class overheads and homework keys.)
- Test Format: Calculations and essay questions.

Part 2: 100 points based on the entire semester

- 25 multiple-choice questions from American Chemical Society standardized tests.
- Coverage of most major topics of this course:
 - Test 1: Chemical formulas and stoichiometry.
 - Test 2: Atomic spectroscopy, quantum numbers, electronic structure, periodic trends in atomic properties. No coverage of the photoelectric effect or de Broglie waves.
 - Test 3: Ionic and covalent bonding, Lewis structures, VSEPR theory, and polarity. No coverage of molecular orbital theory.
 - Test 4: Hybridization (very basic), transition metal compounds (very basic), Q vs. K , law of mass action, computing K , Le Chatelier.
 - Acid-base/solubility topics not covered in Part 1.
- Do not expect very detailed or difficult questions! The goal here is to test your mastery of the basics of the key topics from this semester.

Overall Comments

- You will have 2 hours and 15 minutes to work on the final. You are free to divide your time between the “free response” and multiple choice sections as you see fit.
- You are allowed to fill both sides of a 8.5” x 11” piece of paper with whatever information you want, and use it during the exam. Note that this personal “cheat sheet” will be in lieu of a sheet of formulas at the back of the exam booklet. All I will give you on the back page of the test is a periodic table and relevant physical constants.

[From the test booklet:]

Instructions before starting the test:

1. Write your name in the space above and on the backs of Pages 2-11.
2. Your exam booklet should have **twelve** pages total, with questions on Pages 2-11, and a periodic table and other reference data on Page 12. Check to see you have twelve pages now. If you do not, ask for another copy of the exam.
3. You may tear off Page 12 if you wish, but be careful not to remove the staple.
4. Part I of this test (on pp. 2-4) contains three questions on acid-base chemistry and solubility. Justify all of your answers in Part I. Partial credit will be awarded for work in Part I.
5. Part II of this test (on pp. 5-11) contains 25 multiple-choice questions, each worth 4 points, covering most of the major topics of the semester. Circle the correct answer to each of the questions in the exam booklet. There is no penalty for incorrect answers. Feel free to use blank spaces in this exam booklet for scratch work. However, realize that you will receive no partial credit for this work.
6. You may use as a reference a single sheet of 8.5"x 11" paper that you have filled (front and back) with information.
7. You have **2 hours and 15 minutes** to work on this exam. Do not start until you are instructed to.