

Chem 115 - Section I
Fall, 2006
Study Guide for Exam II

The second hour exam will be given during regular class time on Wednesday, November 8th. To the extent possible, please take alternate seating, leaving a blank row in front and behind you, and blank seats on either side, as you did for Exam I. The test will cover all the material in the lectures corresponding to the assigned material in Chapters 4, 5, and 6 through section 6.3. As detailed below, it will have a variety of questions and problems, similar in type and level to those assigned for homework and those on Sample Test 2 (see separate posting). The test consists of six pages, including the cover page (five pages of questions). The cover page gives the relationships between Ångstroms, meters, and nanometers; Planck's constant; and the speed of light *in vacuo*. You will also receive a copy of the periodic table, which you may use for any additional information. Any other constants or data, if needed, will be given with the specific questions. When taking the test, the only things you should have out are pencils (not pens), erasers, your calculator, the test packet, and the periodic table distributed with the test (not your own), **and nothing else**. Do not cheat!

The test will consist of the following parts.

1. (10 points; 2 points each) Who did what? Match the person with the concept or discovery. Know how the following people's work related to the topics covered on this test:

Arrhenius	Balmer	Bohr	Brackett
Einstein	Hess	Lenard	Lymann
Pfund	Planck	Rutherford	Thomson

2. (12 points; 6 points each) Write the *net ionic equations* for the reactions that occur when the following are mixed together. Indicate all states (e.g., *s*, *l*, *g*, *aq*).

Know solubility rules, gas-forming reactions, and neutralization reactions to prepare for these. Be able to distinguish strong electrolytes from weak electrolytes or non-electrolytes. Remember to write solids, weak electrolytes, and molecular compounds in "molecular" form; i.e., don't break them up into ions. Only break up soluble strong electrolytes into ions. Your final equation should have lowest whole-number coefficients.

3. (32 points; 4 points each) Circle the correct answer to each of the following.

Multiple choice questions, each having only one correct answer from among five possibilities (one question has only three choices). These multiple choice questions concentrate on solubility of ionic compounds; electrolyte and non-electrolyte identification; types of metathetical reactions (e.g., precipitate formation, gas formation, neutralization); analytical concentration vs. actual species concentrations in solution; oxidation-reduction reactions and oxidation numbers; electromagnetic radiation and the electromagnetic spectrum; Bohr atom and line spectra. There is no penalty for guessing, so don't leave any question without an answer circled.

4. (16 points; 8 points each part)

Two straightforward numerical problems dealing with solution concentration and volumetric analysis.

5. (16 points) A Hess's Law problem, in which you must calculate the enthalpy of a target reaction from three given thermochemical equations.

6. (14 points + 5 point bonus) A calorimeter problem using $q = C\Delta T$. Remember that $q_{\text{cal}} = -q_{\text{rxn}}$.

BONUS (5 points) A thermochemical calculation using given ΔH_f° data and your answer to the preceding calorimeter problem. Your final answer to the calorimeter problem must be essentially correct to receive bonus credit.