## Chem 103, Spring 2006 Prof. Sevian Study Guide for Exam 1

The first exam will be given in two locations, according the first letter of your last name: Last names beginning A – H: room to be announced on website and in class Last names beginning I – Z: Small Science Auditorium S/1/006 (where class is held)

Please show up directly to the correct location, so as to have the maximum time available on the exam.

The exam will take place during regular class time, 10:00-11:15 a.m., on Thursday, February 23. You will have the entire class period to complete the exam, but you will need to work efficiently to complete it. All exams must be turned in by 11:20. If you arrive late to the exam, you will not be given extra time. If you arrive after the first exam has been turned in, you will not be allowed to take the exam. I urge you to leave home earlier than usual to allow for surprise commuting problems.

When you arrive at the exam, please take alternate seating (*i.e.*, there should be a vacant seat to the left and right of you). Bring more than one pencil and an eraser (no pens or colored pencils) and your calculator. Be sure your calculator is working and that you have spare batteries, if needed. You may bring a spare calculator if you wish.

The exam will have a cover page. You should write your answers on the test pages (there is no separate answer sheet). Make sure you write all numeric answers with the proper number of significant figures. In addition to the test packet, you will be given a copy of the periodic table, which you can use in conjunction with any question. Use the back of it if you need scrap paper (work on scrap paper will not be graded). You may not use notes, books, or your own scrap paper during the exam.

There will be multiple versions of the exam, and yours will probably not be identical to others around you. You are bound by academic honesty principles at this university. If it is evident that you have cheated on the exam, expect a grade of zero. Further action may also be taken, which can result in expulsion from the university. As indicated in the syllabus, anyone bringing any device capable of communicating with any other device (*e.g.*, activated cell phone, pager, communicating calculator) will receive a zero on the exam. Furthermore, <u>no sharing of calculators</u> is allowed.

As announced in class, the exam will cover lecture material through February 21, and homework assignments through Homework 3. These correspond to all sections of chapter 1 through chapter 3 in the text. A sample exam, and key, have been posted on the course website, to assist you in gauging the level of difficulty of questions and scope of the exam. The format of the exam and style of questioning in this course may differ from the sample exam.

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The exam will consist of the following parts, worth 100 points total: Multiple choice and short response: worth approximately 60 points of the total Problems: worth approximately 30 points of the total

Laboratory: worth 10 points

Avogadro's number (1 mol of units =  $6.022 \times 10^{23}$  units) will be provided on the exam.

<u>Multiple-choice/Short response</u>: You should study and make sure you are proficient at each of the following skills, calculations, and conceptual understandings:

- Identify a material as an element, compound or mixture
- Identify some properties of matter as extensive or intensive
- Calculate and use density as evidence to identify a material
- Isotopes: know what is the same about two isotopes, what is different, and be able to determine numbers of protons, neutrons, and electrons in an atom of a given isotope
- Calculate molar masses of compounds
- Identify whether compounds are ionic or molecular
- Use nomenclature rules to name compounds and write formulas (ionic, molecular, acids)
- Write and balance a chemical equation, including combustion reactions specifically
- Convert between common metric units
- Determine proper significant figures
- Calculate number of particles present in a sample, using definition of a mole
- Use the periodic table to identify halogens, noble gases, alkali metals, alkaline earth metals, transition metals, and more generally metals vs. nonmetals vs. metalloids
- Calculate atomic weight of an element from isotope abundances and exact atomic masses of each isotope
- Identify correct charges on metal and nonmetal elements that form ions
- Determine percent composition by mass of elements in a compound
- Determine empirical formula of a molecular, anhydrous ionic or hydrated ionic compound given percent composition by mass, and vice versa

Problems: There will be two problems.

- 1. One of the in-class group problems (same question with different numbers)
- 2. A simple stoichiometry problem

Laboratory: There will be <u>one</u> problem that is related to one of the three labs you have done.

- 1. *Measurement of length and volume* Relevant concepts: calculating mean and standard deviation of measurements, reliability of measurements by different procedures
- 2. *Mass and density* Relevant concepts: same as #1 and calculation of density, significant figures
- 3. *Reactions of copper* Relevant concepts: simple stoichiometry