Chem 1020 Exam 1 Study Guide
Spring 2012
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A conversion sheet and periodic table identical to ones you have already been given **will be provided** in the exam packet. You will **not** be allowed to use your own personal copy.

The exam will cover Ch 1, Ch 2, Ch 3 (omit 3.8-3.9, 3.11-3.12), Ch 4, and Ch 5 (5.1 through 5.7, fixed-charge only).

You will need a *scientific* calculator to successfully complete the exam. Please bring one. Cell phones or PDAs will not be allowed as calculators.

The test will be composed of 3 parts with the following approximate quantities of questions:

1. Multiple choice: 25-30 questions (~85 points)
2. Problems (show your work): 1-2 questions (~15 points)

A **#2 pencil** will be required to fill out the Scantron for the multiple choice section of the test.

Your **writing instrument** and **calculator** are the **only personal items** you will be allowed to have on the desk with you. Scratch paper, periodic table, and conversion charts will be provided to you.

Note: concepts and skills on this study guide are provided as a study aid and are *not* the sole material from which the exam will be constructed. Remember, any information presented in the reading assignments, lectures, or labs may appear on the exam.

Chapter 1

Concepts to master	
• Scientific method, especially distinctions between hypothesis, law, and theory	

Chapter 2

Concepts to master	Skills to master
• Accuracy vs. precision in measurements • Uncertainty in measurements • Significant figures as a method to track uncertainty in measurements • Scientific notation as a method to make large/small numbers manageable • Fundamental SI units • Length, volume, mass – how they're measured, definitions of units • Prefixes to modify an SI unit by a certain power of 10 • Dimensional analysis as a method of unit conversion involving conversion factors with canceling units • Density and its relationship to mass and volume	• Convert any standard number into scientific notation, and vice-versa • **Memorize** prefixes of SI units given in class (m, c, and k). Use in converting one metric unit into any other metric unit. **These conversion factors will *not* be provided!** • Find the number of significant figures in any measurement. Round an answer to the correct number of significant figures using the correct rules depending on whether addition, subtraction, multiplication, or division has taken place. • Use dimensional analysis to convert any unit into any other unit. English-to-Metric and English-to-English conversion factors will be given. Use the method of SI prefixes to convert Metric to Metric with dimensional analysis. **(Unit conversions worksheet)** • Calculate a density given a mass and volume, or calculate any one of those three values when given the other two. **(Density worksheet)**

Chapter 3

Concepts to master	Skills to master
• Mixtures vs. pure substances • Homogeneous vs. heterogeneous mixtures • Compounds vs. elements • Names and meanings of state changes (freezing, boiling, etc.) • Physical changes vs. chemical changes • Chemical reactions (reactants and products) • The 3 temperature scales, when they're used	• Distinguish physical and chemical properties and changes • Predict what type of matter a substance is: compound, element, homogeneous or heterogeneous mixture • Convert a temperature in any scale into any one of the other scales. Equations are given on your conversion sheet, but know how to use them!

Chapter 4

Concepts to master	Skills to master
• Dalton's atomic theory • Conclusions from Dalton's theory like Law of constant composition and Law of conservation of mass • Thomson's discovery of electron, and his plum pudding model • Rutherford's discovery of the nucleus through the gold foil experiments, and his nuclear model • Modern atom: containing protons, neutrons, and electrons. Charge and relative mass of each. • Structure of periodic table, identify alkali metals, alkaline earth metals, halogens, noble gases; metals, nonmetals, and metalloids. • Ions: how they're formed • Valence electrons • Definitions of isotope, atomic number, and mass number. Use of isotope names and symbols.	• **Memorize** names and symbols in table of common elements, available on class website. Be able to give symbol when element is named, and vice-versa. • Identify whether a certain element is a metal, nonmetal, or metalloid; main group or transition • Predict the ionic charge for main-group metals and nonmetals • Identify the number of valence electrons in any main-group element • Write an isotope symbol and isotope name when given number of protons, neutrons, and electrons, and vice-versa. Make use of mass number and atomic number.

Chapter 5

Concepts to master	Skills to master
• Chemical formulas • Molecular vs. ionic compounds • Diatomic element definition • Ionic compounds: formula units, formation, structure, balance of + and – charges • Fixed-charge binary ionic compounds	• From a formula, identify if a compound is molecular or ionic • Identify the 7 diatomic elements • Writing an ion pair, formula, and name for fixed-charge binary ionic compounds.