CHM1045C: Study Guide for Exam 1: Chapters 1 & 2 (for Tro textbook)

Revised September 9, 2016

This is NOT a complete list of what will be on the Test. You must also study class notes, the homework, and the textbook. This is just a study guide to help you.

Short Answer:

1) Define and identify examples of: matter, pure element, pure substance, pure compound, homogeneous mixture, heterogeneous mixture, elements, molecules, states of matter (gas, liquid, solid), physical properties, chemical properties, intensive properties, extensive properties, physical change, chemical change, Scientific Method, conservation of mass, Law of Definite Proportions, compound, atom, Law of Multiple Proportions, accuracy, precision, period, group, metals, nonmetals, metalloids, alkali metals, alkaline earth metals, halogens, noble gases, transition metals, protons, neutrons, electrons, nucleus, isotopes, mass number, atomic mass, average atomic mass, atomic number, chemical formula, ion, anions are negative ions, cations are positive ions, Avogadro's Number, mole, amu, molar mass, Law of Conservation of Mass, Law of Conservation of Energy, energy, work, kinetic energy, potential energy.

2) Identify the number of significant figures in a given number. Be able to add, subtract, multiply and/or divide numbers and identify the correct number of significant figures that the answer should have, and round correctly. Must be able to write numbers in Scientific Notation and rewrite in decimal form.

3) Metric System, know all the prefixes, symbols, and conversions in Table 1.2 on page 17. (Know prefixes tera down to femto on this table.) Be able to use these in dimensional analysis calculations.

4) Given two of the following pieces of information of an atom determine the others: the mass number of an atom, the number of protons, the number of electrons, the atomic number, and the number of neutrons.

5) Identify units of length, area, volume, mass, density, time, or temperature.

6) What distinguishes one element from another? -> the number of protons.

7) See also, "Review" at the end of Chapters 1 & 2 and homework problems.

8) Know chemical symbols and English names of elements #1 - 56, 78-80, 82, 86-88, and 92.

9) Be able to write the complete element symbol.

10) Be able to classify any element as a metal, nonmetal, or metalloid.

11) Know group names (i.e. alkali metals, etc.)

12) Be able to predict ion charges of fixed charged ions.

Calculations:

1) Using dimensional analysis, convert from any given unit to another. Be able to convert units that are squared (area) or cubed (volume) also, for example ft^3 to mm^3. The conversion factors you must know are all the metric prefixes in Table 1.2 on page 17, and:
1 inch = 2.54 cm (an exact number)
1 mL = 1 cm^3 (exact)
12 inch = 1 foot (exact)
3 feet = 1 yard (exact)
1 hour = 60 minutes (exact)
1 minute = 60 seconds (exact)
1 day = 24 hours (exact)
All metric prefixes on p. 17. (exact)

2) Density = mass/volume, given two of these values, calculate the third value.

3) Given the relative abundances and masses of isotopes, calculate the average atomic mass.

4) Convert between temperature units: Kelvin, Celsius, and Fahrenheit.

5) Be able to calculate the number of protons, neutrons or electrons in an atom or ion given various information (see class, textbook, and homework examples).

6) Convert between grams, moles and number of atoms or molecules. (Know Avogadro's number: 1 mole <u>items</u> = 6.022×10^{23} <u>items</u>). Be able to id. molar mass (i.e. 1 mole C = 12.011 g) and use to convert between grams and moles.

Other helpful information:

1) For a Test or Quiz, I will give you any information that you need, that is not on the list to memorize, above. For Homework, you will have to look up some information in your text book or lecture notes. For Lab Reports, you may have to look up information in that lab write-up, for example, the density of water. It is usually better to look up information in the textbook or lab book, because those are the numbers that the correct answer is based on. For common conversions, those would be the same. If you look up something online, you have to make sure that you trust the source.