## Chem 1110 and Chem 106 Exam 1 Study Guide

## Chapter 1

- 1.1 a) Know matter occupies space and has mass. Mass measures the amount of matter in something. b) Differentiate between mass and weight.
  - Master Tutor Section 1.1
  - Review Section 1.1 in the Concept Summary
  - For practice, do Exercise 1.2
- 1.2 Identify and differentiate between chemical and physical changes and properties.
  - Master Tutor Section 1.2
  - Review Section 1.2 in the Concept Summary
  - Review Example 1.1 and Learning Check 1.1
  - For practice, do Exercises 1.8 and 1.10
- 1.3 a) Characterize a substance using the terms diatomic, triatomic, polyatomic, heteroatomic, and homoatomic. b) Know the limits of physical and chemical subdivisions.
  - Master Tutor Section 1.3
  - Review Section 1.3 in the Concept Summary
  - Review Example 1.2 and Learning Check 1.2
  - For practice, do Exercises 1.12 and 1.14
- 1.4 a) Identify substances as pure substances, elements or compounds. b) Classify mixtures as homogeneous (solutions) or heterogeneous.
  - Master Tutor Section 1.4
  - Review Section 1.4 in the Concept Summary
  - Review Example 1.3 and Learning Checks 1.3 and 1.4
  - For practice, do Exercises 1.18 and 1.22

- 1.5 Just read, no skills to practice
- a) Convert between metric measurements using prefixes kilo-, micro-, deci-, centi-, milli-, and base units (m, L, and g). Know those prefixes, but you don't have to memorize the conversions in Table 1.3. b) Convert between temperatures in F and C and between C and Kelvin.
  - Master Tutor Section 1.6
  - Review Section 1.6 in the Concept Summary
  - Review Examples 1.6 and 1.7 and Learning Checks 1.7 and 1.8
  - For practice, do Exercises 1.30 and 1.34
- 1.7 a) Express numbers in correct scientific notation. b) Do multiplication and/or division calculations involving scientific notation.
  - Master Tutor Section 1.7
  - Review Section 1.7 in the Concept Summary
  - Review Examples 1.8 through 1.11 and Learning Checks 1.9 through 1.11
  - For practice, do Exercises 1.46, 1.48, 1.54, 1.58, 1.60
- a) Determine the number of significant figures in a value, including scientific notation.
  b) Give the answer with correct number of significant figures to a calculation involving addition, subtraction, multiplication and/or division.
  - Master Tutor Section 1.8
  - Review Section 1.8 in the Concept Summary
  - Review Examples 1.12, 1.13, and 1.14 and Learning Checks 1.12 through 1.15
  - For practice, do Exercises 1.62, 1.68, 1.70, and 1.72

- 1.9 Given a conversion factor, perform a factor-unit calculation.
  - Master Tutor Section 1.9
  - Review Section 1.9 in the Concept Summary
  - Review Examples 1.15, 1.16, and 1.17 and Learning Checks 1.16 and 1.17
  - For practice, do Exercises 1.78 and 1.82
- 1.10 Determine % compositions when given the portions of a whole, and use % to determine the portion of a whole.
  - Master Tutor Section 1.10
  - Review Section 1.10 in the Concept Summary
  - Review Example 1.18 and 1.19 and Learning Check 1.18
  - For practice, do Exercise 1.88
- 1.11 Density is used in lab experiments, but not covered in Exam 1.

Key Equations: Be sure to put these on your exam notes.

## <mark>Chapter 2</mark>

- 2.1 Determine the kind and number of atoms in a molecule.
  - Master Tutor Section 2.1
  - Review Section 2.1 in the Concept Summary
  - Review Example 2.1 and Learning Check 2.1
  - For practice, do Exercises 2.4 and 2.6

2.2 a) Know the properties of protons, neutrons and electrons. b) Determine the mass and charge of atomic nuclei. c) Predict the number of electrons in a neutral atom.

- Master Tutor Section 2.2
- Review Section 2.2 in the Concept Summary
- For practice, do Exercise 2.10

2.3 a) Determine the mass and numbers of protons and neutrons in an isotope. b) Use the  ${}^{A_{Z}}E$  and element-mass (ie. C-14) designations for isotopes. c) Determine number of electrons in an isotope.

- Master Tutor Section 2.3
- Review Section 2.3 in the Concept Summary
- Review Example 2.2 and Learning Check 2.2
- For practice, do Exercises 2.14, 2.16, 2.18, and 2.22

2.4 Calculate and/or apply the molecular weights of atoms and molecules.

- Master Tutor Section 2.4
- Review Section 2.4 in the Concept Summary
- Review Example 2.4 and Learning Check 2.4
- For practice, do Exercise 2.30

2.5 You may skip this section. It is not covered in the Tutor or Exam 1.

2.6 a) Interconvert number of grams and number of moles of atoms/molecules. b) Interconvert number of atoms/molecules and number of grams. c) Interconvert number of atoms/molecules and number of moles.

- Master Tutor Section 2.6
- Review Section 2.6 in the Concept Summary
- Review Examples 2.7, 2.8 and Learning Checks 2.7, 2.8
- For practice, do Exercises 2.44 and 2.46

2.7 Determine the number of moles or individual atoms of an element in a given quantity (moles or number) of molecules.

- Master Tutor Section 2.7
- Review Section 2.7 in the Concept Summary
- Review Example 2.10 and Learning Check 2.9

• For practice, do Exercises 2.50 and 2.52

## Chapter 3

3.1 Identify elements on the periodic table by period and group numbers.

- Master Tutor Section 3.1
- Review Section 3.1 in the Concept Summary
- Review Example 3.1 and Learning Check 3.1
- For practice, do Exercises 3.2 and 3.4

3.2 a) Determine the subshells and number of orbitals in specific electron shells. b) Determine the number of electrons found in specific orbitals, subshells, and shells. c) Know the relative energy levels of subshells.

- Master Tutor Section 3.2
- Review Section 3.2 in the Concept Summary
- Review Example 3.3 and Learning Check 3.3
- For practice, do Exercises 3.12 and 3.16

3.3 Know the definition of valence shell electrons and determine the number of valence shell electrons an element has from the periodic table.

- Master Tutor Section 3.3
- Review Section 3.3 in the Concept Summary
- Review Example 3.4, 3.5 and Learning Check 3.4, 3.5
- For practice, do Exercise 3.18

3.4 a) Determine the electron configuration of an atom. b) Ascertain the number of valence or unpaired electrons from an electron configuration. c) Use electron configurations to determine atomic characteristics/identities. d) Apply Hund's Rule and the Pauli Exclusion Principle in determining electron configurations.

• Master Tutor Section 3.4

- Review Section 3.4 in the Concept Summary
- Review Example 3.6, 3.7 and Learning Check 3.6, 3.7
- For practice, do Exercises 3.24, 3.26, 3.28, and 3.30

3,5 a) Determine the distinguishing electron of an element.b) Based on distinguishing electrons and/or periodic table location, identify elements as noble gases, representative, transition or inner-transition elements. c) Based on physical properties or periodic table location, classify elements as metals, nonmetals, or metalloids.

- Master Tutor Section 3.5
- Review Section 3.5 in the Concept Summary
- Review Example 3.8 and Learning Checks 3.8, 3.9
- For practice, do Exercises 3.34, 3.36, and 3.38

3.6 You may skip this section. It is not covered in the Tutor or Exam 1.