

Study Guide for Exam #2 (Ch. 4-6)

Chem20, Elementary Chemistry

MEMORIZE

- Main Group Elements/Transition Metals, Metals/Non-Metals/Metalloids
- Mass number (A) = # of protons + # of neutrons
- Atomic mass = (natural abundance of isotope A)(mass of isotope A) + (natural abundance of isotope B)(mass of isotope B) + (natural abundance of isotope C)(mass of isotope C)...
- Nomenclature handout – Group 1A/2A/6A/7A and Al^{+3} , Ag^{+1} , Zn^{+2} charges, base element names, polyatomic ions, numerical prefixes
- 1 mole = 6.022×10^{23} units
- Molecular weight of a compound = (# of atom A)(molar mass of atom A) + (# of atom B)(molar mass of atom B) + (# of atom C)(molar mass of atom C) + ...
- Mass percent = $\frac{\text{mass of sample}}{\text{total mass of mixture}} \times 100\%$

Chapter Four

I. The Periodic Table (4.5-4.6): Know, for any element, how to identify the group and period, distinguish between metal, non-metal, or metalloid, and distinguish main group element or transition metal.

Ex., Ch. 4: 51-52, 55-64, 69-72

II. Atomic Notation (4.7-4.8): Know how to write atomic notation for any element or its ions and/or isotopes. Know how to use the atomic number (A) and mass number (Z) to calculate the number of protons, electrons, and neutrons present in one atom, or to calculate A and Z from the atom's composition.

Ex., Ch. 4: 85-94, 109-110

III. Atomic Mass (4.9): Understand how to use natural abundances as percentages. Know how to use the natural abundances and masses of the isotopes of an element to calculate the atomic mass, or to use the atomic mass to solve for any other variable in the equation.

Ex., Ch. 4: 97-102, 111-112

Chapter Five

I. Ionic Formulas (5.5): Know how to write charge-balanced ionic formulas.

Ex., Ch. 5: 53-58

II. Nomenclature of Ionic Compounds (5.7): Know how to identify an ionic compound and distinguish between Type I and Type II from both its ionic formula and its word name, including the usage of polyatomic ions. Know how to translate from ionic formula to word name, or from word name to ionic formula for both.

Ex., Ch. 5: 59-70, 93-94

III. Nomenclature of Molecular Compounds (5.8): Know how to identify a molecular compound. Know how to translate from chemical formula to word name, or from word name to chemical formula for both.

Ex., Ch. 5: 71-76, 93-94

IV. Nomenclature of Acids (5.9): Know how to identify an acid and distinguish between binary and oxyacid. Know how to translate from chemical formula to word name, or from word name to chemical for both.

Ex., Ch. 5: 77-82, 93-94

Chapter Six

I. Conversions for Elements (6.3): Know how to convert between grams \leftrightarrow mols \leftrightarrow atoms for any element, using Avogadro's number and the atomic mass.

Ex., Ch. 6: 37-42

II. Conversions for Compounds (6.4-6.5): Know how to calculate the molecular weight from the chemical formula for any compound. Know how to convert between grams \leftrightarrow mols \leftrightarrow atoms for any compound, using Avogadro's number and the molecular weight. Know how to use the chemical formula as a conversion factor to convert between grams of compound \leftrightarrow grams of constituent element.

Ex., Ch. 5: 47-48, 51-56

III. Mass Percent (6.6-6.7): Know how to calculate the mass percent of a compound in a mixture. Know how to calculate the mass percent of a single element in a compound from a chemical formula.

Ex., Ch. 6: 73-76, 79-86, 111-112

IV. Empirical and Molecular Formulas (6.8-6.9): Know how to calculate the empirical formula for a compound from masses resulting from decomposition or mass percent. Know how to convert empirical formulas into molecular formulas using the molecular weight.

Ex., Ch. 6: 87-88, 91-94, 99-100, 119-122