

UNIT 1 BASIC REVIEW

Textbook References: *Chemistry* Zumdahl 5th Edition Chapters 1, 2, and 3

1. write formulas given the name of an inorganic, organic or Lewis coordinate compound
2. write the name of a compound given the formula of an inorganic, organic or coordinate compound
3. draw structural isomers for hydrocarbons
4. identify organic functional groups and describe the chemical properties of each class of organic compound
5. make measurement and report derived values in significant figures
6. solve problems using dimensional analysis
7. state basic metric and English conversion factors
8. calculate percent error and standard deviation
9. determine the type of error that could of occurred in an experiment
10. describe fundamental structure of the atom
11. determine the number of protons electrons and neutrons in an atom given the mass number and write the symbol fo a given isotope
12. determine the atomic mass of an isotope given the relative abundance and amu of the isotopes
13. determine the molar mass of a compound
14. determine the percent composition of a compound
15. convert between grams and moles or volume for compounds
16. calculate the empirical and molecular formula of a compound
17. determine the formula of a hydrate
18. determine the empirical formula of a combustible compound
19. balance chemical equations
20. solve stoichiometric problems
21. determine which reactant is the limiting reagent
22. determine the amount of excess reagent that remains un-reacted
23. determine the percent yield of a reaction

AP Course Guide correlation:

III. Reactions

B. Stoichiometry

1. Lewis; coordination complexes;

3. Mass and volume relations with emphasis on the mole concept, including empirical formulas and limiting reactants

IV. Descriptive Chemistry

3. Introduction to organic chemistry: hydrocarbons and functional groups (structure, nomenclature, chemical properties)

IB Course Outline correlations:

1.1.1 Apply the mole concept to substances.

1.1.2 Determine the number of particles and the amount of substance (in moles).

1.1. 2Define the terms *relative atomic mass* (A_r) and *relative molecular mass* (M_r).

1.2.2 Calculate the mass of one mole of a species from its formula. (2 The term molar mass (in g mol^{-1}) will be used.)

1.2.3 Solve problems involving the relationship between the amount of substance in moles, mass and molar mass.

1.2.4 Distinguish between the terms *empirical formula* and *molecular formula*.

1.2.5 Determine the empirical formula from the percentage composition or from other experimental data.

- 1.2.6 Determine the molecular formula when given both the empirical formula and experimental data.
- 1.3.2 Identify the mole ratio of any two species in a chemical equation.
- 1.3.3 Apply the state symbols (s), (l), (g) and (aq).
- 1.4.1 Calculate theoretical yields from chemical equations.
- 1.4.2 Determine the limiting reactant and the reactant in excess when quantities of reacting substances are given.
- 1.4.3 Solve problems involving theoretical, experimental and percentage yield.
- 2.1.1 State the position of protons, neutrons and electrons in the atom.
- 2.1.2 State the relative masses and relative charges of protons, neutrons and electrons.
 - 1 The accepted values are:
- 2.1.3 Define the terms *mass number (A)*, *atomic number (Z)* and *isotopes of an element*.
- 2.1.4 Deduce the symbol for an isotope given its mass number and atomic number.
- 2.1.5 Calculate the number of protons, neutrons and electrons in atoms and ions from the mass number, atomic number and charge.
- 2.1.6 Compare the properties of the isotopes of an element.
- 2.2.1 Describe and explain the operation of a mass spectrometer.
- 2.2.2 Describe how the mass spectrometer may be used to determine relative atomic mass using the 12C scale.
- 2.2.3 Calculate non-integer relative atomic masses and abundance of isotopes from given data.
- 9.1.3 State the names of compounds using oxidation numbers.
- 10.1.6 Apply IUPAC rules for naming the isomers of the non-cyclic alkanes up to C₆.
- 10.1.7 Deduce structural formulas for the isomers of the straight-chain alkenes up to C₆.
- 10.1.8 Apply IUPAC rules for naming the isomers of the straight-chain alkenes up to C₆.
- 13.2.4 Define the term *ligand*.