

Honors Chemistry – Final Exam outline

Chapter 1 – Matter and Change

1. Chemistry - What is it?
2. Matter and properties
3. Element – symbols

Chapter 2 – Measurements and Calculations

Measurements

1. Metric system
2. Density
3. Conversion factors
4. Accuracy and precision
5. Significant figures
6. Scientific notation

Chapter 3 - Atoms

1. Atomic theory, history
2. Atoms
 - a. Sizes
 - b. Atomic numbers
 - c. Mass numbers
 - d. #p, #e, #n
 - e. Average atomic mass (weighted avg.)
 - f. $\text{Mass} \leftrightarrow \text{moles} \leftrightarrow \text{\#atoms}$
 - i. Molar mass
 - ii. Avogadro's number

Chapter 4 – Arrangement of Electrons

1. Electromagnetic radiation
 - a. Wavelength, frequency, energy, strength
 - b. How EM radiation produced
 - i. Electron movement, creates types of “light”
2. Electron notations
 - a. Electron configuration
 - b. Orbital notation
 - c. Shorthand notation, noble gas notation
 - d. Electron dot

Chapter 5 – Periodic Law

1. History of periodic table
2. Block/group properties – s, p, d, f
3. 5 properties (definitions, trends and why)
 - a. Atomic radii
 - b. Ionization energy
 - c. Electron affinity
 - e. Ionic radii

Chapter 6 – Chemical Bonding

1. Types of Chemical Bonds
 - a. Ionic, Covalent
 - b. How to calculate
2. Covalent Bonds
 - a. How electrons share
 - b. Orbital notation, electron dots
 - c. Lewis structures
3. Ionic bonds
 - a. Charges
 - b. Figure out formulas
4. Metallic bonding
 - a. Electron sea
5. Molecular geometry
 - a. VSEPR theory
 - b. A, B, E formulas
 - c. Linear, bent, tetrahedral.....

Chapter 7 – Formulas and Compounds

1. Chemical names, formulas
 - a. Charges on elements
 - b. Binary ionic cmpds (-ide)
 - c. Ionic cmpds with polyatomic ions
 - d. Binary covalent (prefixes)
2. Oxidation numbers
3. Mass, MM, moles for cmpds (formulas) & % composition
4. Determining empirical and molecular formulas from masses

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Chapter 8 – Chemical Reactions

1. Chemical reactions (symbols, setup)
2. Types of reactions
 - a. Synthesis, Decomp, Single Replacement, Double replacement, Combustion
3. Activity Series
 - a. Do reactions actually occur?

Chapter 9 - Stoichiometry

1. Stoichiometry
 - a. Mass, moles A ---> B
2. Limiting reactant
3. Percent yield

Chapter 10 – States of Matter

1. Liquid properties
2. Solid properties
3. Changes of state
4. Phase diagram

Chapter 11 – Gases

1. Properties of Gases
2. 1st set of P, V, T equations
3. Combined gas law
4. Stoichiometry of Gases
 - a. Ideal gas law
 - b. Mass, moles, volume A--->B
 - c. Molar mass
 - d. Density

Chapter 12 - Solutions

1. Types of mixtures
 - a. Solutions
 - b. Colloids
 - c. Suspensions
2. Solubility
3. Concentrations
 - a. Molarity
 - b. Molality

Chapter 13 – Aqueous solutions

1. Solubility rules
2. Dissociation reactions
3. Net Ionic Reactions
4. Vapor Pressure
5. Freezing pt and Boiling pt changes
 - a. Non-electrolyte
 - b. Electrolyte

Chapter 14 & 15 – Acids and Bases

1. Acid & Base
 - properties/characteristics, naming and formulas
2. pH, pOH, [H₃O⁺], [OH⁻] calculations
3. Titrations

Chapter 19 & 20 – Redox Reactions

1. Oxidation numbers
2. Redox reactions
 - a. Ox ½ reaction
 - b. Red ½ reaction
3. Balance reactions
4. E^o

Chapter 22 – Organic Chemistry

1. Hydrocarbons
2. Substituted hydrocarbons
 - a. Properties
 - b. Draw and name
 - c. Reactions