

Skyline Chemistry 210

Final Exam Review - Spring 2009

1. Dimensional Analysis
 - Unit conversions
 - Mole conversions
2. 5-step Method Problem-Solving Approach
 - Density
 - Other formulas & Conversions
3. Significant Figures
4. Percent Error / Accuracy vs. Precision
5. Chemical and Physical Properties and Changes.
6. Basic Atomic Structure
 - Protons, neutrons, electrons
 - Average atomic mass / Isotopes
7. Solutions
 - General Concepts
 - Concentrations: molarity, mass percent, parts-per-million (ppm), ppb
8. Formulas and Naming
 - Ionic compounds (*know polyatomic ions*)
 - Covalent compounds
 - Acids
 - Percent Composition
 - Empirical and Molecular Formulas
 - Combustion Analysis
9. Chemical Reactions
 - Types of reactions
 - Predicting Products
 - Writing Complete Balanced Equations
 - REDOX Reactions
10. Stoichiometry
 - Basic Principles
 - Limiting Reagents
 - Solution Stoichiometry
 - Theoretical Yields, Actual Yields, Percent Yields
11. Gas Laws
 - Pressure
 - Kinetic Molecular Theory
 - Combined Gas Law
 - Ideal Gas Law
 - Dalton's Law of Partial Pressures
 - Graham's Law of Diffusion
 - Density of Gases
 - Real vs. Ideal Gases
 - Gases and Stoichiometry
12. Thermochemistry
 - Law of Conservation of Energy (1st law of Thermodynamics)
 - Calorimetry: $q_{\text{system}} = -q_{\text{surroundings}}$
 - $q = mC_p\Delta T$
 - $q = Hc\Delta T$
 - Hess's Law
 - $\Delta H_{\text{reaction}}$ from ΔH_f
 - Heat & phase changes ($q_x = n\Delta H_x$)
13. Electronic Structure of the Atom
 - Electromagnetic Radiation
 - Emission Spectra and the Bohr Model
 - Energy transitions and Quantum Theory
 - Wave / particle duality of light
 - Photons
 - Quantum Numbers
 - Electron Configurations
 - Periodic Trends of Chemical Properties
14. Bonding and Molecular Structure
 - Ionic Bonding
 - Covalent Bonding
 - Electron Dot Structures
 - Octet Rule
 - Formal Charges
 - Resonance
 - Bond Order, Length, Energy
 - ΔH from Bond Energies
 - VSEPR – Molecular shapes
 - Hybridization
 - Electronegativity
 - Polar Bonds and Molecules
 - Valence Bond Theory: Orbital overlap
 - Sigma and Pi bonding
 - Structural Formulas of simple organic molecules (CHNO)
 - Isomerism
15. Solids & Liquids
 - Intermolecular Forces
 - Properties and Intermolecular forces
 - Phase Diagrams
 - Phase Changes

Study Suggestions:

The FINAL EXAM is COMPREHENSIVE. Be sure you are comfortable both with recent material and material covered early in the semester!

The FINAL EXAM will focus on PROBLEMS. The best way to prepare is to rework problems. Some Hints:

- Rework at least a handful of the ones you think are "easy". Make sure you still know the basics!
- Spend more time on kinds of problems you find more challenging – look to your notes and the reading when you are stuck.
- Rework problems without looking at the answers – use the answers only to check!
- You can use the exams, quizzes, worksheets, and problem sets as sources of problems – there are plenty of options for practice.

The FINAL EXAM will also include CONCEPTS. Reviewing course notes and the readings will best prepare you for those questions.

- molality
- Freezing Point Depression / Boiling Point Elevation

- $q_{\text{lost}} = -q_{\text{gained}}$