

Chem 309 Exam 1 Major Topics

To earn a grade of 'A' in this course, you want to memorize, understand, and be able to apply ALL concepts discussed during lecture and lab. The i-clicker questions and practice problems during lecture, the post-lab questions, the quizzes, and homework all provide practice questions for you to evaluate your preparation for exams. The study guide for each chapter contains a COMPLETE list of the learning objectives for each chapter.

Atomic Structure

- Z, A, isotopes, electrons (total, core, and valence)
- Relationship between isotopic distribution and average atomic mass

Structure of Compounds

- The octet rule and valence electrons
- Ionic compounds
 - formula units
 - nomenclature
- Covalent compounds
 - binary compd nomenclature
 - Lewis Structures
 - VSEPR (electron geometry & molecular geometry)
 - Electronegativity and polarity

Intermolecular Forces

- H-bond, dipole-dipole, and London (van der Waals or hydrophobic)
- Role of IMFs in solubility and solution formation
- Role of IMFs in relative boiling points

Matter & Measurement

- Numbers as measurements and significant figures
- Unit systems and conversions between systems
- Density, Dosages, and Molar Mass as conversions

Solution Chemistry

- See IMF's above
- Covalent vs Ionic compounds in aqueous solutions
- Concentration units in calculations
 - m/v
 - %(m/v) [which may also be written as %(w/v)]
 - Molarity = M = moles/L
 - Equivalents = moles of charge/L
- Osmosis, dialysis, tonicity, and RBC (red blood cells)

Gas Laws

- Energy and its units
- Kinetic Theory of Matter
- Temperature units
- Phase changes and Energy
- Pressure units
- Vapor pressure and boiling points – see IMFs above
- Boyle's Law, Dalton's Law and Henry's Law and how they relate to breathing & the transport of O₂ and CO₂ between the atmosphere and our tissues