
Study Guide – Suggested Topics

A periodic table will be given. Bring a calculator.

Prerequisite concepts from General Chemistry 1 & 2, Quantitative Analytical, and Organic I/II, concepts on study guide for exam 1 and 2

Chapter 7
- Self-ionization, self-ionization constant of water (K_w)
- Bronsted acid and base
- Conjugate acid and base
- Acid dissociation constant (K_a), base dissociation constant (K_b), equilibrium reactions, pKa
- Bell’s Rule and estimation of pKa
- Mono-, di-, and polybasic acids
  - Be able to draw structures of acids
- Stepwise dissociation constants
  - trends and reasons
- Lewis acid and base
- Ion-dipole interaction
- Hydration shell
- Polarization of a bond
- Amphoteric
- Saturated solution, solubility, sparingly soluble, solubility product, K_sp
- Thermodynamics of hydration and solution
- Common ion-effect
- Stepwise stability constants, overall stability constant
- Ligand
- Denticity, donor atoms, number of donor atoms
- Chelate and chelate effect
- hard and soft cations (acids) and ligands (bases)
  - Be able to predict if a reaction favors reactants or products

Chapter 19
- d-block metal, transition metal, group numbers, platinum group metals
- Electron configurations of elements and ions, exceptions
- Colors, selection rules,
- Relationship between absorbed and transmitted light for a single absorption
- Laporte rule
- Oxidation states of transition metals
- Coordination compound
  - ligand, coordinate covalent bond, coordination number, coordination sphere
- Bridging ligands, ambidentate ligands
- Nomenclature of inorganic compounds – formula to name, name to formula
- Electroneutrality principle and charges
- Hapticity
- Trends in metallic radii, enthalpy of atomization, first ionization energies
- Keper model
- Geometries of various coordination numbers, names and shapes
- Isomerism and types of isomers: structural isomers, stereoisomers
  - Given a formula, identify/draw all possible isomers
- Ionization isomers, hydration isomers, coordination isomers, linkage isomers
- Enantiomers, diastereoisomers
- Notation for chiral complexes
- Polarimetry, specific rotation
- Racemate
- Resolution of enantiomers

Note: The list of topics is not exhaustive and there may be questions on a topic covered in lecture or the textbook that is not listed above.