

Final Exam Review Chem 1311 Spring 2019

Text: Brown & LeMay – Chapters 1 – 11

Chapter	Topic	Concepts to Remember
1	SI Units	Conversion between Units; Prefixes
	Temperature Conversions	$^{\circ}\text{C}$, $^{\circ}\text{F}$, K
	Dimensional Analysis Significant Figures	Using two or more conversion factors Application of significant figures in basic mathematical operations – addition, subtraction, multiplication, and division
2	Modern View of Atomic Structure	Atomic Numbers, Mass Numbers Atomic mass and calculation of relative atomic mass
	Ions and Ionic Compounds	Predicting Ionic Charges
	Naming Inorganic Compounds and Acids	Names and formulae
3.	Chemical Equations	Balancing equations
	Simple Patterns of chemical Reactivity	Combination and Decomposition
	Formula Weights	Formula and Molecular Weights
		Percentage Composition
	Avogadro's Number and the Mole	Interconverting Masses, Moles and
		Number of Particles
	Empirical Formulas from Analyses	Molecular Formulas from Empirical Formulas
	Quantitative Information from Balanced equations	Stoichiometric Relationship
	Limiting Reagents	Theoretical & Percent Yields
4.	General Properties of Aqueous Solutions	Strong and Weak Electrolytes
	Precipitation Reactions	Solubility Guidelines, Spectator Ions and Net Ionic Equations
	Acids and Bases	Strong and weak Acids and Bases
	Redox Reactions	Oxidation Number (or states), Oxidizing and Reducing agents, Single Displacement Reactions
	Concentration of Solutions	Molarity, Moles and Volume, Dilution
5.	Energy and First Law Of Thermodynamics	Kinetic, Potential Energy and Units of energy; Exo and Endo-thermic Processes
	Enthalpies of Formation and Hess's Law	Using enthalpies of Formation to Calculate Enthalpies of Reaction

		Specific Heat Capacity and Calorimetry
6.	Quantized Energy and Photons	The Photoelectric Effect and Photos
	Quantum Mechanics and Atomic Orbitals	Orbitals and Quantum Numbers; Electron Spin and Pauli Exclusion Principle.
	Electron Configuration	Hund's Rule; Condensed Electron Configuration and the Transition Metals
7.	Sizes of Atoms and Ions	Periodic Trends in Atomic and Ionic Radii
	Ionization Energy, Electron Affinity	Variation in First Ionization energies Electron Configuration of Ions Variation in Electron Affinity
8.	Lewis Symbols and Drawing Lewis Structure	Octet Rule and Formal Charge and
	Bond Polarity and Electronegativity	Dipole Moments Differentiating Ionic and Covalent Bonding
	Resonance	
	Exception to the Octet Rule	Odd number electrons; Less than an Octet; More than an Octet
	Strengths and Lengths of Covalent Bonds	Bond Enthalpies and Enthalpies of Reaction; Bond Enthalpy and Bond Length
	Lattice Energy	Lattice Energy and melting points of ionic compounds
9.	The VSEPR Model	
	Hybrid Orbitals	sp , sp^2 , sp^3 , sp^3d , sp^3d^2
	Molecular Orbitals	Molecular Orbitals of Diatomic Molecules
	Bond Order	Calculate Bond Order of Simple Molecules. Such as: H_2 , Be^{2+}
10.	The Gas Laws and The Ideal Gas Equation And Further Application	Boyle's, Charles, Avogadro's, Combined Gas Law Gas Densities and Molar Mass
	Molecular Effusion and Diffusion Dalton's Law of Partial Pressure	Graham's Law of Effusion Calculation of partial pressure of gases in mixtures
11.	Intermolecular Forces	Comparing Intermolecular Forces: Dispersion, Dipole-Dipole, Hydrogen Bonding and Ion-Dipole
	Phase Changes	Heat of Fusion, Vaporization and Sublimation. Heating Curve
	Vapor Pressure	Vapor Pressure and Boiling Point