Final Exam Review Chem 1411 Fall 2017

Text: Brown & LeMay – Chapters 1 – 11

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| Chapter | Topic | Concepts to Remember |
| 1 | SI Units | Conversion between Units; Prefixes |
|  | Temperature Conversions | oC, oF, K |
|  | Dimensional Analysis | Using two or more conversion factors |
| 2 | Modern View of Atomic Structure | Atomic Numbers, Mass Numbers |
|  | Ions and Ionic Compounds | Predicting Ionic Charges |
|  | Naming Inorganic Compounds | 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 form 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 |
|  | Concentration of Solutions | Molarity, Moles and Volume |
| 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 |
| 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 | Variation in First Ionization energies  Electron Configuration of Ions |
| 8. | Lewis Symbols and Drawing Lewis Structure | Octet Rule and Formal Charge |
|  | 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 |
| 9. | The VSEPR Model |  |
|  | Hybrid Orbitals | sp, sp2, sp3 |
|  | Molecular Orbitals | Molecular Orbitals of H2, F2 |
|  | Bond Order | Calculate Bond Order of Simple Molecules.  Such as: H2, Be2+ |
| 10. | The Gas Laws and The Ideal Gas Equation And Further Application | Boyle’s, Charles, Avogadro’s  Gas Densities and Molar Mass |
|  | Molecular Effusion and Diffusion | Graham’s Law of Effusion |
| 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 |