Final Exam Review Chem 1412 Spring 2018

Text: Brown & LeMay — Chapters 13-17, 19, 20 & 24

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| Chapter | Topic | Concepts to Remember | |
| 13. | The solution Process | The effects of Intermolecular Forces on  Solution Formation and Energetícs of Solution Formation | |
|  | Factors Affecting Solubility | Solute-Solvent Interactions, Pressure and Temperature Effects | |
|  | Expressing Solution Concentration | Mass Percentage, ppm, ppb, Mole Fraction, Morality and Molality | |
|  | Colligative Properties | Vapor Pressure lowering, Boiling Point  Elevation, Freezing Point Depression,  Osmosis and Determination Of Molar Mass | |
| 14. | Reaction Rates | Change of Rate with Time and Instantaneous rate | |
|  | Concentration and Rate Law | Reaction Orders, Using Initial Rates to Determine Rate Laws | |
|  | The Change of Concentration wjth Time | 1st and 2nd Orders, Half-Life | |
|  | Temperature and Rate | The Collision Model and Orientation  Factor, The Arrhenius Equation | |
|  | Reaction Mechanisms | Elementary Reactions, Multistep  Mechanisms. Rate Laws for Elementary Ste s | |
|  | Catalysis | Homogeneous/Heterogeneous Catalysis | |
| 15. | The Equilibrium Constant | Calculating Kc, and Units | |
|  | Application of Equilibrium Constants | Predicting Direction and Calculating Equilibrium Concentrations | |
|  | Le Chatelier's Principle | Effects of volume, pressure and temperature changes. Effects of catalysts. | |
| 16. | The Autoionization Of Water |  | H and POH scales |
|  | Strong Acids and Bases |  | |
|  | Weak Acids and Bases | Relationshi between Ka and Kb | |
|  |  | Calculating Ka from pH; Using Ka to calculate pH | |
|  | Acid-Base Properties of Salt Solutions | Ability of Anions and Cations to react with Water (Salt Hydrol sis) | |
|  | Lewis Acids and Bases |  | |
|  | The Common Ion Effect |  | |

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|  | Buffers | | Composition and Action of Buffers, pH of Buffers, Buffer Capacity and Addition of Stron Acid/Base to a Buffer | |
|  | Acid-Base Titrations | | Strong Acid-Strong Base Titration; Weak Acid-Stron Base Titration | |
|  | Solubilit E uilibria | | KS , Solubili and KS |  |
|  | Factors that Affect Solubility | | Common-lon Effect, Solubility and pH,  Formation Of Complex Ions and Am hoterism | |
|  | Precipitation and Se aration of Ions | | Selective Preci itation of Ions | |
| 19. | Entropy and the 2nd and 3rd Law Of Thermod namics | |  | |
|  | Entro | Chan es in Chemical Reactions | Entro chan es in the Surroundin s | |
|  | Gibb's Free Energy | | Standard Gibb's Free Energy of Formation | |
|  | Free Energy and  Tem erature/E uilibrium | |  | |
| 20. | Balancing Redox Equations | | Balancing Redox Equations by Method of Half Reactions in acidic and basic  SoJutjons | |
|  | Voltaic Cells | |  | |
|  | Cell Potentials Under Standard Conditions | | Standard Reduction Potentials,  Strengths of Oxidizing and Reducing Agents | |
|  | Free Energy and Redox Reactions | | Emf, Free Energy and Equilibrium Constant | |
|  | Cell Potentials Under Nonstandard Conditions | | The Nernst Equation | |
|  | Corrosion | | Corrosion of Iron | |
|  | Electrolysis | | Quantitative As ect of Electrol is | |
| 21-22 | Nuclear E uations | | T pes of Radioactive Deca | |
|  | Nuclear Transmutations | |  | |
|  | Rates of Radioactive Decay | | Radiometric Dating; Calculations Based on Half-Life | |
|  | Detection of Radioactivi | | Radiotracers | |
|  | Energy Changes in Nuclear Reactions | | Nuclear Binding Energies | |
|  | Nuclear Power | | Fission/Fusion | |
|  | Radiation in the Environment | | Radiation Doses/Radon | |
|  | General Characteristics of Organic Molecules | |  | |
|  | Or nic Functional Groups | |  | |
|  | Introduction to Hydrocarbons | | Structure & Nomenclature of Alkanes | |