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 onSolution 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 PointElevation, 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 OrientationFactor, The Arrhenius Equation |
|  | Reaction Mechanisms | Elementary Reactions, MultistepMechanisms. 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 andTem erature/E uilibrium |  |
| 20. | Balancing Redox Equations | Balancing Redox Equations by Method of Half Reactions in acidic and basicSoJutjons |
|  | 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 |