



Tamanawis Secondary APChemistry 12

A Brief Course Outline

1. Review

Silberberg; Ch. 23 Section 23.4, Ch. 12 Section 12.3, Ch. 3 Sections 3.4-3.5

- Safety in the Lab
- Nomenclature of Coordination Compounds
- Intermolecular Forces
- Stoichiometry

2. Gas Laws

Silberberg; Ch.5

- KMT and Ideal Gases
- Measuring Pressure
- Simple Gas Laws
- Combined and Ideal Gas Laws
- Partial Pressure
- Deviations from Ideal
- Graham's Law of Effusion

3. Thermochemistry/Thermodynamics

Silberberg; Ch.6, Ch.20 Sections 20.1-20.5

- Energy and the First Law
- Work and Heat (Internal Energy)
- Enthalpy and Changes of State
- Specific Heat Capacity
- Calorimetry
- Enthalpy Changes and Reactions
- Spontaneous Processes and Entropy
- The Second Law
- Predicting Entropy Changes
- Standard Molar Entropies
- Gibb's Free Energy

4. Reaction Kinetics

Silberberg; Ch.16, Hebden; Ch.1

- Measuring and Calculating Reaction Rate
- Factors Affecting Reaction Rate
- Differential Rate Law
- Experimental Determination of Rate Law
- Integrated Rate Laws
- Reaction Half-life
- Collision Theory and Arrhenius Equation
- Reaction Mechanisms and Rate Law
- Potential Energy Diagrams
- Catalysis

5. Chemical Equilibrium

Silberberg; Ch.17, Ch.20 Section 20.4, Hebden; Ch.2

- Predicting Equilibrium
- Characteristics and Conditions of Equilibrium
- Le Chatelier's Principle
- Applications of Equilibrium; Haber Process
- Equilibrium Shifts and Reaction Kinetics
- Reaction Quotient and Equilibrium Constant
- Equilibrium Calculations
- Reaction Direction: Comparing Q and K
- Free Energy and the Equilibrium Constant

6. Solutions and Solubility Equilibrium

Silberberg; Ch.4 Sections 4.1-4.3, Ch.13 Sections 13.1, 13.3-13.9, Ch.19 Section 19.3-19.4, Hebden; Ch.3

- General Properties of Solutions and Concept of Solubility
- Free Energy Change of Solution Formation and
- Factors Affecting Solubility
- Qualitative Analysis
- Quantitative Analysis
- Solubility Equilibria and K_{sp} Calculations
- Common Ion Effect
- Equilibria of Complex Ions
- Hard Water

Midterm Covering Units 1-6



7. Acid/Base Chemistry

Silberberg; Ch.4 Section 4.4, Ch.18,
Hebden Ch.4

- Definitions and Characteristics
- Table of Relative Acid Strength
- Ion Product Constant for Water and Temperature Effects
- pH and pOH
- Calculations Involving Strong Acid and Bases
- Weak acids and bases: K_a and K_b
- Polyprotic Acids
- Hydrolysis of Salts
- Calculations Involving Weak Acid and Bases
- Buffers
- Titration
- Titration Curves
- Acid/Base Properties of Oxides
- Acid Rain

8. Electrochemistry

Silberberg; Ch.4 Sections 4.5-4.6 Ch.21
Hebden; Ch.5

- Introduction and Definitions
- Assigning Oxidation Numbers
- Table of Standard Reduction Potentials
- Building Your Own Tables
- Balancing Half-reactions and Redox Reactions
- Redox Titration
- Electrochemical Cells
- Applications of Electrochemical Principles
- Corrosion and Prevention
- Electrolytic Cells
- Applications of Electrolytic Principles
- Relationship Amongst Q , K and E under standard and non-standard conditions.
- Relationship between ΔG° and E
- Faraday's Laws

Final Exam Covering All Units Including Those From CH11 Honours

Evaluation:

- Class Work represents 75% of your final grade.

Tests	60%
Quizzes	15%
Labs and Assignments	25%

- An in-class Final represents 25% of your final grade.
- The AP Chemistry exam occurs sometime in early to mid May. This exam does not influence your school mark.



What You Should Bring to Every Class:

- Course Textbook
- Pens (blue & red) and pencils
- Ruler, eraser and whiteout



- 3- ring binder with paper and dividers
- Graph paper
- Scientific calculator