

Study Topics for Exam 4

Lecture 16: Mendeleev's Periodic Table

Table of 1867

Arrangement According to Atomic Masses

Atomic Mass of Beryllium

Chemical Groups

Alkali Metals, Alkaline Earth Metals, etc.

Diagonal Relationships

Table of 1871

Missing Elements

eka-Aluminum

Light

Wave Behavior

Diffraction

Interference

Constructive and Destructive

Young's Double Slit Experiment

Electromagnetic Radiation

Electromagnetic Spectrum

UV, Visible, IR

Speed, Wavelength, Frequency

Particle Behavior

Photoelectric Effect

Photons

Energy

Wave-Particle Duality

Atomic Line Spectra

Hydrogen, Helium, etc.

Lecture 17: Atomic Spectra

Hydrogen, Helium, etc.

Hydrogen Spectrum

Emission Spectrum

Lyman, Balmer, Paschen Lines

Series Limit

Absorption Spectrum

Energy Diagrams

Bohr Model

Lecture 18: Review the Hydrogen Spectrum

Review the Energy Diagram for Hydrogen

- Review the Bohr Model for Hydrogen
 - Problem with the Bohr Model
- Wave-Particle Duality of the Electron
 - de Broglie Prescription
 - Wavelength of the Electron
 - Standing Waves
 - 1-Dimensional Wave Model of the Hydrogen Atom
- Schrodinger Wave Equation
 - 3-Dimensional Standing Waves for Hydrogen's Electron
 - Orbitals
 - s, p, d, f, etc.
 - Energy Diagram for H Atom
- Helium Spectrum
 - Energy Diagrams

Lecture 19: Review Hydrogen Atom

- Electron Spin
 - Spin States
- Radio Astronomy
- Helium Spectrum
 - Helium Ground State
 - Pauli Exclusion Principle
 - ns-to-2p Transitions
 - Singlet vs Triplet States
 - Splitting of 2s and 2p Levels
- Aufbau Filling Order
- Electron Configurations
 - He, Li, Be, B
 - Carbon
 - Hund's Rule
 - N, O, F, Ne, Na, Mg, Al
- Core vs Valence Electrons
 - Lewis Structures
 - Octet Rule
- Periodic Table of the Elements
 - s block, p block, d block
 - A vs B Groups
 - Lanthanides and Actinides