

Chemistry Chapter 5

1. **Amplitude:** the height of a wave from the origin to a crest, or from the origin to a trough.
2. **Atomic Emission Spectrum:** a set of frequencies of electromagnetic waves given off by atoms of an element; consists of a series of fine lines of individual colors.
3. **Aufbau Principle:** states that each electron occupies the lowest energy orbital available.
4. **de Broglie Equation:** predicts that all moving particles have wave characteristics and relates each particle's wave length to its frequency, its mass, and Planck's constant.
5. **Electromagnetic Radiation:** a form of energy exhibiting wave like behavior as it travels through space; can be described as wavelength, frequency, amplitude, and speed and includes visible light, microwaves, X rays, and radio waves.
6. **Electromagnetic Spectrum:** includes all forms of electromagnetic radiation, with only differences in the types of radiation being their frequencies and wavelengths.
7. **Electron Configuration:** the arrangement of electrons in an atom, which is prescribed by three rules – the aufbau principle, the Pauli Exclusion Principle, and Hund's rule.
8. **Electron-Dot Structure:** consists of an element's symbol, representing the atomic nucleus and inner-level electrons that is surrounded by dots, representing the atom's valence electrons.
9. **Energy Sublevel:** the energy levels contained within a principal energy level.
10. **Frequency:** the number of waves that pass a given point per second.
11. **Ground State:** the lowest allowable energy state of an atom.
12. **Heisenberg Uncertainty Principle:** states that it is not possible to know precisely both the velocity and the position of a particle at the same time.
13. **Hund's Rule:** states that single electrons with the same spin must occupy each equal-energy orbital before additional electrons with opposite spins can occupy the same orbital.
14. **Pauli Exclusion Principle:** states that a maximum of two electrons can occupy a single atomic orbital, but only if the electron have opposite spins.
15. **Photoelectric Effect:** phenomenon in which photoelectrons are emitted from a metal's surface when light of a certain frequency shines on the surface.
16. **Photon:** a particle of electromagnetic radiation with no mass that carries a quantum of energy.
17. **Planck's constant:** h , which has a value of 6.626×10^{-34} J-s, where J is the symbol for the joule.
18. **Principal Energy Level:** the major energy levels of an atom.
19. **Principal Quantum Number:** n , which the quantum mechanical model assigns to indicate the relative sizes and energies of atomic orbitals.
20. **Quantum:** the minimum amount of energy that can be gained or lost by an atom.
21. **Quantum Mechanical Model of the Atom:** an atomic model in which electrons are treated as waves; also called the wave mechanical model of the atom.

- 22. Valence Electron:** the electrons in an atom's outermost orbitals; determined the chemical properties of an element.
- 23. Wavelength:** the shortest distance between equivalent points on a continuous wave; is usually expressed in meters, centimeters, or nanometers.
- 24. Em wave relationship:** $c = \lambda\nu$ (λ -wavelength, ν -frequency) pg. 119
- 25. Energy of a Quantum:** $E_{\text{quantum}} = h\nu$ pg. 123
- 26. Energy of a Photon:** $E_{\text{photon}} = h\nu$ pg. 124
- 27. Energy Change of an Electron:** $\Delta E = E_{\text{high-energy orbit}} - E_{\text{lower-energy orbit}} = E_{\text{photon}} = h\nu$
pg. 128
- 28. de Broglie's Equation:** $\lambda = h/mv$ (m-mass, v-velocity, and λ -wavelength) pg.130