

**CHE 101 - Study Guide Ch 10**  
**Modern Atomic Theory and the Periodic Table**

**Terms:** Frequency ( $\nu$ , nu), wavelength ( $\lambda$ , lambda), speed ( $v$ ), photons, line spectrum, quanta, principal quantum number ( $n$ ), angular momentum quantum number ( $l$ ), magnetic quantum number ( $m_l$ ), and spin quantum number ( $m_s$ ), valence electron, representative elements, transition elements, orbital, orbital diagram, Pauli exclusion principle, Hund's rule.

**Concepts:**

1. Progression of atomic models leading up to Quantum Models (Thomson  $\rightarrow$  Rutherford  $\rightarrow$  Bohr  $\rightarrow$  de Broglie  $\rightarrow$  Heisenberg  $\rightarrow$  Schrödinger).
  - a. Thompson –
  - b. Rutherford –
  - c. Bohr
  - d. De Broglie
  - e. Heisenberg
  - f. Schrodinger
2. Scientists:
  - a. Planck
  - b. Einstein
  - c. Bohr
  - d. De Broglie,
  - e. Heisenberg
  - f. Schrödinger.
3. Experiments: Black Body Radiation, Photoelectric Effect, Line Spectra.
4. Differences between Classical and Quantum Theory's.
5. Understand terms describing electromagnetic radiation.
6. Relationship between quantum numbers ( $n, l, m_l, m_s$ ), how many electrons can be found in each level.
7. Write electron configurations ( $1s^2 2s^2$  etc) **and** draw orbital configurations (Table 10.1 and 10.2).
8. Order of filling shells (1s, 2s, 2p, 3s, 3p, 4s, 3d, 4p, 5s, 4d, 5p etc).
9. Calculate the number of valence electrons for common elements.
10. Understand the relationship between electron shell configuration and periodic table.
11. Understand the relationship between electron shell configuration and periodic trends.