**Honors Chemistry**

**Modern Atomic Concepts Unit Test- Outline**

By the time of the exam, students should be able to:

* Explain that light can behave as both waves and particles
* Describe the contributions of deBroglie, Schrödinger, and Heisenberg to the quantum mechanical model of the atom
* Compare and contrast Bohr’s model of the atom with the quantum mechanical model
* Define *orbital*
* List the four quantum numbers (n, l, m, s), and identify their meanings
* Identify the number of sublevels in each principal energy level
* Identify the number of orbitals in each sublevel
* Identify the shape of the s, p, d, and f orbitals
* Identify the maximum number of electrons each orbital, sublevel, and energy level can hold
* Write electron configurations of elements following the Aufbau Principle, Hund’s Rule, and Pauli Exclusion Principle
* Construct orbital fill diagrams of electron configurations
* Use an orbital fill diagram to determine the number of filled/unfilled orbitals or paired/unpaired electrons
* Determine the four quantum numbers of a selected electron from an orbital fill diagram
* Construct Bohr diagrams of neutral atoms
* Differentiate between valence and kernel electrons
* Draw the Lewis dot diagram of a neutral atom
* Classify an electron configuration as ground or excited state
* Write a possible excited state electron configuration for a given element

Throwbacks from the Atomic Concepts Quiz:

* Describe the experiments conducted by Thomson and Bohr, the observations made during these experiments, and the conclusions about the atom derived as a result of these experiments
* Explain, in terms of energy and electrons, the production of the bright line spectrum of an element
* Identify the number of protons, neutrons, and electrons in a neutral atom
* Calculate the mass number of an atom
* Determine the nuclear charge of an atom