# ****Electron Configurations Chapter 4 study guide****

* What evidence supports

    -the wave-theory of energy?  
    -the quantized particle theory of energy?  
    -the wave particle duality?

* What observations support the Bohr model of a hydrogen atom.
* What insights lead to the quantum model?
* How do the Bohr model and the quantum model compare?
* What are the meanings of the symbols used in electron orbital notation?
* How can the quantum numbers be interpreted (physically) to describe the geometry of electron clouds.
* How are the orbital filling rules applied to write the electron configuration for particular elements?
* What are the meanings of the following formulas.

    E  =  *mc2*  
    E  =  *h*      
    c  =  

* Given any pair of variables in the preceding formulas, how can we solve for the remaining value?

Vocabulary

-Planck's Constant

-Photoelectric Effect and Compton Effect (and their relevance)

-Line spectra vs. Continuous Spectra

-Ground State vs. Excited State

-Matter Waves

-Heisenberg's Uncertainty Principle

-Quantum-Mechanical Model of the Atom

-Electron Orbits vs. Orbitals

-Electron Density

-Principal Energy Levels and Sublevels

-Quantum Numbers

-Electron Configuration

-Orbital Diagram

-Rules for filling orbitals (Aufbau Principle, Pauli's Exclusion Principle, Hund's Rule)

-Exceptions to the conventional orbital-filling order

Sample test questions:

1. Sketch out a drawing of the Bohr atom, labeling the orbits n=1, n=2, n=3 and so forth. Explain (in writing) how the Bohr model can be used to explain the unique line spectra of hydrogen. Whenever appropriate, use the unit vocabulary in your explanation.

2. Compare and contrast the Bohr model of the atom, with the quantum model of the atom. Your answer will be graded on accuracy, completion, and the amount of specific detail you provide.

3. Write a complete electron notation for elemental zinc. Demonstrate that you can represent the same information in the form of an arrow diagram.

4. Determine the electron configuration for the outermost orbitals of Mg1+ and Mg2+ ions. Based on your understanding of the stability of completely filled orbitals, which of these ions would you predict as more stable? Explain your answer.

5. A fairly dim white light will charge a glow-in-the-dark toy, enabling it to glow when the lights are turned out. Not so for a red light, large or small. Explain this observation in terms of the theories you’ve learned in this unit.

6. Compare and contrast the geometries of a 1s orbital, 2s orbital and a full set of 2p orbitals.