Big Chem: Unit 9 Electron Structure

PRINT Name _____ Period _____

1. What is the wavelength of an electron of mass 9.11 x 10^{-28} kg traveling at a velocity of 2.00 x 10^8 m/s? (Planck's constant = 6.63 x 10^{-34} J/Hz. Hint: Substitute in this formula: Ans: 3.64 x 10^{-15}m.

$$\lambda = \frac{h}{mv}$$

λ = wavelength in meters
v = the velocity in meters/sec
Where m = the mass in kilograms
h = Plancks's constant in J/Hz

Hint: Use the Electron Orbitals (Goose) Chart:

2. Calculate the maximum number of electrons that can occupy the levels when n = 2, 3, 5, and 7.

3. How many orbitals are in a(n) a. *d* sublevel, b. *f* sublevel ?

4. Write the electron configurations of the elements with Z = 1 through Z = 20. *(Z = atomic number = the number of electrons to configure) .* Hint: $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $4s^2$... etc.

5. Write **electron configurations** and draw the **dot diagrams** for the following elements: *Remember that dot structures use the valence (outermost) electrons and s and p orbitals only.*
   a. Z = 28, b. Z = 18, c. Z = 16, d. Z = 47, e. Z = 19, f. Z = 32.

6. How many electrons can exist in the fifth energy level? See <u>Electronic Energy Levels</u> Chart.

7. What elements are composed of atoms having the following configurations:
Hint: the total number of electrons, Z, is the atomic number.
   Use <u>*The Periodic Table*</u> to determine the element.
   a. $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $4s^2$ $3d^5$
   b. $1S^2$ $2S^2$ $2p^6$ $3S^2$ $3p^6$ $4S^2$ $3d^{10}$ $4p^6$ $5S^2$ $4d^4$

8. Write the electron configurations for niobium and zinc.

9. How many pairs of electrons are there in an atom of boron? an atom of sulfur? an atom of fluorine? *Hint: A filled orbital represents a pair of electrons on* the <u>Electronic Energy Levels</u> Chart.