Electron Orbitals, Diagrams, & Configurations Notes Name:_____Period:____

Schrodinger

- Model was based on mathematics
- Based on energy levels, but the exact path of the electron is **not** defined
- _____= the liklelihood of finding the electron in a certain position
- Electrons have 90% probability of occupying that region in space = _____
- Each orbital has a maximum of _____ electrons

Each energy level (n) has energy sublevels

- s= _____
  - _____ orbital
  - Maximum of _____ electrons
- p= _____
  - _____ orbitals
  - Maximum of _____ electrons
- d= _____
  - _____ orbitals
  - Maximum of _____ electrons
- f= _____
  - _____ orbitals
  - Maximum of _____ electrons

Electron Configurations

- Way electrons are arranged around the nucleus of an atom
- 3 different types of electron configurations
  - Orbital configuration
  - Electron configuration
  - Noble gas configuration

Order of Orbital Filling

- Use the periodic table to help you
- Know where the different blocks are on the periodic table
  - s, p, d, & f
- Know the maximum number of electrons in each sublevel
- Read from left to right across the period beginning with hydrogen and stopping when you get to your element.

Rules for all Electron Configurations

1. _____- electrons fill lowest energy levels first (1s 2s 2p 3s 3p 4s 3d 4p etc)
2. _____- only 2 electrons can be placed in an orbital
   - The electrons must have opposite spins (clockwise and counter clockwise)
3. _____- electrons entering orbitals of equal energy will fill one into each orbital with the same spin & then add a second spin when all contain one

Orbital Diagrams

- Includes a _____ for each of the atom's orbitals, _____ represent electrons
  - An empty box represents an _____ orbital
  - A box with one _____ represents an orbital with _____ electron
  - A box with _____ arrows (one up and one down) represents a _____ orbital
  - Boxes should be labeled with the _____ and _____ (s, p, d, f)
- You can use an orbital diagram to _____ an element

Electron Configuration

- Sometimes called _____ electron configurations because all electrons are in their _____ possible energy levels
- Steps for writing a ground state electron configuration:
  - Start from _____
  - Write _____ level (1-7)
  - Write _____ (s,p,d,f)
  - Write number of _____ in the sublevel as an _____ (superscript)
  - Stop at the desired number of _____

Practice

- Draw the orbital diagram for the following elements:
  - Oxygen
  - Titanium
  - Boron
- Write the electron configuration for the following elements:
  - Cobalt (Co)
  - Tungsten (W)

Electron Configuration

- Elements can be identified by their ending electron configurations
- Examples:
  - $3d^8$
  - $2p^4$
  - $5s^1$
  - $1s^2$