68 pts

Electron Configurations and Orbital Diagrams

1. (6 pts) What is the Pauli Exclusion Principle? How many electrons can occupy an orbital, according to principle? Why?

Pauli - 2e⁻ must spin in opposite directions

2e⁻ - Hund's Rule

2. (5 pts) How does the energy of the principal energy level depend on the value of n, 1,2,3,…? Does a higher value of n mean a higher or lower energy?

It is the value of the E Level

3. (2 pts) The number of sublevels in the principal energy level (increases/decreases) as n increases?

1 - s 2 - s, p 3 - s, p, d

4. (4 pts) Which of the following orbital designations is (are) not correct?

2p 1d 3f 4s

5. (5 pts) Which orbital is the first to be filled in any atom? Why?

1s - build outwards

6. (5 pts)Which electrons in an atom are the valence electrons? Why are these electron important?

outermost

used in bonding

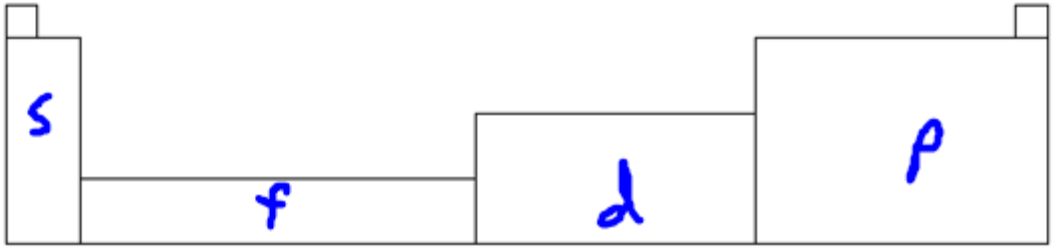
7. (3 pts) How are the electron arrangements in a given group of the periodic table related?

Same number of val e⁻

8. (4 pts) What are the differences between the 1s and 2s orbitals of the hydrogen atom? How are they similar?

diff - Size + E Similar - shape

9. (4 pts) Label the s, p, d, f regions on the periodic table below.



10. (30 pts) Write the electron configuration and orbital diagrams for each of the following elements. Also, circle the valence electrons and give their wood be charge when they become an ion.

Strontium- Sr - [Kr] $5s^2$

↿⇂

2+

zinc- Zn - [Ar] $4s^2 3d^{10}$

↿⇂, ↿⇂ ↿⇂ ↿⇂ ↿⇂ ↿⇂

2+

gallium- Ga - [Ar] $4s^2 3d^{10} 4p^1$

↿⇂, ↿⇂ ↿⇂ ↿⇂ ↿⇂ ↿⇂, ↿ _ _

3+

sulfur- S - [Ne] $3s^2 3p^4$

↿⇂, ↿⇂ ↿ ↿

2-

Sodium- Na - [Ne] $3s^1$

↿

1+

argon- Ar - [Ne] $3s^2 3p^6$

↿⇂, ↿⇂ ↿⇂ ↿⇂

Plutonium- Pu-[Rn]$7s^2$ $5f^6$

↿⇂, ↿ ↿ ↿ ↿ ↿ ↿ –

2+

fluorine- F-[He]$2s^2 2p^5$

↿⇂, ↿⇂ ↿ ↿

1-

Copper* Cu-[Ar]$4s^1$ $3d^{10}$

↿, ↿⇂ ↿⇂ ↿⇂ ↿⇂ ↿⇂

1+

this one is goofy one

silicon- Si-[Ne]$3s^2 3p^2$

↿⇂, ↿ ↿ –

4±