1. How many protons, neutrons, and electrons in each of the following?

a) ^{73}Ge — 32p, 41n, 32e⁻

b) $^{126}_{53}I^-$ — 53p, 73n, 54e⁻

c) mass # = 197; atomic # = 79; charge = +3 — 79p, 118n, 76e⁻

d) most common ion of lithium-7. — 3p, 4n, 2e⁻

2. Write the ground state electron configuration for:

a) the potassium atom $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$

b) the selenium ion $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6$

c) Cr $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$

d) Pb^{+4} $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6$ ~~$6s^2$~~ $4f^{14} 5d^{10}$

3. Write the noble gas electron configuration for each item in #2.

a) [Ar] $4s^1$

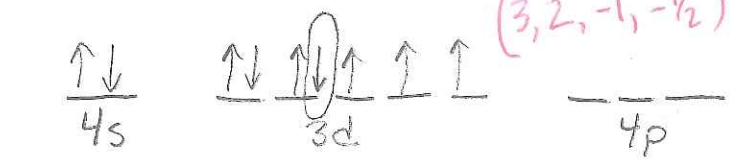
b) [Kr]

c) [Ar] $4s^1 3d^5$

d) [Xe] $4f^{14} 5d^{10}$

4. Iron has two common oxidation states (charges), +2 and +3. Explain why iron can form both of the relatively stable ions. [Ar] $4s^2 3d^6$ can lose the 4s electrons or the 4s + 1 of the 3d (extra stable w/ $3d^5$)

5. Write the set of quantum numbers for the electron circled in the diagram below of a partial orbital notation.



(3, 2, -1, -½)

6. Write the quantum numbers for the valence electrons in an atom of tin. $5s^2 4d^{10} 5p^2$

(5, 0, 0, ½) (5, 1, -1, +½)
(5, 0, 0, -½) (5, 1, 0, +½)

7. Which has a larger radius, the chlorine atom or the chlorine ion? Why? more electrons in Cl^-, but same # of protons

8. Explain why sulfur has a lower ionization energy than phosphorus. S: $3p^4$ electrons share an orbital (repulsions between e^-)

9. Explain why iodine has a lower ionization energy than bromine.

I has more C.E. aka more shielding

10. Rank the following from lowest to highest electronegativity.

Ca, O, N, P, F Ca, P, N, O, F

11. Rank the following from smallest to largest radius.

Xe, Cs^+, I^-, Ba^{+2} Ba^{+2}, Cs^+, Xe, I^-

12. Calculate the wavelength of the electromagnetic radiation being broadcast by WBRU (95.5 MHz)

$c = \lambda\nu$ $3.00\times10^8\ m/s = \lambda\,(95.5\times10^6\ Hz)$ $\lambda = 3.14\ m$

13. Calculate the wavelength of the photon released by a hydrogen atom when an electron moves from the 6th energy level to the 1st energy level.

$$E_6 = \frac{-2.178\times10^{-18}\ J}{36} = -6.05\times10^{-20}\ J$$

$$E_1 = \frac{-2.178\times10^{-18}\ J}{1} = -2.178\times10^{-18}\ J$$

$$\Delta E = 2.1175\times10^{-18}\ J$$

$E = h\nu$ $\nu = \frac{E}{h}$ $\lambda = \frac{c}{\nu}$ $\lambda = \frac{ch}{E}$

$c = \lambda\nu$

$$\lambda = \frac{(3.00\times10^8\ m/s)(6.63\times10^{-34}\ J\cdot s)}{2.1175\times10^{-18}\ J}$$

$$\lambda = 9.39\times10^{-8}\ m$$

$$= 93.9\ nm$$