During Class Invention

Name(s) with Lab section in Group

Electron Configuration Part II

- 1. Write the complete electron configuration for
- a) F *1s²2s²2p⁵*
 - b) Si 1s²2s²2p⁶3s²3p²
 - c) Zn $1s^22s^22p^63s^23p^64s^23d^{10}$
 - d) Er $1s^22s^22p^63s^23p^64s^23d^{10}4p^65s^24d^{10}5p^66s^25d^14f^{11}$
 - 2. The maximum number of electrons in

e)	The 2 nd shell	8 electrons	b)	a d subshell	10 electrons
c)	a p orbital	2 electrons	d)	3p subshell	6 electrons

3. Draw an orbital diagram for

a) nitrogen



4a. What does the term 'shield' mean when describing the attraction experienced by an electron in an outer shell?

Shielding is what the inner core electrons do to part of the nuclear charge experienced by the valence electrons. Consider fluorine in the Table in DCI23.4. There are 2 inner core electrons (electrons in the n = 1 level), 7 valence electrons and 9 protons in the nucleus. The 2 inner core electrons are shielding the 7 valence electrons from the nucleus. The result is that each of the valence electrons experience an effective nuclear charge of +7.

5. Complete the following table

	Nuclear	Total # of	# of inner	# of valence	Effective Nuclear
Element	Charge (same	electrons	core electrons	Electrons	Charge
	the atomic	(same as the		(Outer most	(Z – IC electrons)
	number)	atomic numb		electrons)	
hydrogen	+1	1	0	1	+1
lithium	+3	3	2	1	+1
Beryllium	+4	4	2	2	+2
Boron	+5	5	2	3	+3
Carbon	+6	6	2	4	+4
Nitrogen	+7	7	2	5	+5
Oxygen	+8	8	2	6	+6
Fluorine	+9	9	2	7	+7
Sulfur	+16	16	10	6	+6
Potassium	+19	19	18	1	+1
Bromine	+35	35	28	7	+7

6. Explain the basis for the rule "the atomic radius decreases going across a period".

Going across a period all of the electrons are in the same shell, the number of inner core electrons (the ones shielding the valence electrons from a portion of the nuclear charge) remain constant. Since the nuclear charge increases going across the period the valence electrons experience an increasing ENC that causes the valence electrons to experience a greater attraction to the nucleus. This means the valence electrons are pulled closer to the nucleus and the atomic radius will decrease going across the period. (see the table is DCI 25.1)