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Atomic Orbitals Worksheet 2

1. Determine the number of electrons present in each of the first three energy levels. Set up your equations. Circle your final answers.

2. It is known that each energy level needs to be filled completely to move on to the next. Given the following elements, determine in which energy level the final electron would be present.

	Atomic Number	***# of electrons***	***Highest Energy Level***
A. Argon (example)	*18*	*18*	*3^{th}*
B. fluorine	_____	_____	_____
C. magnesium	_____	_____	_____
D. sulfur	_____	_____	_____
E. silicon	_____	_____	_____
F. beryllium	_____	_____	_____
G. oxygen	_____	_____	_____

3. Identify the order in which the first four available energy sublevels are filled. Place the sublevels in order from first-filled to last.

4. Following the *directions* from *Atomic Orbital Worksheet 1, question 8*, identify (in order) all of the energy levels and sublevels that would be occupied in a chlorine atom. Remember, a chlorine atom has 17 total electrons.

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5. Given the following elements, determine in which energy level the final electron would be present. Note – in the example I have included the total electrons present in each sublevel in parentheses. You are not required to do this, but it might be useful to help you keep track of your math.

	# of electrons	***Energy Sublevels***	***Highest/Last Sublevel***
A. *Argon (example)*	*18*	*1s ($2e^-$) 2s ($2e^-$) 2p ($6e^-$) 3s ($2e^-$)*	*3p ($6e^-$ are present)*
B. fluorine	_____	_____	_____
C. magnesium	_____	_____	_____
D. sulfur	_____	_____	_____
E. silicon	_____	_____	_____
F. beryllium	_____	_____	_____
G. oxygen	_____	_____	_____

6. *Illustrate* the shapes and orientations of the three p orbitals.

7. Which energy level would be the first to have the presence of an f sublevel?

8. At the beginning of our notes on this section, we stated that a maximum of 18 electrons can exist in the third energy level (n = 3). Break down where each of those electrons exists by sublevel.

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9. Given the following elements, determine in which sublevel the final electron would be present *(this is the same expectation as question 5)*. As with question 5, you may include the electrons present in each sublevel in parentheses. This is not required, but it might be useful to help you keep track of your math.

	# of electrons	***Energy Sublevels***	***Highest/Last Sublevel***
A. helium	_____	_____	_____
B. lithium	_____	_____	_____
C. phosphorus	_____	_____	_____
D. carbon	_____	_____	_____
E. sodium	_____	_____	_____
F. neon	_____	_____	_____
G. hydrogen	_____	_____	_____
H. aluminum	_____	_____	_____
I. nitrogen	_____	_____	_____

10. Attempt to *illustrate* the shapes and orientations of the five different d orbitals.