QUANTUM NUMBERS WORKSHEET

1. State the four quantum numbers, then explain the possible values they may have and what they actually represent.

2. State the number of possible electrons described by the following quantum numbers

   a. n = 3, l = 0
   b. n = 3, l = 1
   c. n = 3, l = 2, ml = -1
   d. n = 5, l = 0, ml -2, ms -1/2

3. Give the n and l values for the following orbitals

   a. 1s
   b. 3s
   c. 2p
   d. 4d
   e. 5f

4. What is the m_l values for the following types of orbitals?

   a. s
   b. p
   c. d
   d. f

6. How many possible orbitals are there for n =

   a. 4
   b. 6

7. Write the complete set of quantum numbers that represent the **valence electrons** for the following elements:

a. He

b. V

c. Ni

d. Cu

e. Br

8. Write the electron configurations for the elements above.

He
V
Ni
Cu
Br

9. Without referring to a text, periodic table or handout, deduce the maximum number of electrons that can occupy an:

a. ___ s orbital ___ b. the subshell of p orbitals ____ c. the subshell of d orbitals

d. ___the subshell of f orbitals e. ____the subshell of g orbitals

10. How many electrons can inhabit all of the n=4 orbitals?

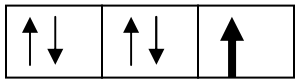
_____

11. Fill in the blanks with the correct response:

a. ._____ The number of orbitals with the quantum numbers n=3, l=2 and m_l = 0 is
b. ._____ The subshell with the quantum numbers n=4, l=2 is
c. ._____ The m_l values for a d orbital are
d. ._____ The allowed values of l for the shell with n=2 are
e. ._____ The allowed values of l for the shell with n=4 are
f. __ The number of orbitals in a shell with n=3 is
g. ._____ The number of orbitals with n=3 and l=1 is
h. .__ The maximum number of electrons with quantum numbers with n=3 and l=2 is
i. .____ When n=2, l can be
j. ._____ When n=2, the possible values for m_l are
k. .___ The number of electrons with n=4, l=1 is
l. .The subshell with n=3 and l=1 is designated as the _____subshell
m. ._____=The lowest value of n for which a d subshell can occur is n

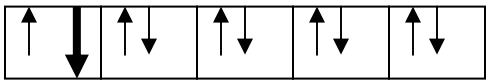
12. Write the values for the quantum numbers for the **bold** electron in the following diagrams:

a. 3p orbitals



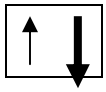
a.

c. 4d orbitals



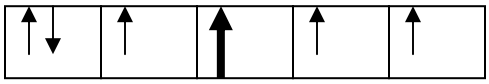
c.

b. 5s



b.

d. 3d orbitals



d.

13. __How many electrons can occupy any single subshell orbital____

?a. What is the value of ***l*** for a 4 f electron 14

b. ?What is the orbital designation for an electron in the 3rd shell and p sublevel
c. ?What are the possible values of ml for a 5d electron
d. ?What is the maximum number of electrons in the 3rd energy level
e. ?How many orbitals have the following quantum numbers: n =4, l = 2, ml = -2
f. ?How many electrons have the following quantum numbers: n =4, l = 2, ml = -2