ROSEDALE ACADEMY

Name _____

1-2F: QUANTUM NUMBERS PRACTICE WORKSHEET

1. Name the orbitals described by the following quantum number

   a. n = 3, ℓ = 0

   b. n = 3, ℓ = 1

   c. n = 3, ℓ = 2

   d. n = 5, ℓ = 0

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

   a. 1s

   b. 3s

   c. 2p

   d. 4d

   e. 5f

3. 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_____

4. What are the possible m_ℓ values for the each of the following types of orbitals?

   a. s

   b. p

   c. d

   d. f

5. How many possible orbitals are there for n =

   a. 4

   b. 10

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

7. 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=_____.

8. Which sets of quantum numbers are unacceptable? (Select a, b, c, or any combination)

   a. n=3, l= -2, m_l= 0, m_s= +½
   b. n=2, l= 2, m_l= -1, m_s= -½
   c. n=6, l= 2, m_l= -2, m_s= +½