Teacher's Tools® Chemistry
Atomic Structure: Quantum Numbers: Worksheet 2

1. For a neutral As atom in the ground state, how many electrons have quantum numbers n = 4, l = 1?

   (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

2. Which set of quantum numbers (n, l, m_l, m_s) represents the outermost electron in a gaseous aluminum atom?

   (A) 2, 1, 0, +1/2 (B) 2, 1, -1, +1/2 (C) 3, 0, 0, +1/2 (D) 3, 1, -1, +1/2

3. What is the maximum number of electrons that can have a principal quantum number of 3 within one atom?

   (A) 3 (B) 8 (C) 18 (D) 32

4. The maximum number of electrons in an atom that can have quantum numbers n = 2, l = 1 is

   (A) 2 (B) 6 (C) 8 (D) 4

5. The quantum numbers 3, 1, -1, +1/2
   (A) refer to an electron in the p orbital of the 3rd shell.
   (B) refer to an electron in the p orbital of the 2nd shell.
   (C) refer to an electron in carbon.
   (D) refer to an electron in the s orbital of the 3rd shell.

6. One of the outermost electrons in a strontium atom in the ground state can be described by which of the following sets of four quantum numbers?

   (A) 5, 2, 0, ½ (B) 5, 1, 1, ½ (C) 5, 1, 0, ½ (D) 5, 0, 1, ½ (E) 5, 0, 0, ½

7. How many atomic orbital configurations that satisfy Hunds' rule can be written for the $1s^2 2s^2 2p^2$ structure of the carbon atom such that all the p-electrons have a spin quantum number of +1/2?

   (A) 1 (B) 2 (C) 3 (D) 4

8. What is the correct set of quantum numbers for the highest energy electron of Na?

   (A) 3, 0, 0, ½ (B) 3, 1, 0, ½ (C) 3, 1, -1, -½ (D) 1,0, 0, -½

9. Which of the following sets of quantum numbers is not possible?
   (A) 3, 1, 0, ½
   (B) 1, 1, 0, -½
   (C) 2, 1, 1, ½
   (D) 4, 2, -2, -½
   (E) 2, 1, 0, ½