

Quantum Numbers Worksheet

- 1) What are quantum numbers?
- 2) What information does the first three quantum numbers indicate?
- 3) What does the fourth quantum number indicate?
- 4) What does the principal quantum number indicate?
- 5) The letter, n , is used to designate the principal quantum number (True or False).
- 6) What does the orbital quantum number indicate?
- 7) Orbitals with different shapes occupy different regions. These regions are called _____.
- 8) The quantum numbers designated in ascending order use the letters _____.
- 9) What is the shape of the s orbital?
- 10) What is the shape of the p orbital?
- 11) In the n th principal energy level, orbitals of _____.
- 12) What does the magnetic quantum number indicate?
- 13) There is only one orientation of the s orbital (True or False).

- 14) How many possible orientations are there for the p orbital?
- (a) What are these orientations called?
- 15) What does the spin quantum number indicate?
- 16) The first three quantum numbers completely indicate _____.
- 17) How many electrons can the first principal energy level hold?
- 18) How many electrons can the second principal energy level hold?
- 19) The third principal energy level can hold 18 electrons. What orbitals are found in the third principal energy level?
- 20) The fourth principal energy level can hold 32 electrons. What orbitals are found in the fourth principal energy level?

Solutions

- 1) Numbers that specify the properties of atomic orbitals and their electrons.
- 2) n indicates the distance from the nucleus, l indicates the sublevel (s,p,d, or f), and m_l indicates the orbital orientation.
- 3) The spin of an electron, clockwise or counterclockwise.
- 4) n indicates the main or principal energy levels surrounding a nucleus.
- 5) True.
- 6) The type of sublevel, s, p, d, or f.
- 7) Sublevels.
- 8) s, p, d, and f.
- 9) Spherical.
- 10) Figure eights.
- 11) n shapes are possible.
- 12) The orientation of an orbital about the nucleus.
- 13) True.
- 14) Three.
 - (a) p_x , p_y , and p_z .
- 15) Which way the electron is spinning, clockwise or counterclockwise.
- 16) The energy level and the shape of each orbital.
- 17) Two.
- 18) Eight
- 19) s, p, and d.
- 20) s, p, d, and f.