General Chemistry
Practice Quiz

N_A = 6.022 \times 10^{23} \text{ per mole} \quad h = 6.626 \times 10^{-34} \text{ Js} \quad R = 1.097 \times 10^{-7} \text{ nm}^{-1}

1. What are the four quantum numbers (give symbols).
   \( n \) - principal energy
   \( l \) - angular momentum - shape
   \( m_l \) - magnetic orientation
   \( ms \) - spin

2. Which is the principle quantum number and what does it indicate?
   Energy and size of orbital

3. Give the electron configurations of the following elements:
   a. Ge (Z = 32) \( [Ar] 4s^2 3d^{10} 4p^2 \)
   b. Nb (Z = 41) \( [Kr] 5s^2 4d^1 5d^1 \) (expected config)
   c. Bi (Z = 83) \( [Xe] 6s^2 5f^{14} 6d^{10} 5p^3 \)
   d. Cl (Z = 17) \( [Ne] 3s^2 3p^5 \)

4. Complete the following orbital diagram for nitrogen.

   \[ \begin{array}{c}
   1 \hspace{1cm} 2 \hspace{1cm} 1 \hspace{1cm} 1 \\
   \text{2s} & \text{2p} \\
   \end{array} \]

5. List the following in order of increasing atomic radii:
   Ge, S, B, F, Si, \( F < B < S < Si < Ge \)

6. List the following ions in order of increasing size:
   \( Al^{3+}, O^{2-}, F^{-}, Mg^{2+}, N^{3-}, Na^{+} \quad \text{and} \quad Al^{3+} < Mg^{2+} < Na^{+} < O^{2-} < F^{-} < N^{3-} \)

7. Give the electron configurations of the following ions
   a. \( Cr^{3+} \) \( [Ar] 3d^3 \)
   b. \( Cl^- \) \( [Ar] \)
   c. \( Ag^+ \) \( [Kr] 5s^1 4d^{10} \) (exception to know)