1. List the complete electronic configuration of each of the following. You may use [ ] around an inert gas element symbol to indicate the electrons up to and including that element.

A. Fe\(^{2+}\)  
B. Fe\(^{3+}\)  
C. Si\(^{4+}\)  
D. Cl\(^{-}\)  
E. N\(^{5+}\)  

2. List five species (ions or atoms) with the electronic configuration

\[1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^2\ 4p^6\]

3. What type of orbital (s, p, d, or f) are being filled across the first, second, and third transition series? ________________________

4. What type of orbitals are being filled across the rare earth elements and the actinides? ________________________
5. Give a general description of the valance electrons for each of the indicated columns of the periodic table. See example. (Be sure to use a modern table - column designations have changed).

<table>
<thead>
<tr>
<th>Column</th>
<th>Valance configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX. Alkali Metals</td>
<td>ns(^1), n = 1 to 7</td>
</tr>
<tr>
<td>Alkaline earths</td>
<td></td>
</tr>
<tr>
<td>Halogens</td>
<td></td>
</tr>
<tr>
<td>Group 13 (boron elements)</td>
<td></td>
</tr>
</tbody>
</table>

6. List the valence electrons of the following species.

   A. Mg  
   B. Ga  
   C. S   
   D. F   
   E. Co  

7. How many electrons can each of the following subshells hold?

   A. 4s  
   B. 4d  
   C. 3p  
   D. 5f  

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