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. \(^{Fe^{2+}}\) \([Ar] \ 3d^6\)

B. \(^{Fe^{3+}}\) \([Ar] \ 3d^5\)

C. \(^{Si^{4+}}\) \([Ne]\)

D. \(^{Cl^-}\) \([Ne] \ 3s^2 \ 3p^6\)

E. \(^{N^{5+}}\) \([He]\)

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

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

\_Se^{2-}\]

\_Br^-\]

\_Kr\]

\_Rb^{1+}\]

\_Sr^{2+}\]

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

4. What type of orbitals are being filled across the rare earth elements and the actinides? ___ f orbitals
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>ns^2, n = 2-7</td>
</tr>
<tr>
<td>Halogens</td>
<td>ns^2 np^5, n=2-6</td>
</tr>
<tr>
<td>Group 13 (boron elements)</td>
<td>ns^2 np^1, n=2-6</td>
</tr>
</tbody>
</table>

6. List the valence electrons of the following species.

A. Mg 3s^2
B. Ga 4s^2 4p^1
C. S 3s^2 3p^4
D. F 2s^2 2p^5
E. Co 3d^7 4s^2

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

A. 4s 2
B. 4d 10
C. 3p 6
D. 5f 14