Chem 121: Homework 4

A.

<table>
<thead>
<tr>
<th>isotope symbol</th>
<th>number of protons</th>
<th>number of neutrons</th>
<th>number of electrons</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^{75}_{34}$Se$^{2-}$</td>
<td>34</td>
<td>41</td>
<td>36</td>
</tr>
<tr>
<td>$^{43}_{20}$Ca$^{2+}$</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>$^{127}_{53}$I$^{-}$</td>
<td>5</td>
<td>53</td>
<td>74</td>
</tr>
</tbody>
</table>

B.  a) $1s^22s^22p^6$  
    b) $1s^22s^22p^63s^23p^64s^23d^104p^6$  
    c) $1s^22s^22p^6$

C.  Br$^-$: $1s^22s^22p^63s^23p^64s^23d^104p^6$

Isoelectronic with Kr, Se$^{2-}$, As$^{3-}$, Rb$^+$ and Sr$^{2+}$  (the question only asked for three ions.)
54. a) metal b) metalloid c) metalloid d) nonmetal e) metal

55. Metals lose electrons in reactions: a) potassium, d) barium, and e) copper

56. Nonmetals gain electrons in reactions: a) nitrogen and b) iodine

57. a) Te and b) K

58. c) Mo

59. c) calcium and d) barium

60. c) magnesium and e) beryllium

62. c) potassium and d) lithium

63. a) halogen b) noble gas c) halogen d) neither e) noble gas

64. a) noble gas b) halogen c) neither d) noble gas e) halogen

68. The elements most like magnesium would be those elements in the same group (2A) because they all have similar physical and chemical properties. Therefore, the answer is d) calcium.

70. You’d expect Li and Na to be most similar, as they are both in the same group (Alkali Metals.)

76. a) +6 b) -2 c) -3 d) +2

78. The number of protons is determined using the atomic number of each element, the number of electrons is determined by examining the net charge on the ion.
   a) 13p + 10e- = +3
   b) 16p + 18e- = -2
   c) 53p + 54e- = -1
   d) 47p + 46e- = +1

80. a) False; it would have 26 protons and 25 electrons. b) False; it would have 54 electrons. c) and d) are True.
82. a) F is in group 7A, therefore it will form F⁻.
   b) N is in group 5A, therefore it will form N²⁺.
   c) Mg is in group 2A, therefore it will form Mg²⁺.
   d) Na is in group 1A, therefore it will form Na⁺.

83. a) Ga is in group 3A, therefore it will lose 3 electrons.
   b) Li is in group 1A, therefore it will lose 1 electron.
   c) Br is in group 7A, therefore it will gain 1 electron.
   d) S is in group 6A, therefore it will gain 2 electrons.

84. a) I is in group 7A, therefore it will gain 1 electron.
   b) Ba is in group 2A, therefore it will lose 2 electrons.
   c) Cs is in group 1A, therefore it will lose 1 electron.
   d) Se is in group 6A, therefore it will gain 2 electrons.

86. F⁻ 10
    Be 4
    Br⁻ 35
    Al³⁺ 10
    O²⁻ 10

Chapter 5

38.  1  1  4  1
    3  3  12  2

50. Al₂O₃  BeI₂  CaS  CaI₂
52. Ca(OH)₂  CaCO₃  Ca₃(PO₄)₂  CaHPO₄

54. a) RbNO₃  Rb₂SO₄  Rb₃PO₄
    b) Sr(NO₃)₂  SrSO₄  Sr₃(PO₄)₂
    c) In(NO₃)₃  In₂(SO₄)₃  InPO₄

56. lithium iodide; magnesium sulfide; barium fluoride; sodium fluoride

58. mercury (II) bromide; iron (III) oxide; copper (II) iodide; tin (IV) chloride

62. a) barium hydroxide
    b) iron (III) hydroxide
    c) copper(I) nitrite
    d) lead (II) sulfate
    e) potassium hypochlorite
    f) magnesium acetate

66. CuClO₃  KMnO₄  PbCrO₄  CaF₂  Fe₃(PO₄)₂  LiHSO₄