G12 Chemistry: Class 6 Homework

1. Identify the following atoms or ions from their electron configurations: **[4 marks]**

   a. W: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^3$ _____

   b. X^+: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6$ _____

   c. Y^-: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6$ _____

   d. Z: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{11}$ _____

2. Write the condensed ground-state electron configuration and an orbital filling diagram for each of the following atoms or ions. (HINT: Pay close attention to anomalous configurations!) **[10 marks]**

   a. Mg

   b. S^{2-}

   c. K^+

   d. Cr

   e. Au

3. In general, ionization energy increases from left to right across a period. Aluminum, however, has a lower ionization energy than magnesium. Explain. **[3 marks]**

4. The following data lists the ionization energies for a given atom:

   IE_1 = 738 kJ/mol IE_2 = 1451 kJ/mol IE_3 = 7733 kJ/mol

   Predict the valence electron configuration for this atom and explain your reasoning. **[2 marks]**

5. Draw Lewis structures for each of the following molecules. **[8 marks]**

   a. NH_3 b. CH_4

   c. CF_4 d. AsH_3

e. BrO^-

f. H_2S

g. H_2O_2

h. ClNO

6. Draw Lewis structures for each of the following ions. (HINT: Consider resonance structures). **[4 marks]**

a. CO_3^{2-}

b. NO^+

c. ClO_3^-

d. SO_3^{2-}

7. Draw Lewis structure for the following molecules. (Note: Neither of these molecules has a single central atom.) **[2 marks]**

   a. N_2H_4 b. N_2F_2

8. Draw Lewis structures for the following molecules: **[6 marks]**

   a. PF_5 b. SF_6

   c. ICl_4^- d. XeF_4

   e. BH_3 f. $RnCl_2$