(Write your answers neatly. If I can’t read your writing easily, I will mark it wrong! Complete explanations are expected for all questions. Be sure to demonstrate your logic in answering the questions for full credit.)

1. (6 points) Would you expect to find an element having both a very large (positive) first ionization energy and an electron affinity that is much less than zero (large but negative)? Explain.
2. (6 points) Predict the value for the electron affinity of the Na+1 ion. (This one is easy. Think about what it means!)
3. (9 points) Arrange the members of each of the following pairs in order of increasing radius. Justify your choice.
   1. Te, Te-2
   2. Al, Al+3
   3. S-2, Cl-1
4. (8 points) Draw a Lewis structure for H2N2. There are two possible isomers you can draw for this molecule. Draw both and predict which one is the more stable. Explain your choice.
5. (9 points) Write the shorthand electronic configuration of Platinum based on the periodic table.

Platinum is diamagnetic. Based on this experimental evidence, do you expect an anomalous configuration for Pt, and if so, what configuration would you propose? Justify your answer with an explanation.

1. (6 points) If a great deal of energy is required to form gaseous ions, why do ionic compounds form at all?
2. (6 points) What is a polar covalent bond?
3. (12 points) Draw three resonance structures and an isomer for N=N=O.

Resonance structures

Isomer

1. (6 points) Why does the octet rule not hold for many compounds containing elements in the third period of the periodic table and beyond?
2. (10 points) Draw four reasonable structures for the PO3F-1 ion. The central P atom is bonded to the three O atoms and to the F atom. Show formal charges and predict which of the resonance structure(s) is/are the best.
3. (22 points) Draw lewis electron dot structures for the following molecules and give the orbital geometries, molecular geometries, and hybridization of the central atoms
   1. TeI4
   2. XeF4Se (Xe in center, show geometry using drawing tools)
   3. KrO2 (Show at least 2 resonance structures and evaluate them.)

Extra credit (5 points)

Some chemists think that helium should be properly be callod “helon.” Why? What does the ending in helium (-ium) suggest?