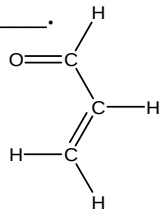
Chem 121
Test 3
Version A

You have 50 minutes to complete this 100 point test. Show all work for full credit. You may use a non-graphing, scientific calculator.

1. (10 pts) Fill in the blank:
   a. NO_2^+ and SCN^{1-} are _____ because they have the same number of _____ electrons.
   b. _____ is the pull towards the nucleus that particular electron experiences in a multi-electron atom. (hint: three words)
   c. _____ helps us to determine what atom carries the partial negative charge in a polar bond.
   d. The energy and frequency of a photon are _____ related to one another.
   e. The entire d-set of orbitals can hold _____ total electrons and the entire f-set of orbitals can hold _____ total electrons. But, each single orbital can only hold two electrons, according to the _____. (hint: three words)
   f. There are seven _____ bonds and two _____ bonds in the molecule in the right margin.



2. (15 pts) Give the full electron configurations (NOT the Noble Gas) for the following atoms/ions. Indicate the number of valence electrons and determine if the atom/ion is diamagnetic or paramagnetic.

	Electron Configuration	**# VE**	**D or P**
Fe^{2+}			
Se			
Cl^{1-}			
Sr			
Cu			

3. (4 pts) Circle the atom with the largest ionization energy.
   a. Ge or S
   b. Al or P

4. (6 pts) Circle the atom/ion with the largest atomic/ionic radii.
   a. Se or P

   b. Br or Br^{1-}

   c. Si or O

5. (15 pts) The campus radio station operates at a frequency of 88.1 MHz.
   a. Calculate the wavelength of light (in m) that corresponds to the campus radio station. (1 MHz = 10^6 Hz)

   b. Calculate the energy of a mole of photons with this frequency.

6. (10 pts) Using 4 – 6 grammatically correct sentences, explain how screening occurs in atoms and how this influences atomic size.

7. (10 pts) Write all the possible valid sets of quantum numbers for n = 5.

8. (40 pts) Draw the Lewis Dot Structures for the following molecules/ions. For each structure, give the following: (i) AXE Notation, (ii) molecular geometry, (iii) polar/nonpolar, and (iv) hybridization.

a. KrF_2

c. SO_3^{2-}

b. PO_4^{3-}

d. BrF_5