

AP Chem  
Take Home Exam Ch 7 – 9, 25  
(40 pts)

Name: \_\_\_\_\_  
I have neither given nor received aid on this exam,  
except from my group; list names if applicable:  
Period: 1 2 3 4                      November 15, 2005

Use the atomic masses and constants on the laminated Periodic Table provided.

1. (12 pts) Unknown metallic element X has four valence electrons.
  - a. (4 pts) Give two possible ground state noble gas electronic configurations for X, each from a different group on the periodic table.  
Ans =  
  
Ans =
  - b. (4 pts) Give two possible formulae for compounds element X would form with phosphorus.  
Ans =    Ans =
  - c. (4 pts) Is element X paramagnetic or diamagnetic? Explain how you know.
  
2. (14 pts) Consider the molecule N<sub>2</sub>O.
  - a. (4 pts) Draw the “best” Lewis structure and assign formal charges to each atom in the molecule.
  
  - b. (2 pts) Name the electron-domain geometry of the central atom. \_\_\_\_\_
  - c. (2 pts) Name the molecular geometry of the central atom. \_\_\_\_\_
  - d. (2 pts) Name the type of hybridization employed by the central atom. \_\_\_\_\_
  - e. (4 pts) Given the following bond lengths:  
N-N 167 pm                      N=N 120 pm                      N≡N 110 pm  
N-O 147 pm                      N=O 115 pm  
...and that observations of the N/N bond length in N<sub>2</sub>O is 112 pm and the N/O bond length is 119 pm, what does this suggest about the actual bonding in the N<sub>2</sub>O molecule?

3. (14 pts) Draw and name all the “straight-chain” isomers with the formula  $C_4H_6Cl_2$ . Draw and name one isomer in each box below; all boxes need not be used, attach more paper if necessary.

Name:	Name:	Name:	Name:
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