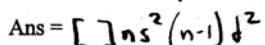
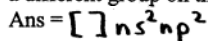


AP Chem
 Take Home Exam Ch 7 - 9, 25
 (40 pts)

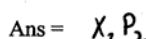
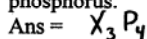
Name: KEY
 I have neither given nor received aid on this exam,
 except from my group; list names if applicable:
 Period: 1 2 3 4 November 15, 2005

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.

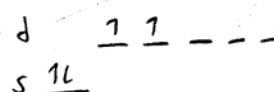
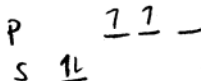


- b. (4 pts) Give two possible formulae for ^{binary} compounds element X would form with phosphorus.



- c. (4 pts) Is element X paramagnetic or diamagnetic? Explain how you know.

Paramagnetic

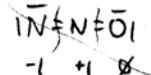
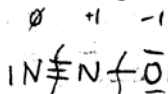


2. (14 pts) Consider the molecule N_2O .

- a. (4 pts) Draw the "best" Lewis structure and assign formal charges to each atom in the molecule.



16e⁻



- b. (2 pts) Name the electron-domain geometry of the central atom. linear
 c. (2 pts) Name the molecular geometry of the central atom. linear
 d. (2 pts) Name the type of hybridization employed by the central atom. sp

- 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_2O is 112 pm and the N/O bond length is 119 pm, what does this suggest about the actual bonding in the N_2O molecule?

Actual N/N bond has partial N=N character (N=N 112 pm > N≡N)
 " N/O " " " N=O character

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.

<p>Name:</p> <p>cis 2,3-dichlorobutene</p>	<p>Name:</p> <p>trans 2,3-dichlorobutene</p>	<p>Name:</p> <p>cis 1,4-dichlorobutene</p>	<p>Name:</p> <p>trans 1,4-dichlorobutene</p>
<p>Name:</p> <p>1,1-dichloro-1-butene</p>	<p>Name:</p> <p>trans 1,2-dichloro-1-butene</p>	<p>Name:</p> <p>cis 1,2-dichloro-1-butene</p>	<p>Name:</p> <p>trans 1,3-dichloro-2-butene</p>
<p>Name:</p> <p>trans 1,1-dichloro-2-butene</p>	<p>Name:</p> <p>trans 1,2-dichloro-2-butene</p>	<p>Name:</p> <p>cis 1,2-dichloro-2-butene</p>	<p>Name:</p> <p>cis 1,3-dichloro-2-butene</p>

- (1) 1,1-1
- (2) 1,1-2
- (2) 1,2-2
- (2) 1,3-1
- (2) 1,3-2
- (2) 1,4-1
- (2) 1,4-2

(1) 2,3-1
(2) 2,3-2
(1) 2,4-1
(1) 3,3-1
(1) 3,4-1
(2) 4,4-1

= German, zusammen "together"
E = "entgegen" "opposite"

