CHEMISTRY 101 **SPRING 2005** NAME

EXAM 3 S 501-511 Signature

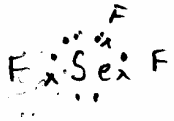
Form A

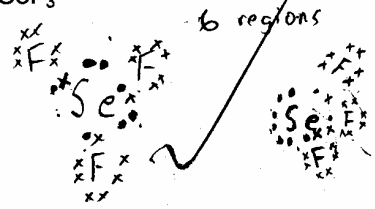
PART 2

Please read and sign: "On my honor, as an Aggie, I have neither given nor received unauthorized aid on this exam."

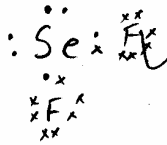
(24 pts) **25.** (i) Draw the Lewis dot structures for the following species (2 pts each). Show all lone pairs of electrons. For the central atom, give the number of regions of high electron density (2 pts), the hybridization (2 pts), electronic geometry (2 pts), the molecular (or ionic) geometry (2 pts), and say if the species has a dipole moment or not (2 pts).

(a) SeF_3^-





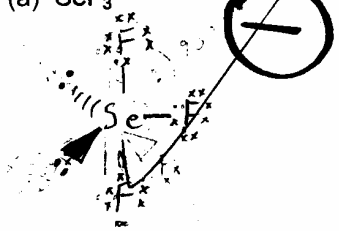
(b) SeF_2



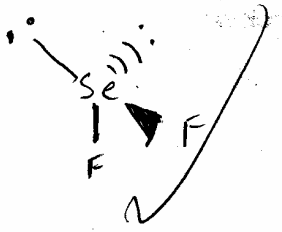
	SeF_3^-	SeF_2
Regions of High e^- Density	5	4
Hybridization	sp^3d	$2p^3$
Electronic Geometry	trigonal bipyramidal	tetrahedral
Molecular Geometry	~~T-shaped~~	bent
Dipole Moment? (Yes or No)	Yes	Yes

(6 pts) (ii) Draw a 3-dimensional representation of these 2 species using wedges and dotted lines. Show ALL lone pairs of electrons, not just the ones on the central atom. Show the bond angles.

(a) SeF_3^-



(b) SeF_2



OVER ⇒

26. The first ionization energy of lithium is +520 kJ/mol of atoms.

(3 pts) (a) Define ionization energy in a formal way (include an equation).

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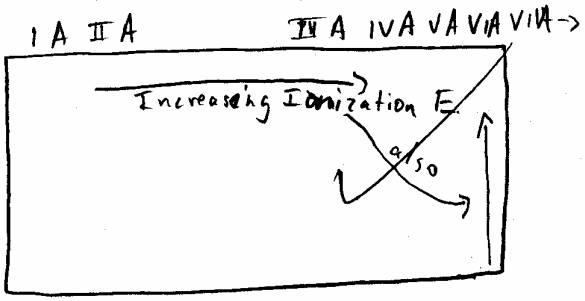
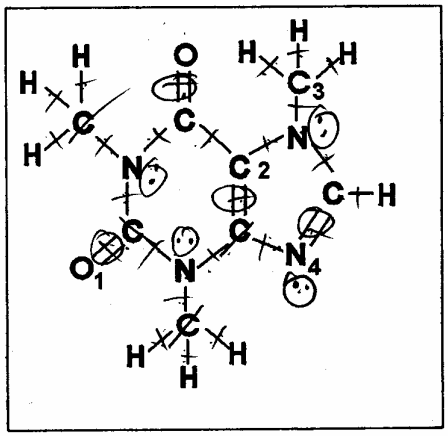
Ionization energy refers to the energy needed to strip away the last (or corresponding) electron in orbit around an atom.

$Li + 520\ KJ \rightarrow Li^+ + 1e^-$

(2 pts) (b) What is the general trend of the first ionization energies of Group A elements with position in the periodic table? You can draw and label a diagram.



27. Here again is the structure for caffeine.



(a) (2 pts) How many sigma bonds are present? 24

(b) (2 pts) How many pi bonds are present? 4

(c) (1 pt) How many lone pairs of electrons are present? 4

(You have to look for them!)

SCRAP PAPER OR COMMENTS ON EXAM

CHEMISTRY 101 **Spring 2005** NAME_____
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39 excellent
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