1. Multiple Choice. Write the letter of the ***best choice*** in the space provided:

__d___ The maximum number of electrons in the d sublevel of the fourth energy level is

a. 8 b. 16 c. 32 d. 10

__b___ The third energy level has this total number of p-orbitals.

a. 2 b. 3 c. 4 d. 5

__c___ This molecular geometry corresponds to a molecule with 6 pairs of electrons and 2 lone pairs.

a. octahedral b. linear c. square planar d. bent

__b___ This is the orbital diagram for Sulfur.

a. [Ne] å å å ç
3s 3p

b. [Ne] å å æ æ
3s 3p

c. [Ar] å å æ æ
4s 4p

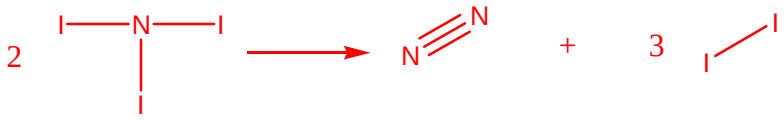
d. [Ne] å å æ æ
4s 4p

__c___ A compound that is square pyramidal has _____ bonded pairs and 1 lone pairs.

a. 2 b. 4

c. 5 d. 6

2. The enthalpy of the decomposition of Nitrogen Triiodide to Nitrogen gas and Iodine gas is –318 kJ (mol rxn)$^{-1}$. Based on this and the bond energies listed on the back of your periodic table, estimate the ***N—I bond energy***.



$$\Delta H \approx BE(\text{broken}) - BE(\text{formed}) = -318\ \text{kJ} = \left[(6)(N-I)\right] - \left[(1)(N-N) + (3)(I-I)\right]$$

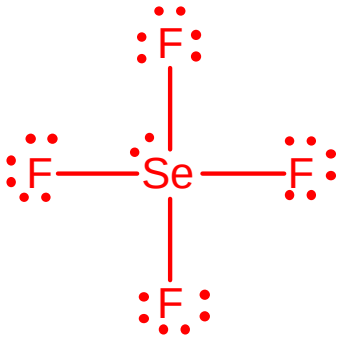
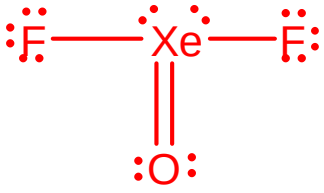
$$\frac{-318\ \text{kJ} + (1)(N-N) + 3(I-I)}{6} = BE(N-I) = \frac{-318\ \text{kJ} + 942\ \text{kJ} + 3(149\ \text{kJ})}{6} = 179\ \text{kJ}$$

3. An electron drops from the 4th energy level to the 1st energy level in a Li^{2+} ion. What is the ***wavelength, in nm***, of the light emitted?

$$\frac{1}{\lambda} = \frac{Z^2 R_H}{hc}\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right) = \frac{(3)^2\left(2.180\times10^{-18}\ \text{J}\right)}{\left(6.262\times10^{-34}\ \text{Js}\right)\left(2.998\times10^{8}\ \text{m s}^{-1}\right)}\left(\frac{1}{1^2} - \frac{1}{4^2}\right) = 9.25949\times10^{7}\ \text{m}^{-1}$$

$$\lambda = \frac{1}{9.25949\times10^{7}\ \text{m}^{-1}} \times \frac{1\ \text{nm}}{10^{-9}\ \text{m}} = 10.80\ \text{nm}$$

4. For each of the following compounds:
   i. Draw the electron dot structure (or Lewis structure)
   ii. What is the electron group geometry?
   iii. What is the molecular geometry?
   iv. Does the molecule have a resonance structure? (yes or no)
   v. Is the molecule polar?
   vi. What is the hybridization on the central atom?
   vii. How many Ô and Ñ bonds are present

i. SeF_4 	ii. trigonal bipyramidal iii. see-saw iv. no v. yes vi. sp^3d vii. 4Ô, 0Ñ
i. XeF_2O 	ii. trigonal bipyramidal iii. t-shape iv. no v. yes vi. sp^3d vii. 3Ô, 1Ñ