

Exam 2 Problems: Problem 1

(a) (i): Li; the second ionization is highest because it is attempting to ionize Li^+ which is isoelectronic with He, the element with highest IE.

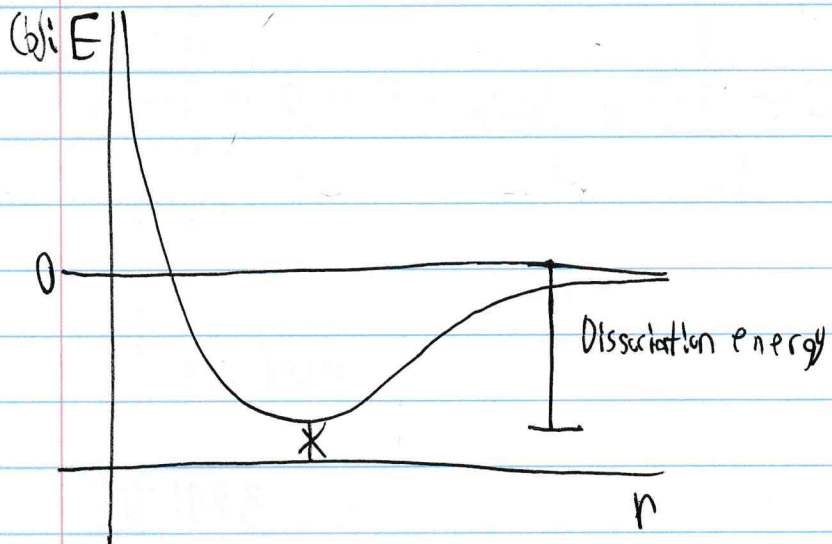
(ii): Boron's 4th IE, since it is trying to pull ^{the final} an electron off the most positive nucleus.

(b) (i): Na^+ , Na, Rb

(ii): Ar, P, Cl

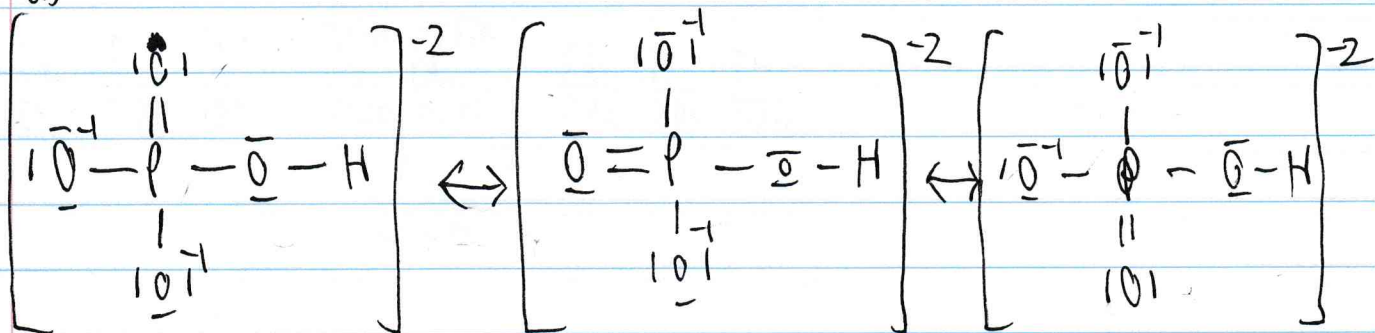
Problem 2

(a) 1.8 nm



Problem 3

Q. (i):

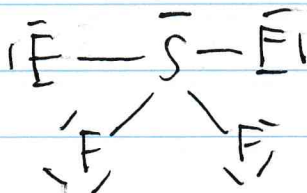


(ii): Tetrahedral

(iii): 109.5

Q

(b) (i):

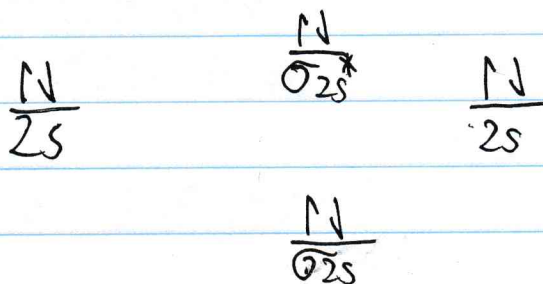
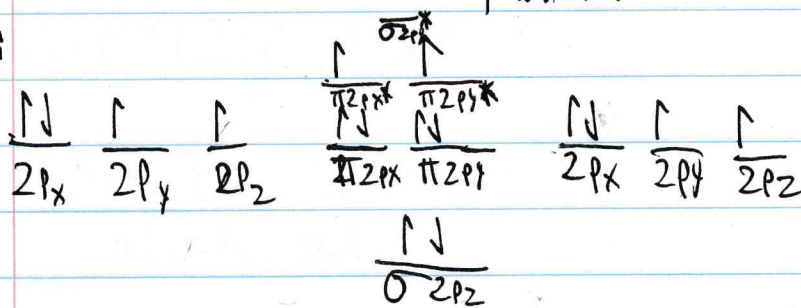


(ii): See sqw

(iii): AX₄E

Problem 4

(a) i

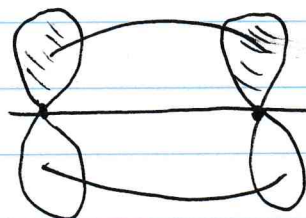


(b) $(\sigma 2s)^2 (\sigma 2s^*)^2 (\sigma 2p_z)^2 (\pi 2p_x)^2 (\pi 2p_y)^2 (\pi 2p_x^*)^1 (\pi 2p_y^*)^1$

(c) $1/2 (8-2) = 2.$

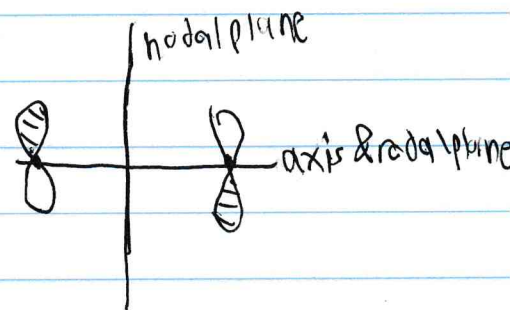
(d) Paramagnetic.

(e) $\pi 2p_x$:



1 plane.

$\pi 2p_x^*$:



2 planes.

problem 5

(q): (i): $\sigma(C2sp^2, N2sp^3)$

(i): $\sigma(C2sp^2, C2sp^2)$
 $\pi(C2p_x, C2p_x)$

(ii): $\sigma(C2sp^2, C2sp^2)$
 $\pi(C2p_x, C2p_x)$

(iii): $\sigma(C2sp^3, F2p_z)$

(b): (i): 4

(ii): Bent.

(iii): < 109.5