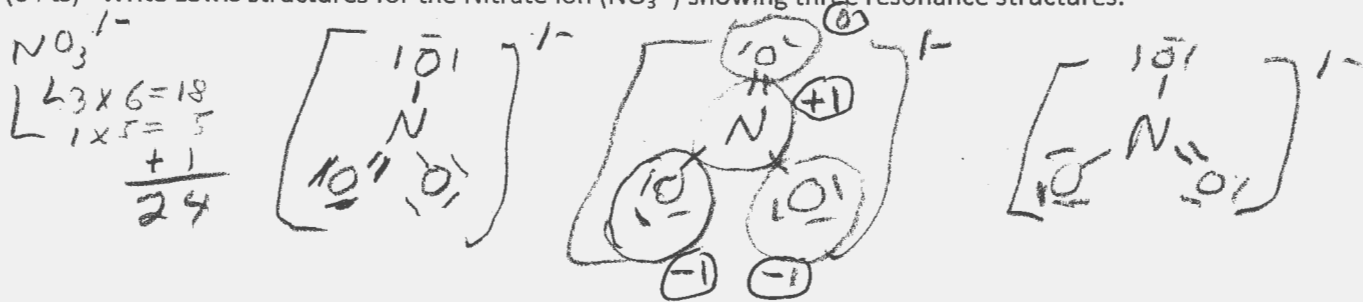


1a. (6 Pts) Write Lewis structures for the Nitrate ion (NO_3^-) showing three resonance structures.



1b. (2 Pts) Show all the formal charges on one of the above structures.

2. (2 Pts) Which of the atoms Cl, I, P, Sb, or Se has the largest radius? Sb

3. (3 Pts) Arrange the following ions in order of increasing ionic radius: K^+ , P^{3-} , S^{2-} , Cl^- .

Smallest to Largest $\text{K}^+ \text{Cl}^- \text{S}^{2-} \text{P}^{3-}$ (They are isoelectronic but K has the most protons and P the least)

4. (1 Pt) Which of the elements (He, Ne, Ar, Kr, Na) has the highest first ionization energy? He

5. (1 Pts) What is the total number of valence electrons in P_2O_5 ? 40 v.e.

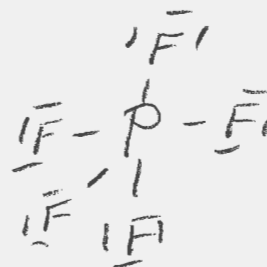
$$\begin{matrix} 2 \times 5 = 10 \\ 5 \times 6 = 30 \\ \hline 40 \end{matrix}$$

6. (4 Pts) Draw the Lewis structures for N_2 and PF_5 .

N_2
10 v.e.



PF_5
 $\begin{matrix} 5 \times 7 \\ 1 \times 5 \\ \hline 40 \text{ v.e.} \end{matrix}$



7. (6 Pts) Show the Lewis structures for any three isomers of C_5H_{10} .

