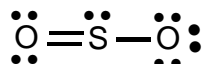


Prelab Questions--Experiment 7 Modeling Molecular Structure (Molecular Modeling I)

Answer **three** (3) of the following questions, based on the last digit of your student ID number.
ID ending in: 0 or 1:a,b,&c 2 or 3:d,e,&f 4 or 5:g,h,&i 6 or 7:j,k,&m 8 or 9:n,o,&p
Many definitions of electronegativity are used; make sure to use Olmstead and Williams Figure 9-12 for electronegativities for these questions.

ID ending in 0 or 1

- (a). Determine the total number of valence electrons in the sulfite ion.
(b). Determine the number of lone pairs (that is, non-bonding pairs) in SO_2 :

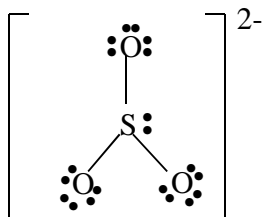


- (c). Fill in the table below with the electronegativities from Figure 9-12 in the "(___)" and predict if a bond between the two atoms will be polar (P), weakly polar $\Delta\chi \leq 0.5$ (WP), or non-polar (non). The two examples that are shown are for the C-C bond, which is non-polar, and the C-H bond, which is non-polar or weakly polar since the electronegativity difference is so small.

	C (2.6)	H (2.1)	N (___)	O (___)	Cl (___)
C (2.6)	non	non to WP			
H (2.1)					
N (___)					
O (___)					
Cl (___)					

ID ending in 2 or 3

- (d). Determine the total number of valence electrons in the nitrate ion.
(e). Determine the number of lone pairs (that is, non-bonding pairs) in SO_3^{2-} ion:



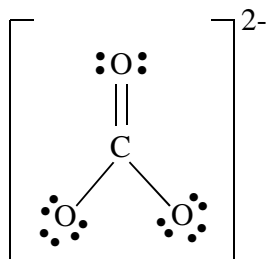
- (f). Fill in the table below with the electronegativities from Figure 9-12 in the "(___)" and predict if a bond between the two atoms will be polar (P), weakly polar $\Delta\chi \leq 0.5$ (WP), or non-polar (non). The two examples that are shown are for the C-C bond, which is non-polar, and the C-H bond, which is non-polar or weakly polar since the electronegativity difference is so small.

	C (2.6)	H (2.1)	N (___)	O (___)	Cl (___)
C (2.6)	non	non to WP			
H (2.1)					
N (___)					
O (___)					
Cl (___)					

ID ending in 4 or 5

(g). Determine the total number of valence electrons in the carbonate ion.

(h). Does each atom have a completed octet of electrons in the following structure of the carbonate ion?



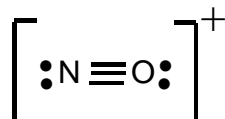
(i). Fill in the table below with the electronegativities from Figure 9-12 in the "(___)" and predict if a bond between the two atoms will be polar (P), weakly polar $\Delta\chi \leq 0.5$ (WP), or non-polar (non). The two examples that are shown are for the C-C bond, which is non-polar, and the C-H bond, which is non-polar or very weakly polar since the electronegativity difference is so small.

	C (2.6)	H (2.1)	N (___)	O (___)	Cl (___)
C (2.6)	non	non to WP			
H (2.1)					
N (___)					
O (___)					
Cl (___)					

ID ending in 6 or 7

(j). Determine the number of valence electrons in perchlorate ion.

(k). Determine the total number of lone pairs (that is, non-bonding pairs) in the NO⁺ ion:

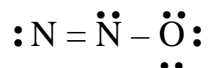


(m). Fill in the table below with the electronegativities from Figure 9-12 in the "(___)" and predict if a bond between the two atoms will be polar (P), weakly polar $\Delta\chi \leq 0.5$ (WP), or non-polar (non). The two examples that are shown are for the C-C bond, which is non-polar, and the C-H bond, which is non-polar or weakly polar since the electronegativity difference is so small.

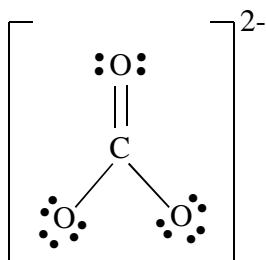
	C (2.6)	H (2.1)	N (___)	O (___)	Cl (___)
C (2.6)	non	non to WP			
H (2.1)					
N (___)					
O (___)					
Cl (___)					

ID ending in 8 or 9

(n). Does each atom have a completed octet of electrons in the following structure?



(o). Determine the total number of lone pairs (that is, non-bonding pairs) in the carbonate ion.



(p). Fill in the table below with the electronegativities from Figure 9-12 in the "(___)" and predict if a bond between the two atoms will be polar (P), weakly polar $\Delta\chi \leq 0.5$ (WP), or non-polar (non). The two examples that are shown are for the C-C bond, which is non-polar, and the C-H bond, which is non-polar or weakly polar since the electronegativity difference is so small.

	C (2.6)	H (2.1)	N (___)	O (___)	Cl (___)
C (2.6)	non	non to WP			
H (2.1)					
N (___)					
O (___)					
Cl (___)					

* The student ID number is the 6-digit number on the front of your ID card at the right-hand side