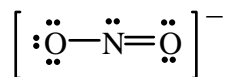


Name _____

1. Complete the following table. [9 pts]

	SO ₂	ICl ₄ ⁻	ClF ₃
Total number of valence electrons in the molecule			
Lewis Structure			
e⁻ pair arrangement			
molecular geometry			
bond angle(s)			

2. **True or False?** The bonds in the nitrite ion (NO₂⁻)
 [4 pts]



- are of different strength
- are of equal strength
- are different in length
- are the same length

3. Write the geometrical shapes (molecular geometry) that VSEPR theory predicts for molecules whose central atoms have the environments indicated. (i.e. Predict the approximate geometrical arrangement of the bonds about the central atom.) [4 pts]

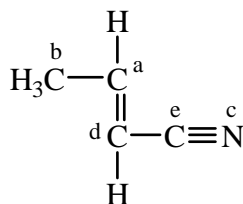
4 single bonds

2 single bonds and 2 non-bonding electron pairs

two single bonds and one double bond

3 single bonds and 1 non-bonding electron pair

4. The random letter labels in this diagram of *crotononitrile* are to be associated with the corresponding bond angle (or other property of the nearest atom). [5 pts]



Match the following (using the labels a, b, c, d, or e):

bond angle $\sim 180^\circ$

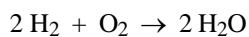
atom centering bond angles of $\sim 109.5^\circ$

CCH angle $\sim 120^\circ$

CCC angle $\sim 120^\circ$

atom having one pair of non-bonding valence electrons

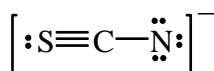
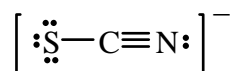
5. Use the given *average* bond energy values to *estimate* ΔH for the following reaction in the gas phase. [4 pts]



Bond	Bond Energy (kJ/mol)
O-H	460
H-H	436.4
C-H	414
O-O	347
O=O	620

- a) +572.8 kJ/mol b) +620 kJ/mol c) -620 kJ/mol d) +347 kJ/mol e) -347 kJ/mol

6. Assign *all* formal charges, including formal charges of zero, to the molecules below. Which is the "best" Lewis structure based on formal charges? [4 pts]



S _____

S _____

C _____

C _____

N _____

N _____