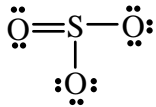
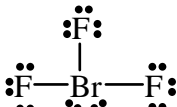
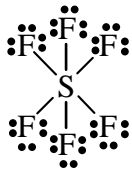
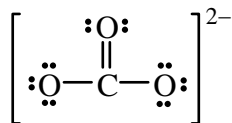


Name KEY

1. Complete the following table. [18 pts]

	SO ₃	BrF ₃	SF ₆
Total number of valence electrons in the molecule	24	28	48
Lewis Structure(s)	 <p>Plus two additional resonance structures</p>		
e⁻ pair arrangement	trigonal planar	trigonal bipyramidal	octahedral
molecular geometry	trigonal planar	t-shaped	octahedral
bond angle(s)	120°	90°, 180°	90°

2. **TRUE or FALSE.** The bonds in the carbonate ion, CO_3^{2-} , are
[4 pts]



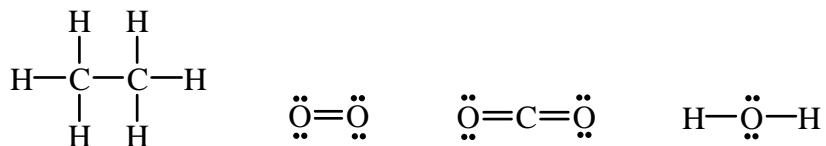
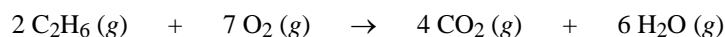
a) the same length.

TRUE

b) of equal strength.

TRUE

3. Predict the enthalpy of reaction (ΔH_{rxn}) from the average bond energies given below. [6 pts]



Bond	Bond Energy (kJ/mol)
O-O	142
O=O	498.7
O-H	460
C-H	414
C-C	347
C=C	620
C≡C	812
C-O	351
C=O	799

Reactants:

$$2(\text{C}-\text{C}) + 12(\text{C}-\text{H}) + 7(\text{O}=\text{O})$$

$$2(347 \text{ kJ}) + 12(414 \text{ kJ}) + 7(498.7 \text{ kJ}) = 9152.9 \text{ kJ}$$

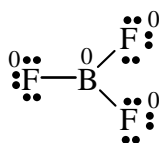
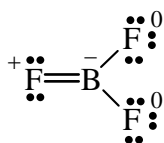
Products:

$$8(\text{C}=\text{O}) + 12(\text{O}-\text{H})$$

$$- [8(799 \text{ kJ}) + 12(460 \text{ kJ})] = -11912 \text{ kJ}$$

$$\Delta H = 9152.9 \text{ kJ} + (-11,912 \text{ kJ}) = \mathbf{-2759 \text{ kJ}}$$

4. Assign **all** formal charges, including formal charges of zero, to the molecules below. Which is the "best" Lewis structure based on formal charges? [5 pts]



The structure on the right is the better structure with all formal charges equal to zero.