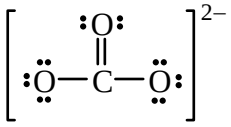
Northern Arizona University **Quiz #8**
CHM 151, General Chemistry I Dr. Brandon Cruickshank
Sections 6, Fall 2008 November 6, 2008

Name KEY

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



a) different in length.

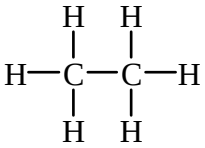
FALSE

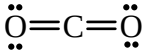
b) different in strength.

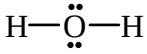
FALSE

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

$$2\ C_2H_6\ (g) + 7\ O_2\ (g) \rightarrow 4\ CO_2\ (g) + 6\ H_2O\ (g)$$







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(C–C) + 12(C–H) + 7(O=O)
2(347 kJ) + 12(414 kJ) + 7(498.7 kJ) = 9152.9 kJ

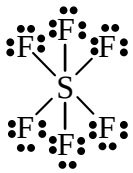
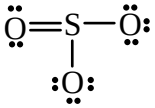
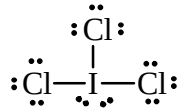
Products:
8(C=O) + 12(O–H)
–[8(799 kJ) + 12(460 kJ)] = –11912 kJ

ΔH = 9152.9 kJ + (–11,912 kJ) = **–2759 kJ**

3. 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.

4. Complete the following table. [18 pts]

	SF_6	SO_3	ICl_3
Total number of valence electrons in the molecule	**48**	**24**	**28**
Lewis Structure(s)		 **Plus two additional resonance structures**	
e^- pair arrangement	**octahedral**	**trigonal planar**	**trigonal bipyramidal**
molecular geometry	**octahedral**	**trigonal planar**	**t-shaped**
bond angle(s)	**90°**	**120°**	**90°, 180°**