Due: **Wednesday, 14-November-2007** at the beginning of class. Early submissions are welcome, as always.

1) Use bond energies to estimate ΔH for the reaction (*Hint*: try drawing the molecules first):

\[
\text{HCCCN} + 4\text{H}_2(g) \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2
\]

2) An experiment requires 50.0 mL of 0.040 M NaOH for the titration of 1.00 millimole (mmol) of an acid. Mass analysis of the acid shows 2.24% hydrogen, 26.7% carbon, and 71.1% oxygen. Draw the Lewis formula for the compound.

3) Assume the values of the C-H and C-C bond energies given in your text in Table 9.5. Then using data from Appendix C in your text, calculate the C=O bond energy in acetaldehyde

4) According to Pauling, the A-B bond energy is equal to the average of the A-A and B-B bond energies, plus an energy contribution from the polar character of the bond:

\[
\text{BE}(A-B) = \frac{1}{2} \left[ \text{BE}(A-A) + \text{BE}(B-B) \right] + k(X_A - X_B)^2.
\]

Here $X_A$ and $X_B$ are the electronegativities of atoms A and B respectively, and $k = 98.6$ kJ. Assume the electronegativity of fluorine is 4.0, and, using data from Table 9.5 in your text, calculate the electronegativity of carbon. (*Hint*: be careful)

5) Two terms that we throw around a lot are **electronegativity** and **electron affinity**. On first look, these would seem to be nearly identical; yet they are distinct. How does electronegativity differ from electron affinity?