Due: **Wednesday, 20-November-2002** at the beginning of class. Early submissions are welcome, as always.

1) Use bond energies to estimate \( \Delta H \) for the reaction:

\[
\text{CH}_3\text{CN} + 2\text{H}_2(g) \rightarrow \text{CH}_3\text{CH}_2\text{NH}_2
\]

2) A compound of antimony and fluorine is a gas. A sample of mass 0.1500 g occupies 16.98 mL at 24°C and 755 mm Hg. What is the molecular weight of the compound? Write 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.

![Lewis formula for acetaldehyde](https://via.placeholder.com/150)

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:

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

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 sulfur. (*Hint*: be careful!)