Homework 1  
September 10, 2003

Problems from the text:
Chapter 1:  19-22, 24-27, 34, 43 (Lewis and Kekule structures and MF)  
Chapter 2:  8, 9, 18-20, 25-29, 34-37, 41, 43, 55, 56 (Formal Charge and Resonance)  
Chapter 3:  23-53, except 33 and 50 (Nomenclature)

Memorize (i.e. expect to see on a quiz or exam):  Tables, 3.1 and 3.3, Figure 3.3

Additional problems:

1. The folate analogue methotrexate is a potent inhibitor of dihydrofolate reductase.  Fill-in all missing hydrogen atoms and lone pairs on the methotrexate structure shown below.

![Methotrexate structure]

2. Draw Lewis and Kekule structures for the natural cofactor biotin, shown below.

![Biotin structure]

3a. Draw all major resonance structures for the two constitutional isomers shown below.

![Isomers structures]

3b. For your answers to “3a”, indicate all formal charges.

3c. Indicate with formal “arrow pushing” the movement of electrons between 2 of the resonance structures shown in your answers to “3a”.