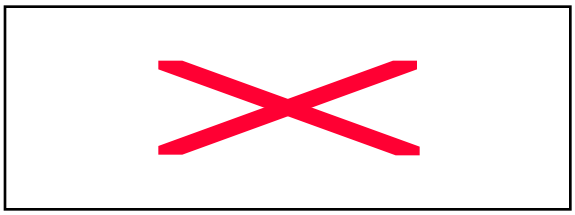
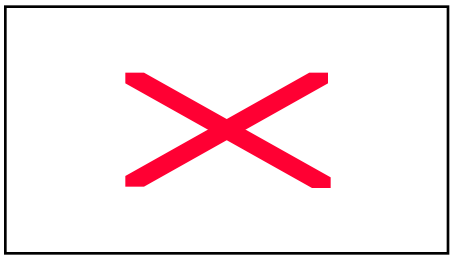
Problem Set #4

Chemistry 3231
September 25, 2001

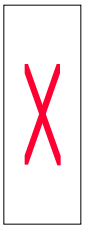
1. (a) Use electron pushing arrows to show how resonance structures **2** and **3** are generated from **1**. Which of **2** or **3** would you predict to better reflect the electronic character of **1**?



(b) Which of **4** or **5** has better resonance stabilization? Why?

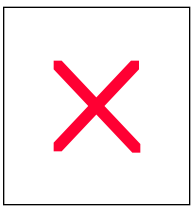


2. On reaction with acid, 4-pyrone (**6**) is protonated at the carbonyl oxygen (C=O) to yield a stable cationic product. Explain the stability of the protonated product (use pictures).

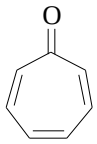


3. Combine the molecular orbitals for two allyl radicals to build the six MO's for benzene. Order the benzene MO's in terms of energy, and classify them as bonding, antibonding, or nonbonding. Be sure to indicate nodes as well.

4. When **7** ionizes, is Cl^- or Cl^+ formed?



5. Cycloheptatrienone (**8**) is a stable compound, but cyclopentadienone (**9**) is so reactive that it cannot be isolated. What accounts for the stability difference between the two?



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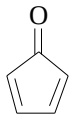

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