Work these problems on a blank copy of your Personal Workshop Form.

1. Propose a synthesis of the following two compounds. You may use benzene and any other carbon containing starting materials of no more than two carbons.

   a) ![Chemical Structure]
   
   b) ![Chemical Structure]

2. Analyze the two syntheses your group came up with in problem 1. Which synthesis would be the least efficient? Explain.

3. Electrophilic aromatic substitution is not limited to benzene rings. Below is the nitration of pyrrole.

   ![Chemical Structure]

   a. Determine which products could be formed.

   b. Using the curved arrow formalism, draw a mechanism for the formation of each product. You can use the NO$_2^+$ cation as the electrophile and do not need to show how it is generated.

   c. Based on your mechanisms, could you predict which product would be the major one? 
   **HINT**: compare the stabilities of each intermediate cation by drawing the important resonance structures.
4. Propose a synthesis of the following compound. You may use benzene and any other carbon containing starting materials of no more than four carbons.

![Synthesis Diagram]

5. Draw the structures of compounds A-F. Compound F contains three rings.