3 Points Each. Please mark your answers on the scantron sheet. You may keep this copy.

1. Which of the following would be LEAST reactive for electrophilic aromatic substitution?
   - a) \[ \text{H}_3\text{C} \text{C}_6\text{H}_3 \text{C}_6\text{H}_3 \]
   - b) \[ \text{H}_2\text{N} \text{N}_2 \text{H}_2 \text{N}_2 \text{C}_6\text{H}_3 \]
   - c) \[ \text{O}_2\text{N} \text{C}_6\text{H}_3 \text{SO}_3 \]
   - d) \[ \text{H}_2\text{O} \text{O}_2\text{H}_3 \text{C}_6\text{H}_3 \]

2. Which of the following would be MOST reactive for electrophilic aromatic substitution?
   - a) \[ \text{H}_3\text{C} \text{C}_6\text{H}_3 \text{C}_6\text{H}_3 \]
   - b) \[ \text{H}_2\text{N} \text{N}_2 \text{H}_2 \text{N}_2 \text{C}_6\text{H}_3 \]
   - c) \[ \text{O}_2\text{N} \text{C}_6\text{H}_3 \text{SO}_3 \]
   - d) \[ \text{H}_2\text{O} \text{O}_2\text{H}_3 \text{C}_6\text{H}_3 \]

3. Which of the following alcohols would have the lowest pKₐ?
   - a) \[ \text{O}_2\text{H} \]
   - b) \[ \text{H}_2\text{O} \text{C}_6\text{H}_3 \text{CF}_3 \]
   - c) \[ \text{H}_2\text{O} \text{C}_6\text{H}_3 \]
   - d) \[ \text{O}_2\text{H} \]

4. What is the product of methyl magnesium bromide, with the following ester?

5. Which product is the result of reaction of mCPBA with 1,2-dimethylcyclohexane?

6. Which of the following is NOT a valid resonance form for nitrobenzene?

7. What is the product of the following reaction?