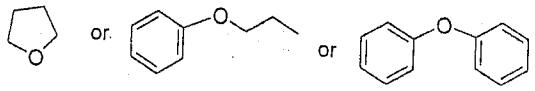
所別：環境工程研究所碩士班 丙組 科目：有機化學

所別：藝術學研究所碩士班 乙組 科目：美學概論

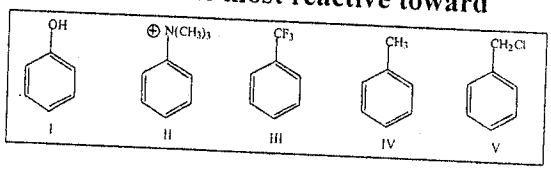
1. Please choose the compound that ***cannot*** be prepared by a Williamson ether synthesis, and ***explain your choice***. (10 pts)



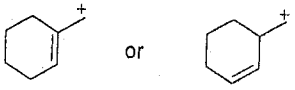
2. Would you expect addition of HCl to the double bond of 3-buten-2-one to follow Markovnikov's rule? **Explain** your answer by a **mechanistic** argument. (10 pts)

3. Using the curved-arrow formalism, **suggest a mechanism** for the following reaction. (10 pts)

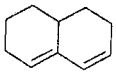
4. In the following compounds, determine which one is **the most reactive toward electrophilic substitution**, and **explain** your answer. (10 pts)



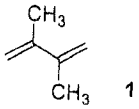
5. In the following pair of ions, determine which ion is **more stable**. Use **resonance structures to explain** your answer. (10 pts)



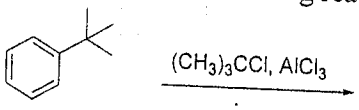
6. **Why** does the diene shown below **fail to undergo a Diels-Alder reaction** with even the most reactive dienophiles? (10 pts)



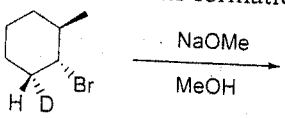
7. Treatment of Compound **1** at **-80 °C** with hydrogen bromide gives **product A** and **product B** in a **20:80** ratio. After heating at **40 °C**, this ratio changes to give mainly **product A**.
Propose **structures** for products **A** and **B**. (10 pts)



8. Provide **the major organic product** of the following reaction. (10 pts)



9. Provide **the major organic product** of the reaction below and a detailed, stepwise **mechanism** which accounts for its formation. (10 pts)



10. Provide the **major organic products** (**A** and **B**) of the following reactions. (10 pts)