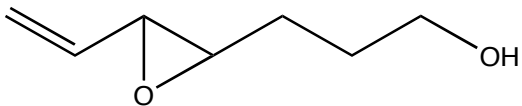
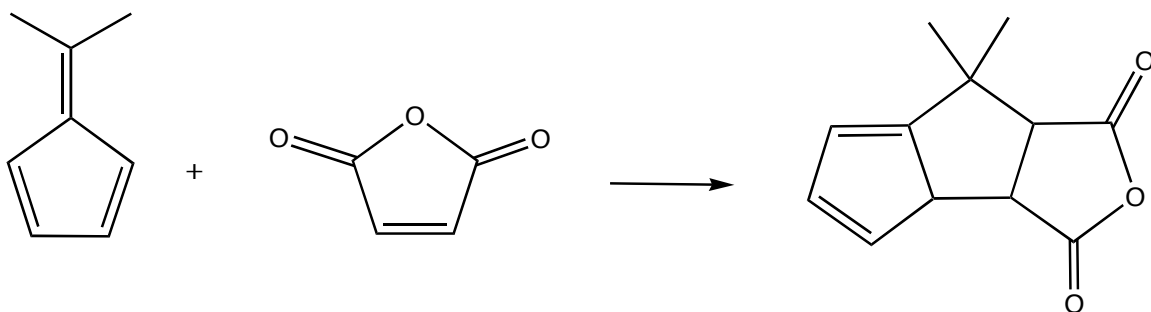


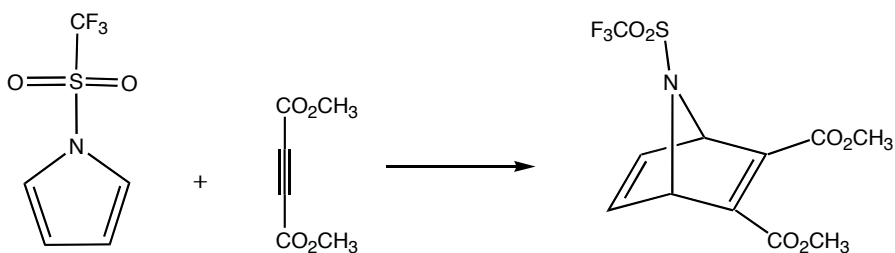
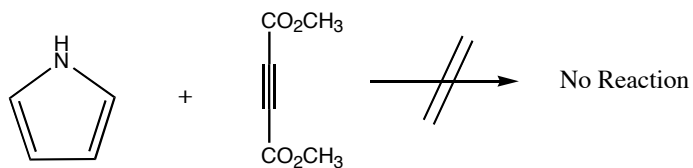
2. Consider the TsOH and LDA initiated reactions of this epoxide under anhydrous conditions. Give the potential products and detailed mechanisms for both and show detailed stereochemistry with all absolute assignments (i.e. R or S).



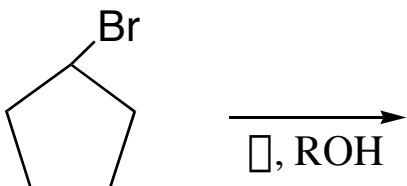
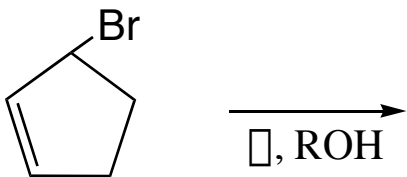
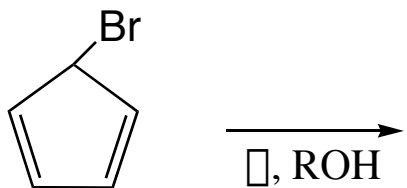
3. Dimethylfulvene is reluctant to undergo Diels Alder reactions with olefins having a strongly electron withdrawing groups and with maleic anhydride undergoes the following reaction. Propose a mechanism and reasoning for why this happens.



4. It is found that pyrrole will not undergo Diels Alder reactions unless the nitrogen atom is substituted with strongly electron withdrawing groups. Explain this result.



5. Discuss the solvolysis of the following substrates. Rank them in terms of rates. Explain your reasoning.



6. Rank the following two compounds in terms of their rate of reactions in a Diels Alder reaction with $\text{CH}_3\text{O}_2\text{C}-\text{CC}=\text{CO}_2\text{CH}_3$. Discuss your reasoning.

