

Massachusetts Institute of Technology

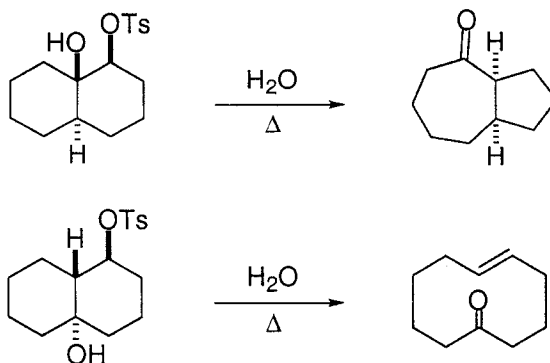
5.13: Organic Chemistry II

Spring 2003

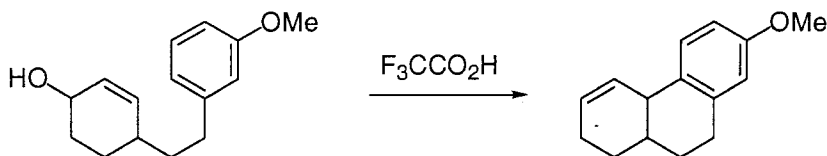
Problem Set 9: Carbocations

Due: Monday, May 5, at noon in your TA's message box

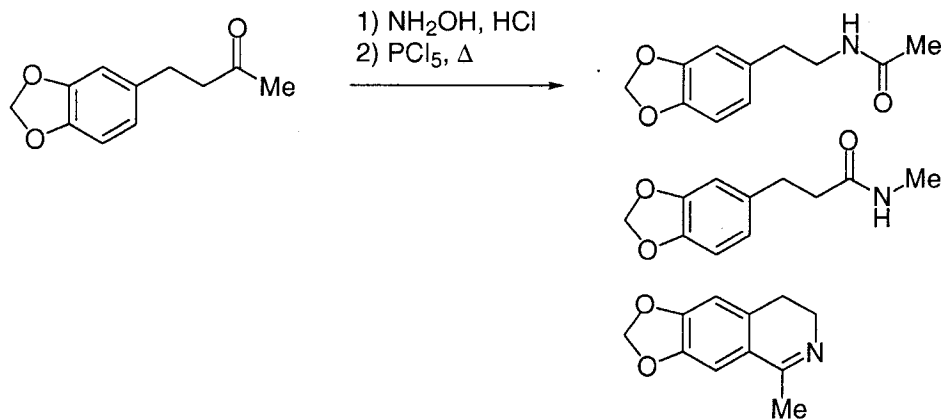
- (1) With the aid of three-dimensional drawings that include cyclohexane rings in chair conformations, provide a clear rationale for the illustrated transformations.



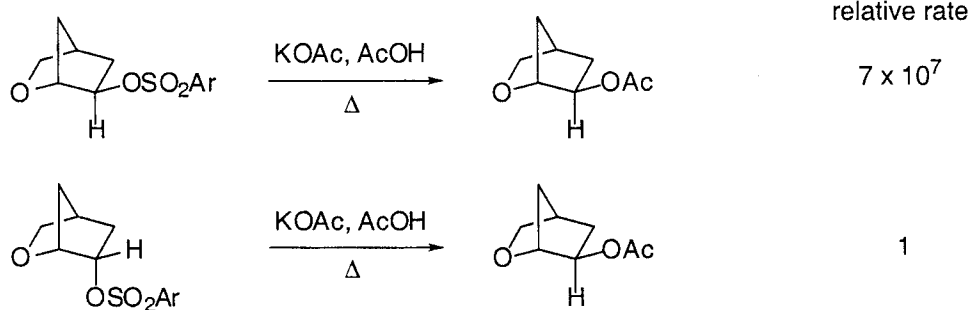
- (2) Provide the best mechanism for the illustrated transformation. Please show all arrow pushing.



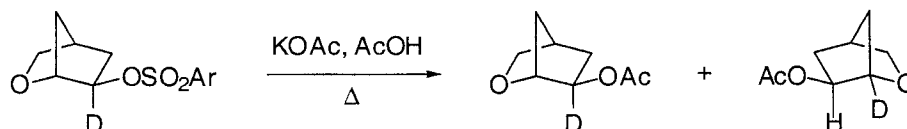
- (3) Provide the best mechanisms for the formation of the three products illustrated below for the Beckmann-type rearrangement. Please show all arrow pushing.



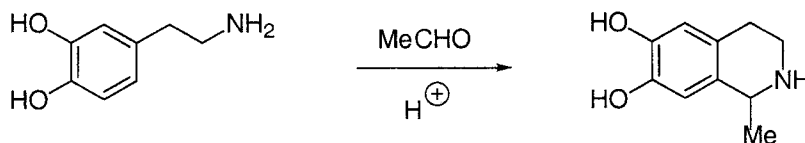
(4) (a) Provide a rationale for the illustrated rate data.



(b) Provide a mechanism to account for the formation of the products illustrated below. In addition, explain why no other stereoisomers are generated in the reaction.



(5) Provide the best mechanism for the illustrated transformation. Please show all arrow pushing.



(6) In the reaction illustrated below, rather than the desired product from a simple Friedel-Crafts acylation, an isomeric product was generated via a more complex route that also involves Friedel-Crafts chemistry. Provide a mechanism for this unexpected process. Please show all arrow pushing.

