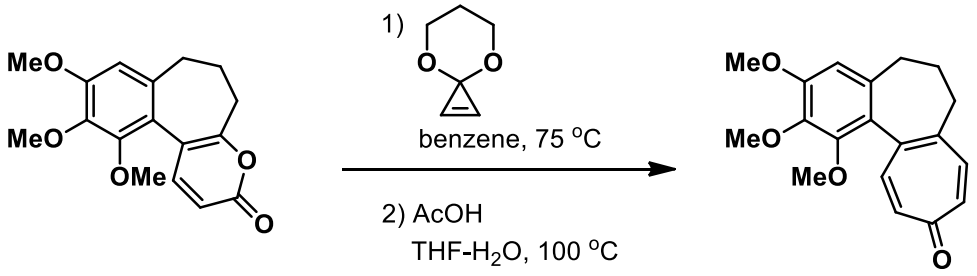
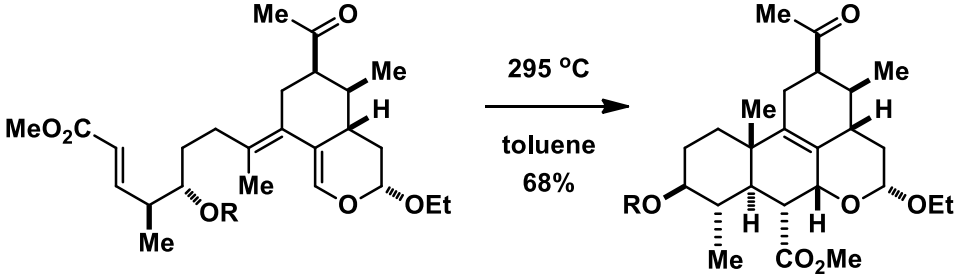
Problem Set 4: This problem set is now available at (www.blackboard.wayne.edu). It will be due in class 23 days (04/23/20) from today (03/31/20). Grades will be administered as follows: 10 (exceptional effort), 8 (complete), 5 (incomplete or inadequate effort), 2 (poor effort), 0 (nonexistent). ***No late problem sets will be accepted.***

1. **Problem:** D. L. Boger *et al.* determined that the cyclic acetal of cyclopropenone could lead to the ring expansion product noted below (D. L. Boger *et al.*, *J. Am. Chem. Soc.*, **1986**, *108*, 6713.). In fact, this reaction is a two-step process which involves the use of acid acid and high temperature for completion of the final product. Please provide a mechanism that accounts for the illustrated transformation.



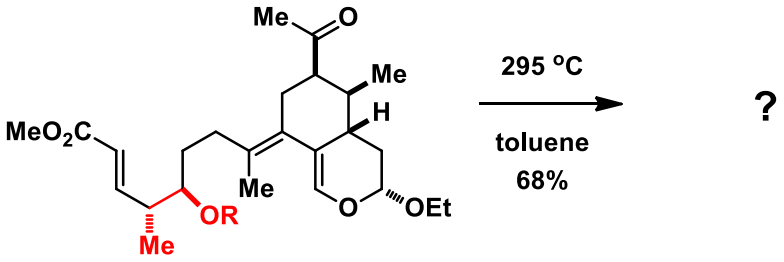
Answer:

2. **Problem: Part A:** The following cycloaddition reaction was recently explored by Spino and Perreault (*Org. Lett.* **2006**, *8*, 4385.) Provide a reasonable transition state that explains the stereochemistry of the product.



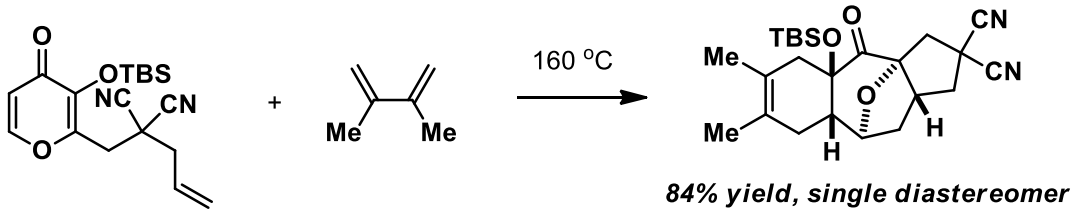
Answer:

Part B: Based on your solution above, predict the stereochemical outcome of the cycloaddition carried out on the diastereomeric compound below. Use clear 3D drawings to explain your answer.



Answer:

3. **Problem:** Rodriguez and co-workers reported the following thermally induced two-component coupling to form the fused tetracyclic product (*JOC*, **1999**, *64*, 966.) Using clear 3D drawings, provide a mechanism for the transformation that accounts for the observed product stereochemistry. Be sure to identify any pericyclic processes.



84% yield, single diastereomer

Answer: