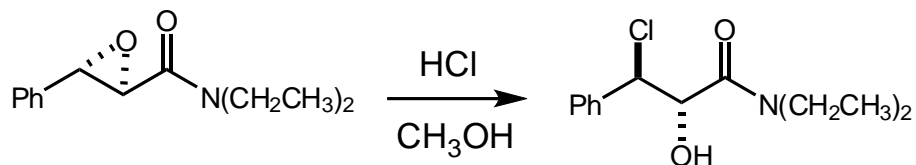


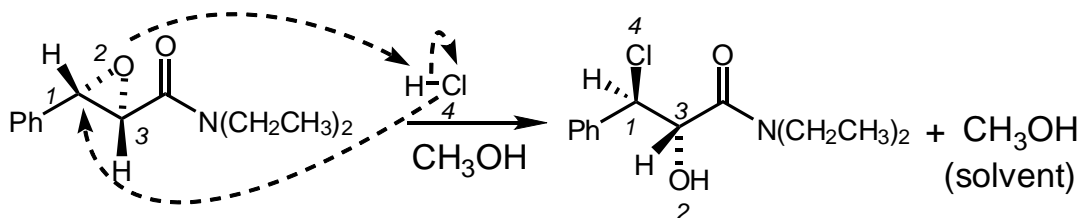
### Problem 3



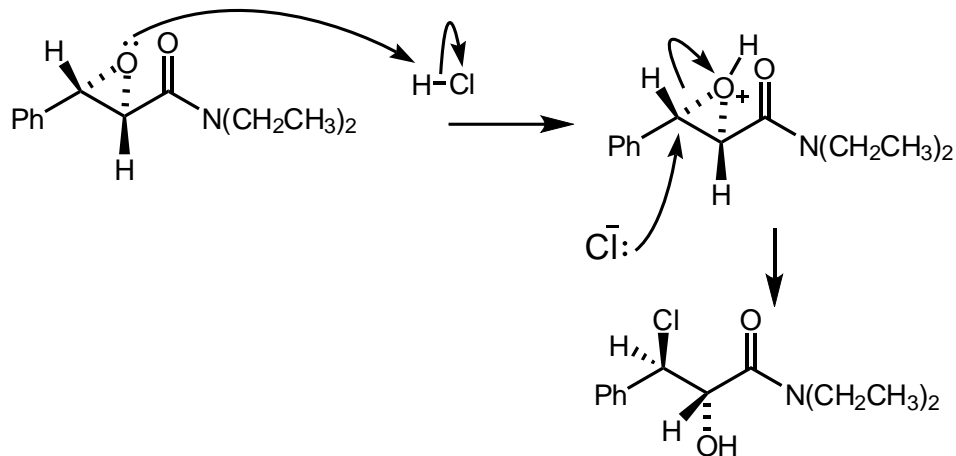
1. Draw all bonds near the reactive center in the starting materials
2. Draw all H-atoms near the reactive sites of starting materials and products
3. Balance the equation
4. Number the non-H atoms
5. Identify bonds made and broken

Bonds made: 1-4, 2-H

Bonds broken: 2-1.

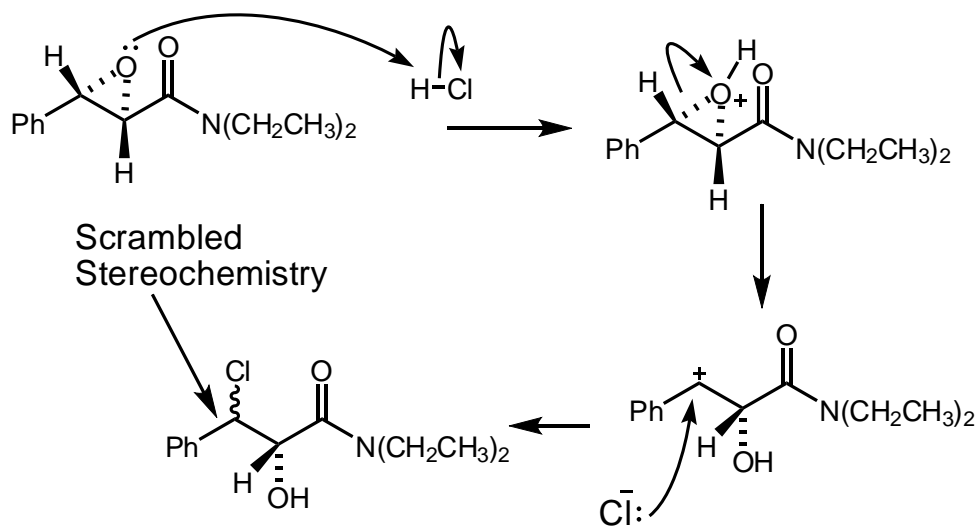


## Mechanism

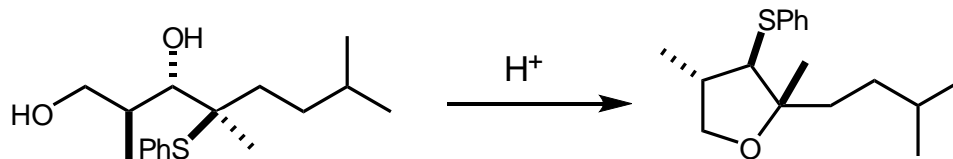


## Discussion

Although the reaction is under the acidic medium, the  $\text{S}_{\text{N}}1$  mechanism was not drawn. How did we know that the reaction is  $\text{S}_{\text{N}}2$  and not  $\text{S}_{\text{N}}1$ ? If we draw an  $\text{S}_{\text{N}}1$  mechanism for the above reaction the stereochemistry at the benzylic position will be scrambled. The  $\text{S}_{\text{N}}2$  reaction requires a backside attack of the nucleophile. As such, it provides the product with the right stereochemistry.



Now try the following mechanism:



V. K. Aggarwal, I. Coldham, S. McIntyre, F. H. Sansbury, M.-J. Villa and S. Warren, *Tetrahedron Lett.*, 1988, 4885-4888.