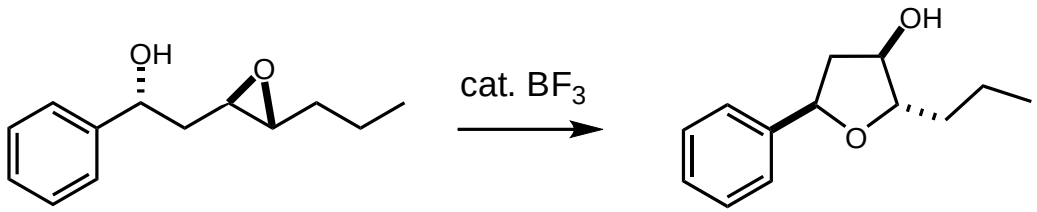
**Problem 6**




Ref.: B. Kang, J. Mowat, T. Pinter and R. Britton, Org. Lett., 2009, 1717-1720.

**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**

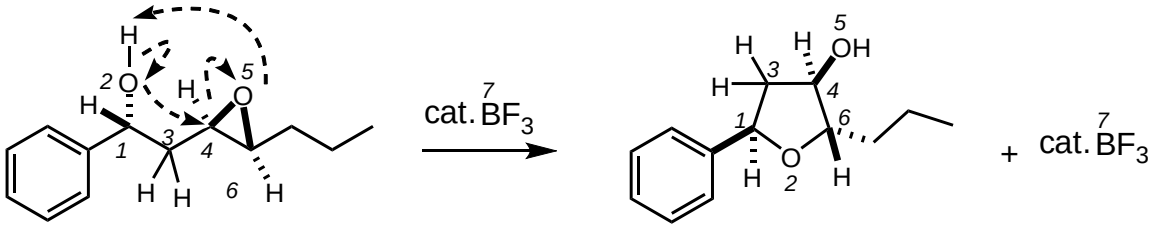
**3. Balance the equation**

**4. Number the non-H atoms**

**5. Identify bonds made and broken**

Bonds made: 2-4, 5-H

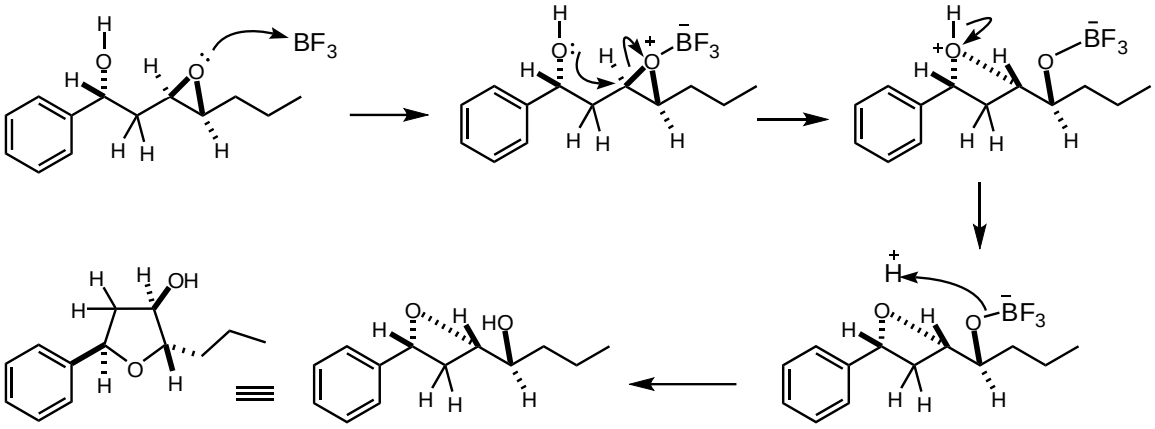
Bonds broken: 2-H, 4-5.




**Identify the conditions**

Acidic (do not generate strong bases)

**Mechanism**

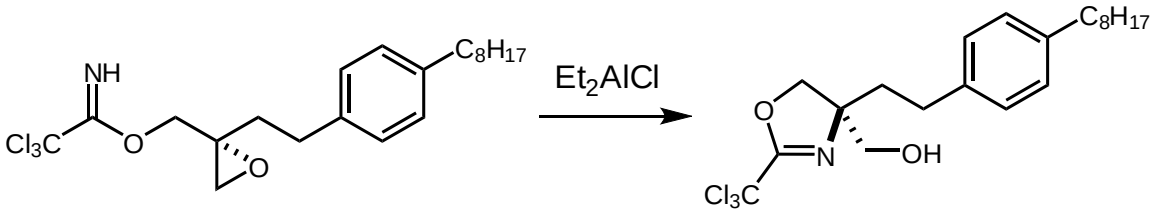


**Discussion**

1. $BF_3$ is a Lewis acid and that is why the conditions are acidic.

2. The first step of the mechanism is not mentioned in the analysis. However, $BF_3$ is a catalyst and must be involved in the reaction mechanism. Catalysts mostly perform the first step.

Now try the following mechanism:



Ref.: X. Lu, C. Sun, W. L. Valentine, E. Shuyu, J. Liu, G. Tigyi and R. Bittman, J. Org. Chem., 2009, 3192-3195.