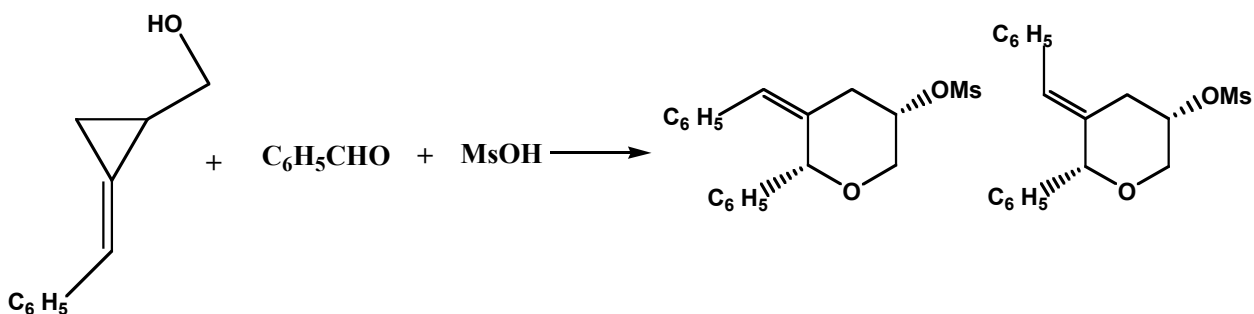


## Problems

1. Functionalized pyrans are a common structural motif found in many natural products and bioactive compounds and over the years there have been many elegant methodologies developed for the synthesis of such heterocycles.

Propose a mechanism for the following reaction.



2. 3, 5-Dicyanopyridines are an important privileged heterocyclic scaffold. Diversifications at positions C2, C4, and C6 of the pyridine core have produced a great number of compound libraries with diverse biological activities.

Propose a mechanism for the following reaction.

