Shown below is the structure of ciguatoxin, a member of a group of potent algal neurotoxins responsible for, among other things, mass poisoning of fish by events known as “red tides”. The problems that follow are taken from steps toward a total synthesis of ciguatoxin.

1. The process shown below results in two isomeric products. Show their structures, including correct stereochemistry, and the mechanisms of their formation. Potassium dimsyl acts as a base rather than as a nucleophile.
2. Show the mechanisms by which all of the steps in the four-step process below proceed.