Formulate a detailed mechanism to account for the following transformation. Be certain to clearly illustrate each of the intermediates and to account for the stereochemical outcome. What is the role of the propionic acid? Why is only a tenth of an equivalent used?

\[
\begin{array}{c}
\text{HO} & \text{O} & \text{OMe} \\
\text{H} & \text{O} & \text{O}
\end{array}
\quad \text{CH}_3\text{C(OMe)}_3 \text{ (excess),} \\
\text{CH}_3\text{CH}_2\text{CO}_2\text{H} \text{ (0.1 equiv)} \\
140 \degree \text{C (83%)}
\quad \begin{array}{c}
\text{MeO}_2\text{C} & \text{H} & \text{O} & \text{OMe} \\
\text{H} & \text{O} & \text{O}
\end{array}
\]

Determine the product composition for competitive processes when \( \Delta G^+ = 2 \text{ kcal/mol} \) and \( T = 25 \degree \text{C} \).

Determine the order, \([i, j]\), for the following transformation. Has the process, as written, occurred with retention or inversion at the migrating carbon atom? Illustrate. Has the migration occurred suprafacially or antarafacially? Be certain your illustration illustrates this point. Does the transformation portray a thermally allowed process? Provide an analysis that verifies your response. [Make a model of starting material and product].