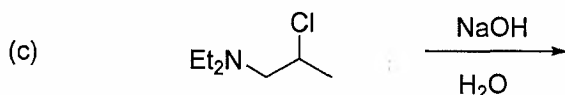
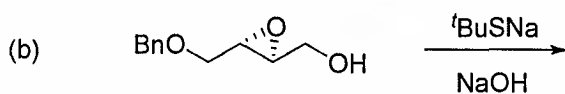
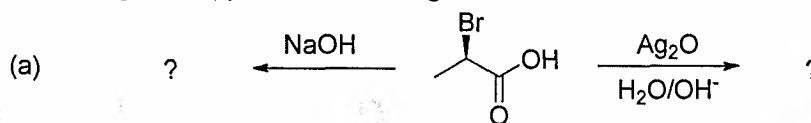
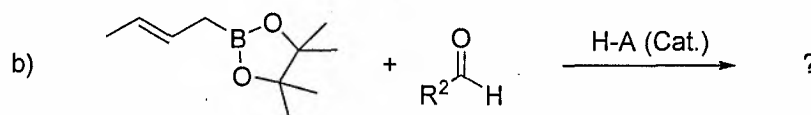
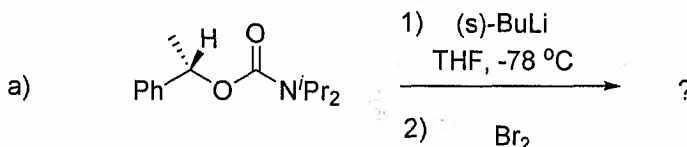


1. Write the product(s) for the following reaction.

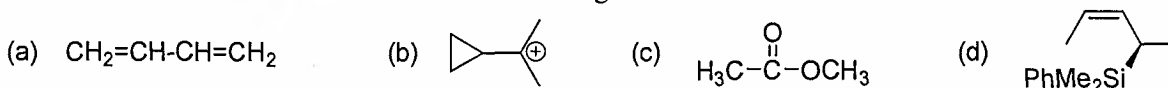


2. Explain the concept of HOMO-raising catalysis with one example.

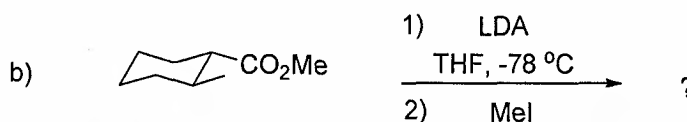
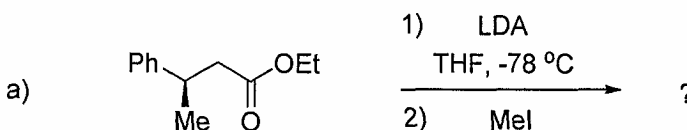
3. Write the product(s) for the following reaction. Provide an explanation for the formation of the major product.



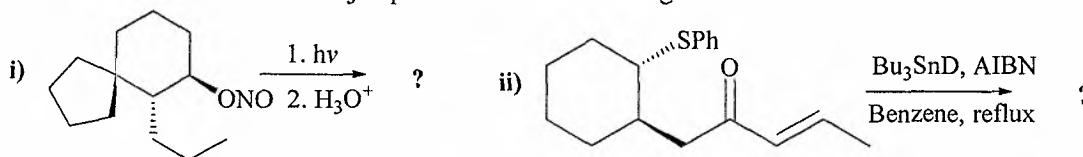
4. Write the most stable conformation of the following molecules.



5. Write the product(s) for the following reaction. Provide an explanation for the formation of the major product.

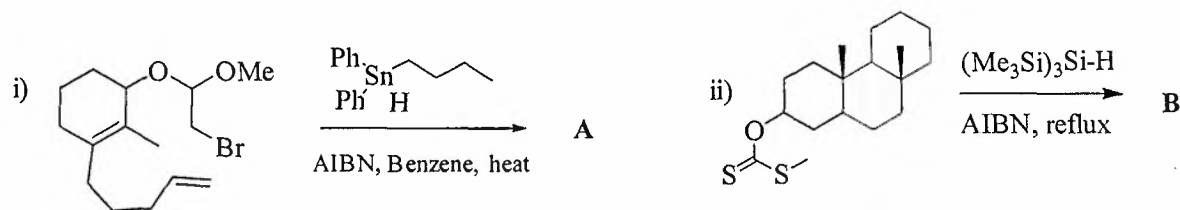


6. Write the mechanism and major product of the following reactions.

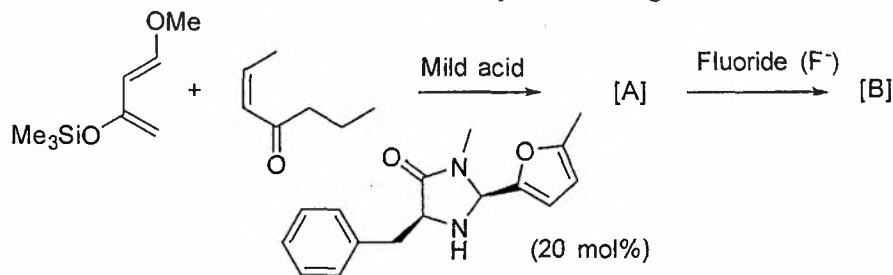


7. Identify A and B. Write the mechanism.

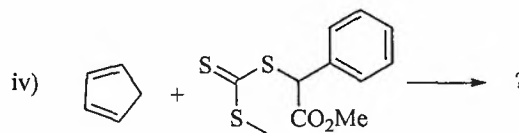
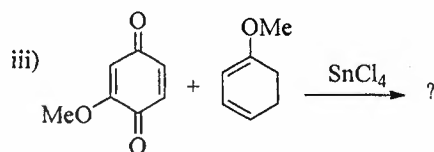
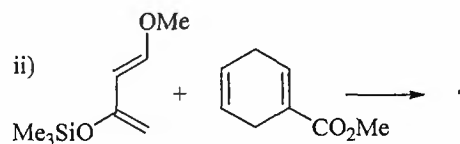
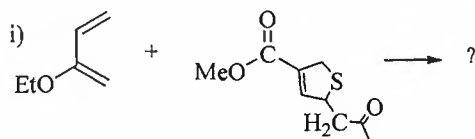
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8. Write the mechanism and enantioselectivity of following Diels Alder reaction. Identify B.



9. Write the major product of the following reaction.



10. A suitable selective decarboxylation was published recently in Nature Chemistry.



Decarboxylative alkylation for site-selective bioconjugation of native proteins via oxidation potentials

Steven Bloom^{1†}, Chun Liu^{1†}, Dominik K. Kölmel¹, Jennifer X. Qiao^{1,2}, Yong Zhang^{1,2}, Michael A. Poss^{1,2}, William R. Ewing^{1,2} and David W. C. MacMillan^{1*}

In the protein there are two or multiple carboxylic acid groups. However, under the experimental condition, only one carboxylic acid group decarboxylates and generate a free radical. Cite appropriate reason about the selectivity. Identify C and D

