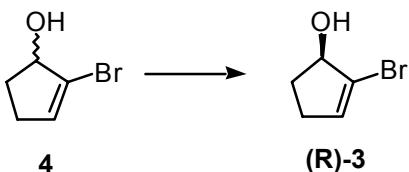
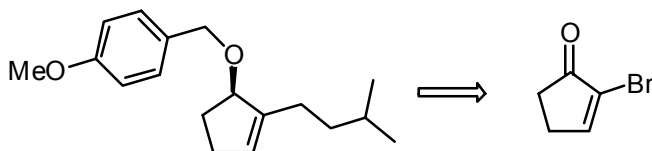


Problem Set 7

1. Prepare R-enantiomer of **4** from a racemic mixture.



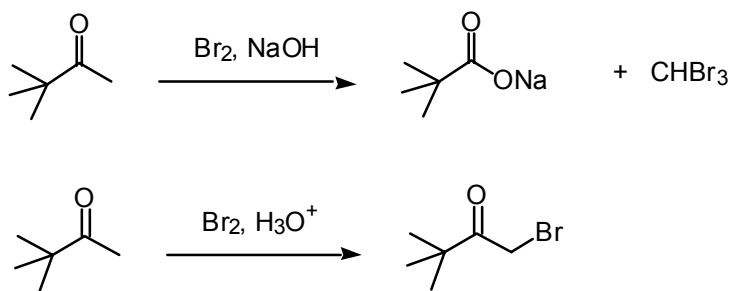
2. Propose an enantioselective synthesis of intermediate **5** from the given starting material.



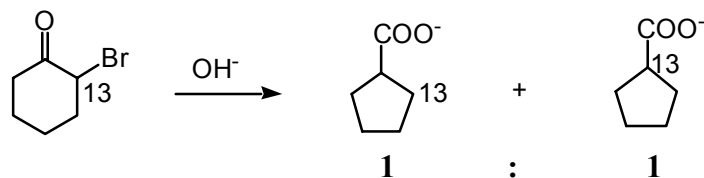
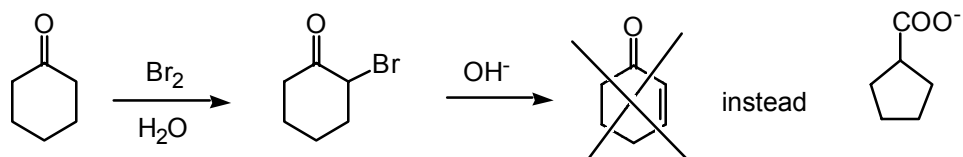
3. a) Sketch $^1\text{H-NMR}$ of cyclohexanone in CDCl_3 . Clearly indicate the chemical shifts (δ scale) and the relative integration values.

b) To this solution (3a) was added THF and D_2O . The resulting homogeneous solution (THF is miscible with both CDCl_3 and D_2O) was acidified with catalytic amount of DCl , and allowed to sit for 24 hrs. Sketch the resulting $^1\text{H-NMR}$ spectrum.

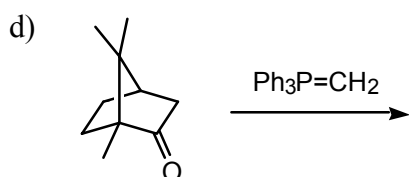
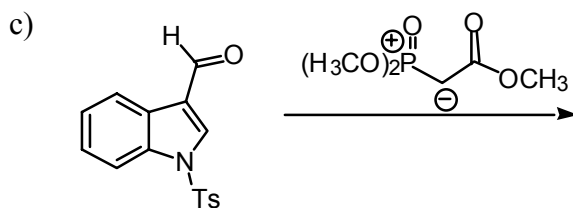
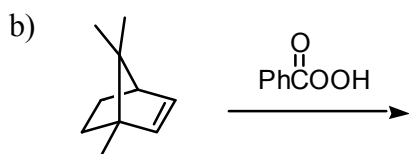
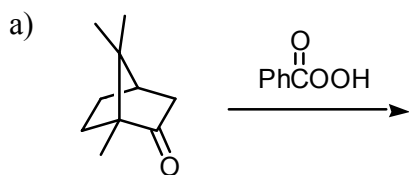
4. Explain the following facts. More specifically, why does α -bromination of a ketone leads to bromoform under basic conditions while monobromo ketones are obtained under acidic conditions. (Hint: mechanism, fast vs slow steps)



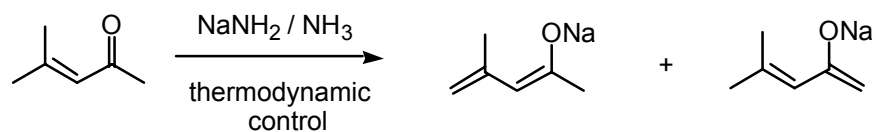
5. Explain the following unexpected result (Favorskii rearrangement) accounting for data from the labeling experiment (^{13}C isotope)



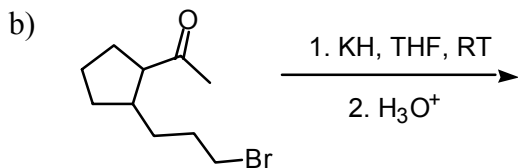
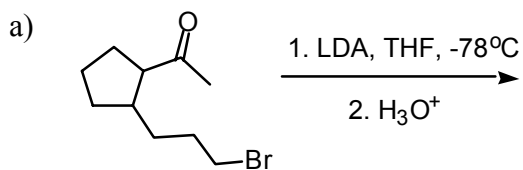
6. Draw products of the following reactions.



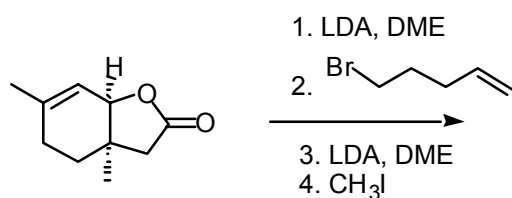
7. Which of these enolates will predominate?



8. Predict and explain the products of the following transformations.

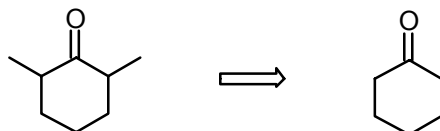


9. Draw the final product of the given sequence.

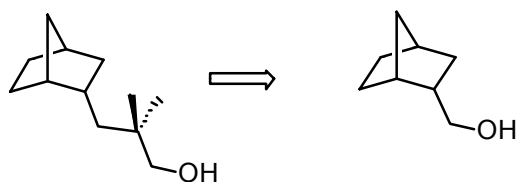


DME: 1,2-dimethoxy ethane

10. Synthesize 2,6-dimethyl cyclohexanone from cyclohexanone.



11. Synthesize product **2** from **1**.



12. A hypothetical enzyme (or synth. Catalyst) performs the following reaction.

a) What is the name of this reaction?

b) Why would it be valuable to obtain such an enzyme?

