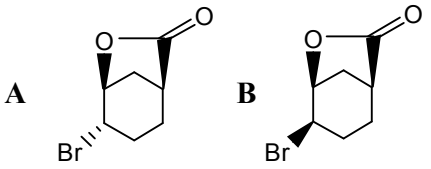
CH105: Organic Chemistry

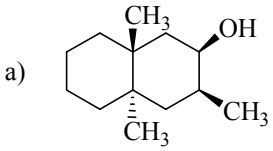
Tutorial-4

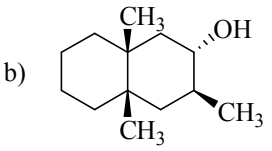
1. A pair of diastereomeric bromides **A** and **B** is given below. (i) Draw the conformational diagram for compounds **A** and **B**. (ii) Which one of these is capable of undergoing elimination reaction upon treatment with a base?



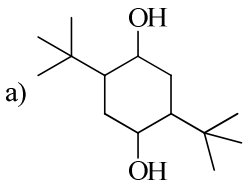
2. (a) Calculate the rotational energy barrior along the C-C bond of 2,2-dimethylpropane, which would have maximum barrior for rotation?
   (b) Sketch the energy versus torsional angle profile for 2,2-dimethylpropane

3. Draw the most stable conformation for the following compounds.





4. Draw the preferred conformations of the following compounds.



b) $HOCH_2CH_2OH$*

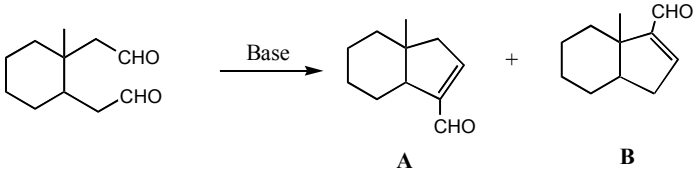
*Draw the energy versus torsional angle profile along C-C bond.

5. Draw the conformational structures of the following compounds (Hint: the trivial names of the compounds are indicative of the nature of bonding between cyclopropane ring(s) and cyclohexane ring).

Triaxane

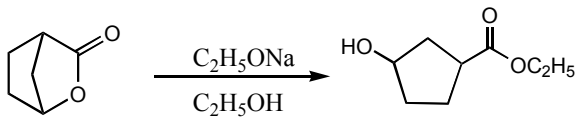
Peraxane

6. Suggest an appropriate mechanism that will account for the formation of **A** and **B** as given belo w



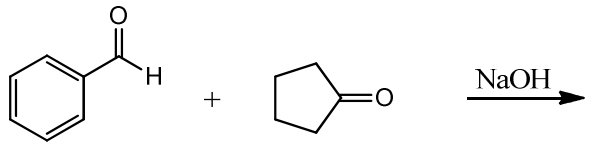
A **B**

7. Propose a mechanism of the given reaction. How do you classify this reaction?

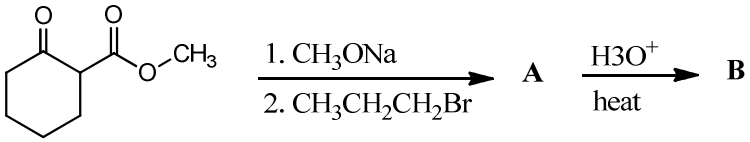


8. Complete the following reactions by identifying the product

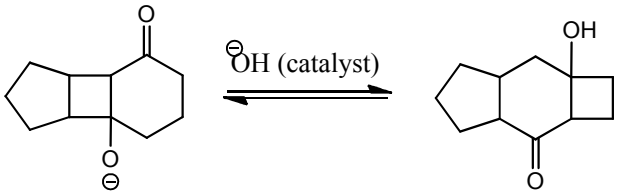
(i)



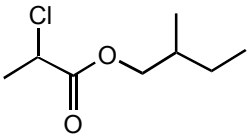
(ii)



9. Provide the best multistep mechanism for the illustrated reaction by showing all electron pushing arrows. (mechanism involves a ring contraction and ring expansion)



10. An excess of racemic acid $CH_3CHClCOOH$ is allowed to react with (S)-2-methyl-1-butanol to form the ester,



Upon careful distillation of the reaction mixture, three fractions are obtained, each of which is optically active. Draw stereochemical formulas of the compound or compounds making up each fraction.

11. Diols can form cyclic acetals/ketals upon treatment with aldehydes/ketones. (a) Identify such products from butane 1,2,4-triol as indicated below. (b) Explain why in one case only a six membered acetal and in the other case a five membered ketal is formed?