

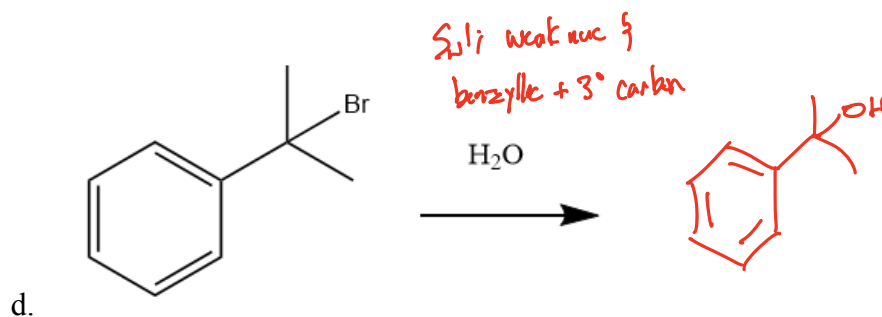
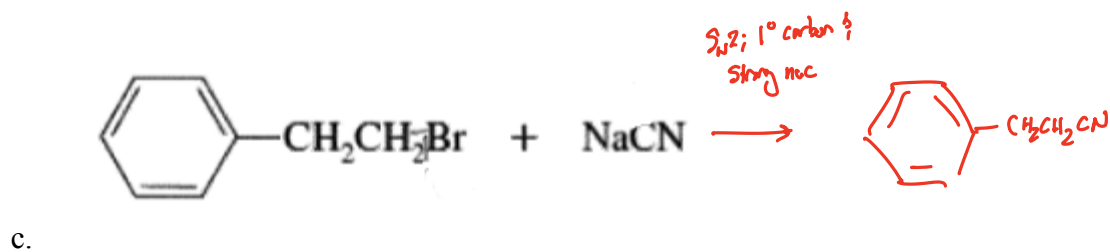
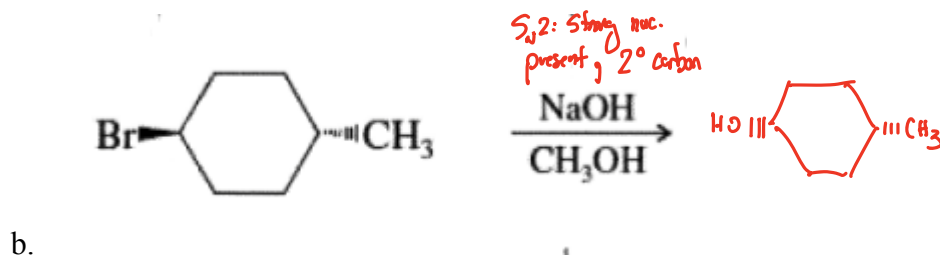
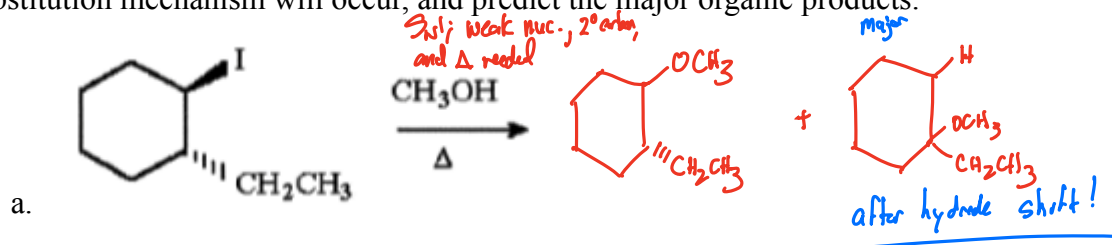
CHEM 223 (2024) SI Session #11

Learning Objectives: By the end of this session, students should be able to:

- Draw mechanisms & explain the rationale behind S_N1 and S_N2
- Use reactants and reaction conditions to differentiate between S_N1 and S_N2
- Begin compounding ideas from Chapter 4 and Chapter 6 to do basic synthesis

Section 1: Differentiating between S_N1 and S_N2

1. (From 2023's Exam) For each of the following reactions, predict which nucleophilic substitution mechanism will occur, and predict the major organic products.



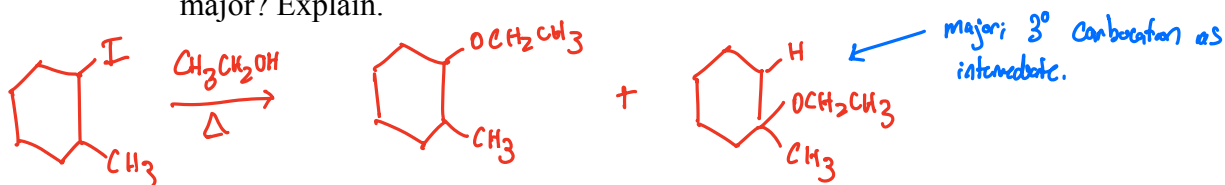
2. Fill out the following table for differentiating between Sn1 and Sn2 (This is in your slides!)

	Sn1	Sn2
Alkyl Halide Preference	$3^\circ > 2^\circ$	methyl $> 1^\circ > 2^\circ$
Nucleophile Strength	Weak	Strong
Rate equation	rate = k [alkyl halide] 1 st order	rate = k [alkyl halide] [nuc] 2 nd order
Stereochemistry Changes	racemization occurs	inversion
Are Rearrangements Possible?	Yes	No; No carbocation is formed.

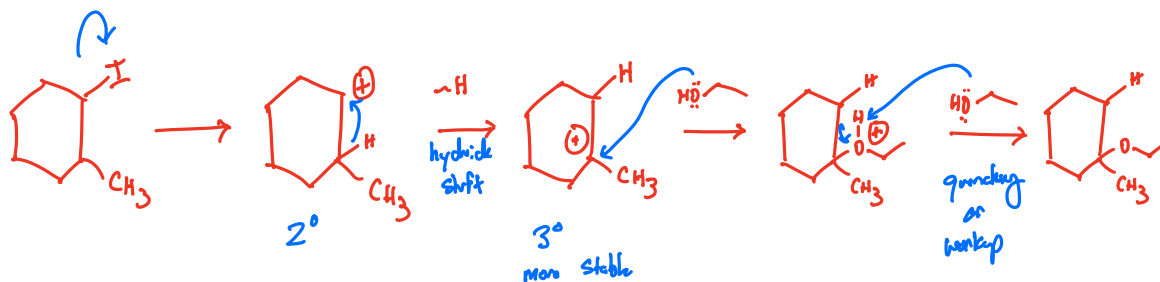
Section 2: Complications within Sn1 & Basic Synthesis

3. 1-bromo-2-methylcyclohexane reacts with ethanol in the presence of heat.

- a. Predict two potential products for this reaction. Which of these will be more major? Explain.

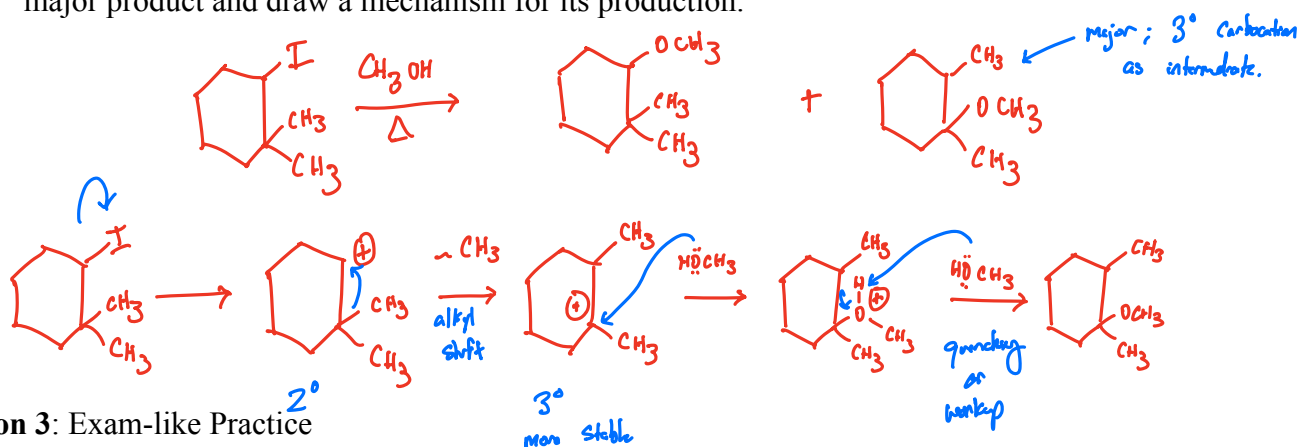


- b. Draw a mechanism for the production of the major product.



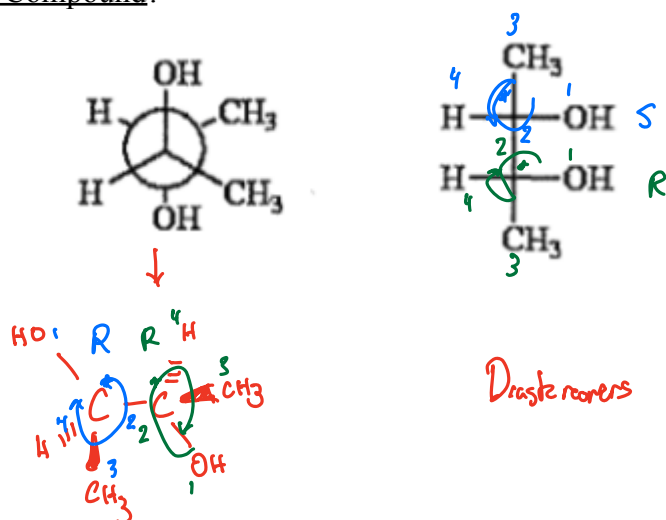
FQ: Why rearranges? \Rightarrow stability!

4. 1-iodo-2,2-dimethylcyclohexane reacts with methanol in the presence of heat. Predict the major product and draw a mechanism for its production.

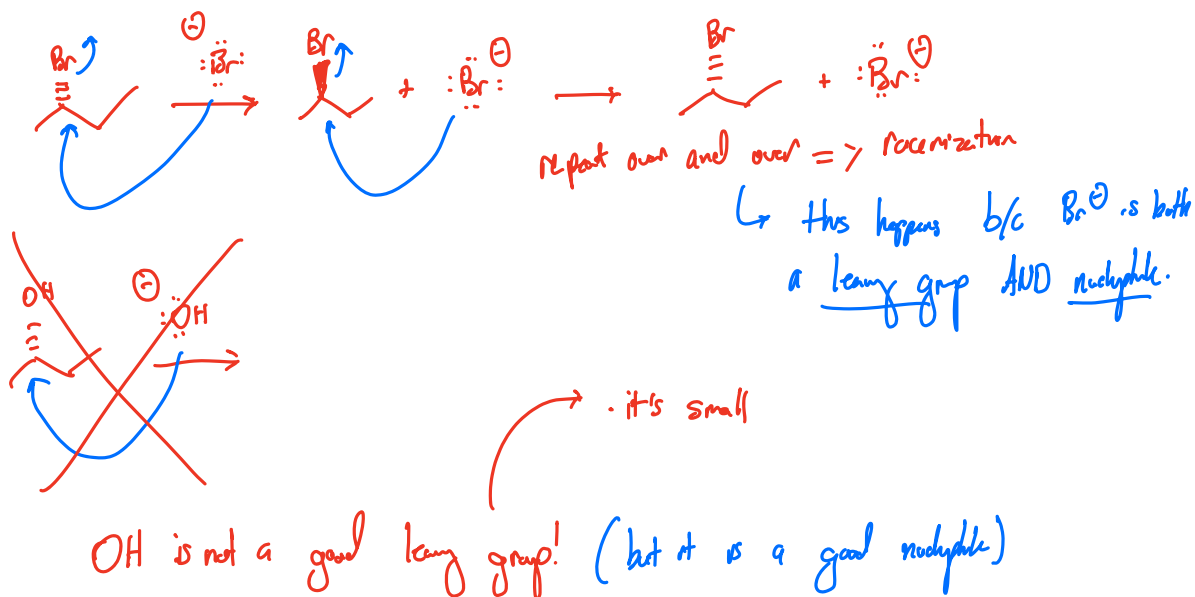


Section 3: Exam-like Practice

5. What is the relationship between the 2 compounds below? Enantiomers, Diastereomers, or The Same Compound?

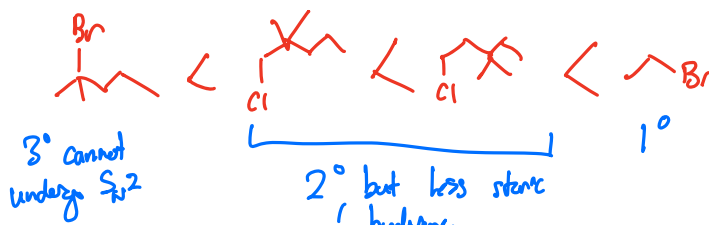


6. Optically active 2-bromobutane undergoes racemization in the presence of KBr. Optically active 2-butanol in the presence of KOH does not. Explain this phenomenon.

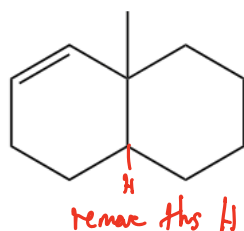


7. Sort the following compounds in order of increasing reactivity with NaCN in the S_N2 reaction

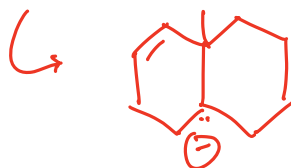
bromoethane, 1-chloro-3,3-dimethylpentane, 1-chloro-2,2-dimethylpentane, and 2-bromo-2-methylpentane.



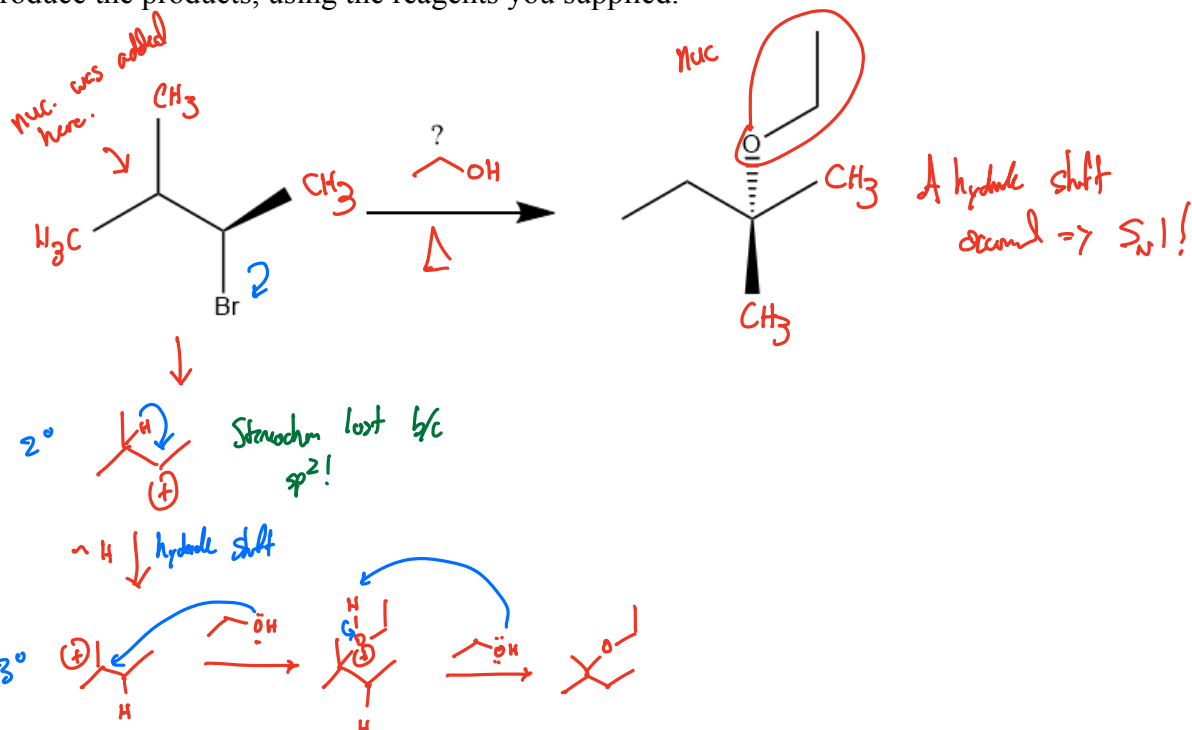
8. In the following structure, remove a hydrogen to create the LEAST stable carbanion. Explain your reasoning.



most substituted!



9. Provide reagents required for the following transformation. Then, provide a mechanism to produce the products, using the reagents you supplied.



10. (Synthesis) Starting with cyclohexane, synthesize cyclohexanol.

