Exam 2 rough areas:
↳ S_N1 vs S_N2; where does Nuc go
↳ R/S configs
↳ Correct lower E_a → major product

CHEM 223 (2024) SI Session #13

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

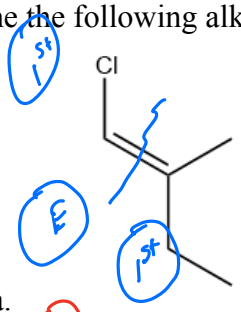
- Name and be able to draw alkenes using E/Z nomenclature
- Describe and draw mechanisms for E1 and E2.
- Describe the intricacies of E1 and E2, and explain which reaction is more favorable for synthesis.
- Differentiate between Elimination-favored and Substitution-favored reactions

Section 1: Alkene nomenclature

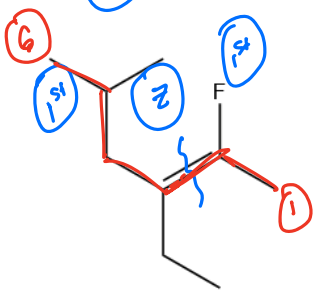
1. Name the following alkenes

Z = Zame Zide
E = opposite

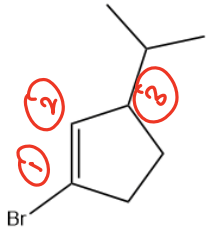
5:13

a. 

(E)-1-chloro-2-methylbut-1-ene

b. 

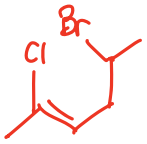
(Z)-3-ethyl-2-fluoro-3-methylhex-2-ene

c. 

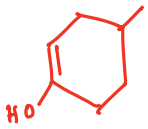
1-bromo-3-isopropylcyclopent-1-ene

2. Draw the following alkenes
   a. (E)-2,3-dimethylhex-3-ene

b. (Z)-5-bromo-2-chlorohex-2-ene

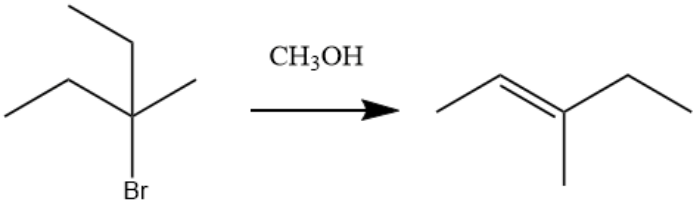


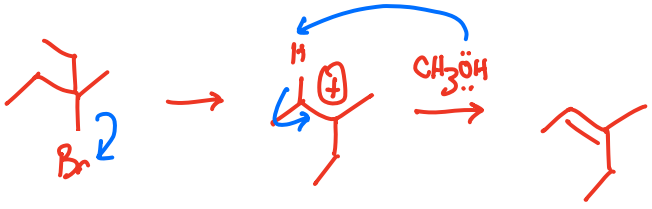
c. 4-methylcyclohex-1-en-1-ol



Section 2: E1

3. Draw the mechanism of the following reaction.





FQ: what is CH_3OH acting as in this rxn?

A: A base, not a nucleophile

4. Is Sn1 possible with these reactants? Explain.

Yes; CH_3OH is both a weak base and weak nucleophile

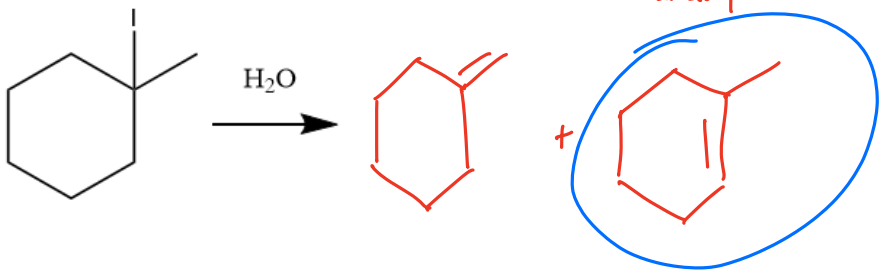
⇓

all E1 and S_N1 reactions compete w/ one another.

FQ: what rxn does heat favor?

↑ E1; ↑ entropy due to more products

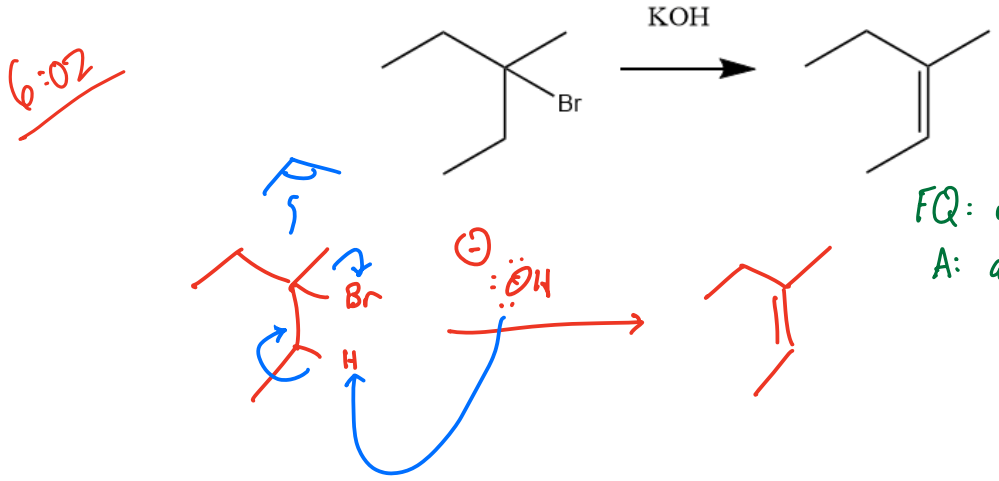
5. Draw the two possible products of the reaction below. Circle the major product and explain your reasoning.



Zaitzev rule: most stable elimination product is the most substituted

Section 3: E2

6. Draw the mechanism of the following reaction.

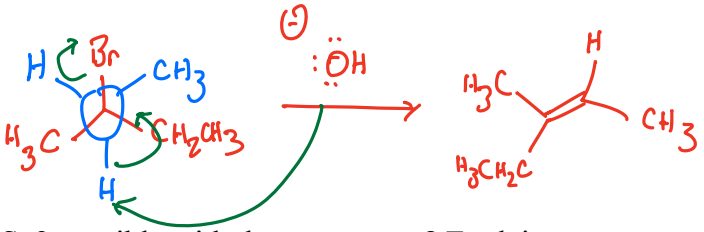


FQ: what is $OH^{\ominus}$ acting as here?
A: a base, not a nucleophile

7. Draw a Newman projection illustrating the mechanism. Explain your decision of conformer.

Can chose either Carbon to be @ the front.

180° between Lh and proton.

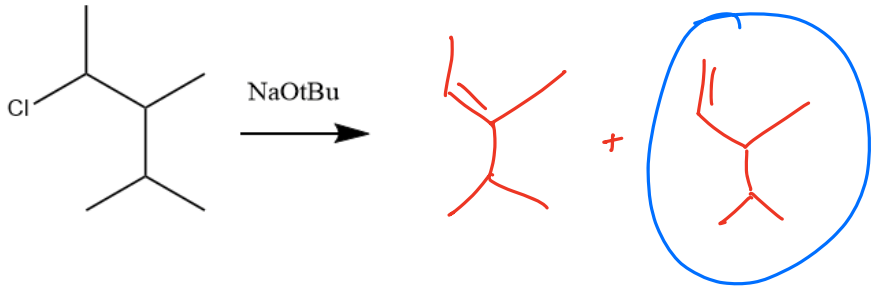


orbitals must be anti-coplanar to facilitate the overlap of p-orbitals in the alkene.

8. Is Sn2 possible with these reactants? Explain.

No; Strong nucleophile, but 3° alkyl halide is too sterically hindered to undergo S_N2.

9. Draw the two possible products of the reaction below. Circle the major product and explain your reasoning.



Circled is major b/c the base is bulky, which favors the less substituted product (Hoffman product)

NaOtBu = $Na^{\oplus}$ $^{\ominus}O$–

bulky base, bad nucleophile.