

Name _____

General Instructions: Write your name in the space provided above and on the provided Scan-tron form. ***Do not put your name anywhere else in this exam book.***

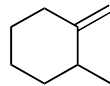
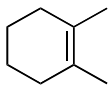
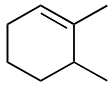
Make sure that you read each question carefully and provide **complete** answers. For the sake of fairness, you will be limited to a maximum of 55 min. Exams must be turned in immediately upon my call of time up.

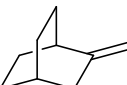
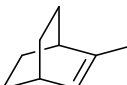

Grading is on the basis of a highest possible score of 100 points.

- I. Multiple Choice – 2.5 points each, 30 points total
- II. Reaction Products – 5 points each, 50 points total
- III. Synthesis – 5 points each, 15 points total
- IV. Mechanism – 10 points

I. Multiple Choice

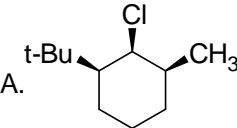
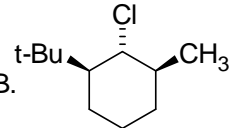
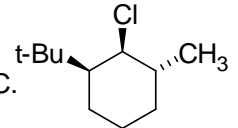
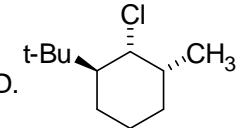
1. What is the order of stability of the compounds listed (from most stable to least stable)?
 I. 1-butene II. 2-butene III. cyclobutene
 A. III > II > I B. II > III > I C. II > I > III D. I > II > III

2. What is the order of stability of the compounds listed (from most stable to least stable)?
 I.  II.  III. 
 A. I > II > III B. III > II > I C. II > III > I D. II > I > III

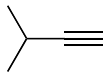
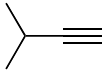
3. What is the order of stability of the compounds listed (from most stable to least stable)?
 I.  II.  III. 
 A. III > II > I B. II > I > III C. I > II > III D. II > III > I

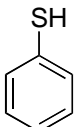
4. Which of the following is the **best** base to use for an E2 reaction?
 A. DMSO B. HCl C. THF D. DBN

5. Which of the following is the **least effective** base to use for an E2 reaction?
 A. KO-t-Bu B. CH₃OH C. NaOH D. DBU

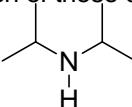
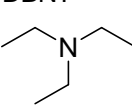
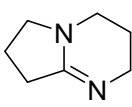
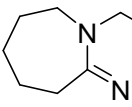
6. Which of the following compounds is **most** reactive toward E2 dehydrohalogenation?
 A.  B.  C.  D. 

7. Which of the following compounds is **most** reactive toward E2 dehydrohalogenation?
 A. 1-iodopentane B. 1-bromopentane C. 2-bromopentane D. 2-iodopentane

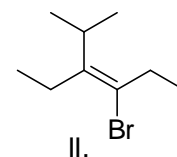
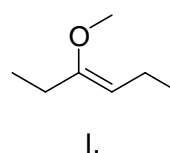
8. Which of the following is the strongest nucleophile?
 A.  B.  C. MeOH D. MeO[⊖]

9. Which of the following is the strongest nucleophile?
 A. MeOH B. MeSH C. MeSe[⊖] D. 

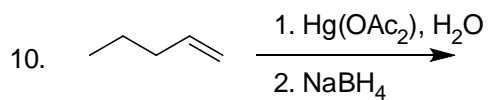
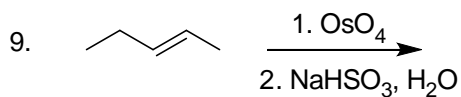
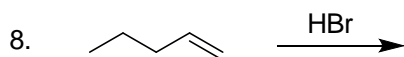
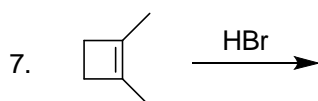
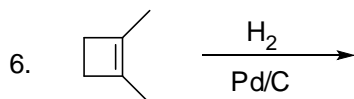
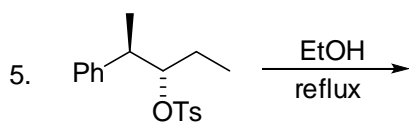
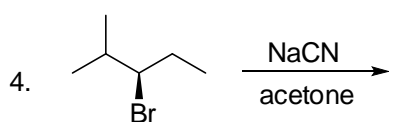
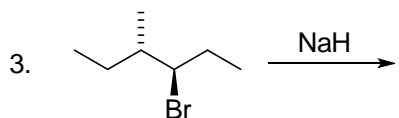
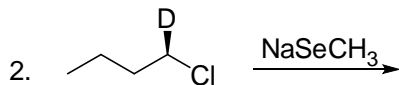
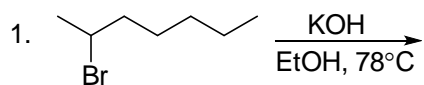
10. Whose rule is used to predict the major product of an elimination reaction?
 A. Zaitsev's B. Krenske's C. Robert's D. Overbee's

11. Which of these choices is DBN?
 A.  B.  C. CH₃CN D.  E. 

12. What are the proper stereochemical descriptors of alkenes I and II at right?
 A. I is Z, II is E. B. I is E, II is Z. C. Both are E. D. Both are Z.



II. Give the structure(s) of the main organic product(s) of each of the following reactions. Indicate major and minor when predictable. Make sure to show the stereochemistry of the product if (and only if) appropriate.



III. Each of the synthetic transformations below can be carried out in two synthetic steps. Give the reagent(s) necessary for each step over the arrows and show the structure of the intermediate product in the spaces in the middle.



IV. Consider the reaction shown below.

1. Is the reaction *anti*, *syn*, or non-stereospecific? Explain.

2. Write the mechanism of the reaction using curved arrows to show the flow of electron pairs.

3. Use the mechanism to explain both the regioselectivity and stereoselectivity of the reaction.

