University of Toledo

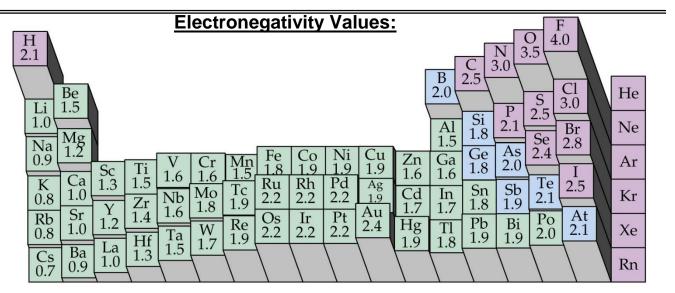
10/23/2019

Organic Chemistry: Chapters 5-8

Last Name:	First Name:	

MAKE SURE THAT YOUR NAME IS WRITTEN AND BUBBLED ON THE GREEN ANSWER SHEET.

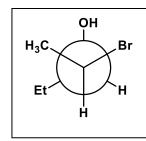
- 1) Place all books and papers on the floor. **Programmable calculators are not permitted.** Ask if you have questions.
- 2) * Write your **name** on side one of the green & white bubble answer sheet.
 - * Write your **name (last name first)** on side 2 of the answer sheet. Fill in the bubbles.
- 3) Answer the multiple-choice questions by filling in the correct bubble on the green answer sheet. (You may want to mark your answers on these pages as well so you can check your work later.) For these questions, only the bubble sheet will be graded.
- 5) A Periodic Table and scrap paper are also provided.
- 6) Regulations on **Academic Honesty** will be strictly enforced during the exam. Violation of this policy WILL result in a grade of F in the course.
- 7) If any instructions are not clear, be sure to ask for assistance.



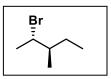
1. Which Fischer projection correctly represents the molecule shown? (5 PTS)

2. Following an S_N1 mechanism, what is the expected organic product? (5 PTS)

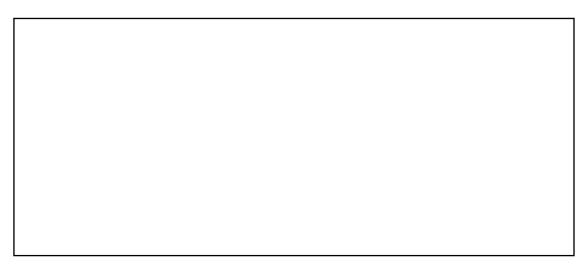
3. Convert/Draw the Newman projection into stick form? (10 PTS)



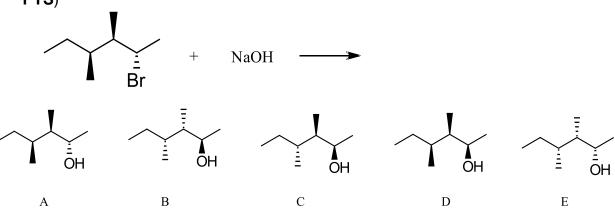
- 4. From the molecule shown and drawn in Q.3 above, determine the name. (5 PTS)
 - a) (4R, 3S)-3-bromobutanol
 - b) (3S, 4R)-5-bromohexanol
 - c) (3R, 4S)-4-bromopentan-2-ol
 - d) (3R, 4R)-4-bromopentan-3-ol
 - e) (3R, 4S)-4-bromopentan-3-ol
- 5. The compound shown, when subjected to an E2-type reaction, undergoes a stereospecific elimination to form a single compound. Please draw out the mechanism of this reaction with as much detail as you can for full points. (10 PTS)



6. From question #5 above, a) write the name the compound and b) draw it in both Fischer and Newman projection forms. (10 PTS)



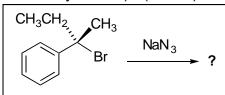
7. What is the major organic product formed as a result of an S_N2 mechanism? (5 **PTS**)



8. What would be the **major** organic product of the following E2 reaction? (5 PTS)

$$\begin{array}{c|c} & & K^{+}\text{-}OC(CH_3)_3 \\ \hline & & \\ \hline & & HOC(CH_3)_3 \end{array} ?$$

- A) CH₂OH
- B) CH₃ OC(CH₃)₃
- C) CH₂
- D) CH₃
- E) CH₂OC(CH₃)₃
- 9. The **major** product of the following reaction conditions will result from (Hint: chiral starting compound is 3° alkyl halide): (**5 PTS**)



- A) E1
- B) S_N1/E1
- C) E2
- D) S_N2
- E) there is no way to know

10. Draw the product(s) of the above reaction. If there is more than one product, note which one(s) is/are major and which one(s) is/are minor. Provide a mechanism for the reaction transformation. Details will be important. If there is more than one product, only one mechanism will suffice. (10 PTS)

11. Predict the major product of the following S_N2 reaction: (5 PTS)

$$H \xrightarrow{\text{Me}} \text{OTs} \xrightarrow{\text{NaCN}} ?$$

$$-\text{OTs} = -\text{O}_3\text{SC}_6\text{H}_4\text{CH}_3$$

A) Et N.

- C) ...
- NC H
- H
- Et Me
- 12. To synthesize the target molecule what reaction pathway could be used? (5 PTS)

reaction 1:

reaction 2:

followed by aqueous acid work-up

reaction 3:

followed by aqueous acid work-up

- a) Reactions 1 and 3
- b) Reactions 1, 2, and 3
- c) Reaction 2
- d) Reactions 2 and 3
- e) Reaction 1

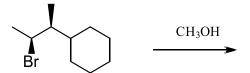
Indicate the reagent(s) required to achieve the following transformation: (5 PTS)

- A) 1) NaOMe 2) HCN / light
- B) 1) Nal 2) NaCN
- C) 1) NaF 2) KCN
- D) NaCN
- E) Simply cannot be done. No way!
- 14. What reactant(s) are required to achieve the following transformation? (5 PTS)

- A) NaCN
- 1) NaOH 2) KCN
- C) O II CI—S—CH₃
 1. II O , pyridine

 2. KCN
- 1) Br₂ / light
 2) NaCN

15. Show the mechanism and product when the following undergoes an S_N1 reaction. (10 PTS)



Bonus Questions - 10 PTS

16. What is the major organic product obtained from the following reaction? (5 PTS)

17. Under E2 reaction conditions, which alkyl halide will most readily eliminate a hydrogen halide? (5 PTS)