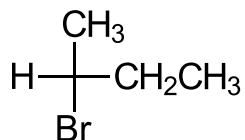
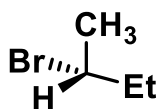
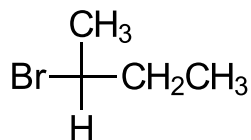


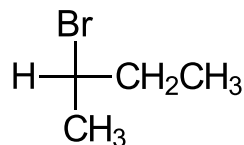
1. Which Fischer projection correctly represents the molecule shown? (5 PTS)



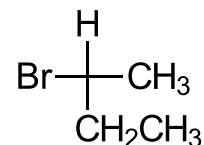
A)



B)

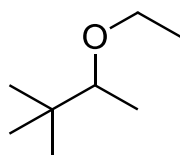
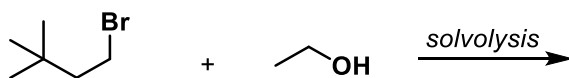


C)

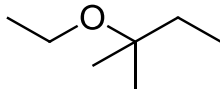


D)

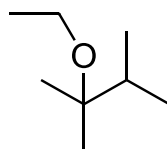
2. Following an S_N1 mechanism, what is the expected organic product? (5 PTS)



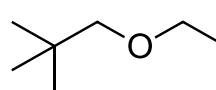
A



B



C

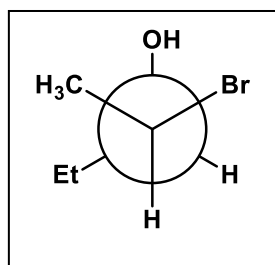


D

No Reaction

E

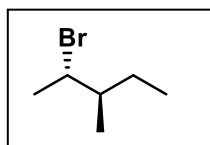
3. Convert/Draw the Newman projection into stick form? (10 PTS)



4. From the molecule shown and drawn in Q.3 above, determine the name. (5 PTS)

- a) (4*R*, 3*S*)-3-bromobutanol
- b) (3*S*, 4*R*)-5-bromohexanol
- c) (3*R*, 4*S*)-4-bromopentan-2-ol
- d) (3*R*, 4*R*)-4-bromopentan-3-ol
- e) (3*R*, 4*S*)-4-bromopentan-3-ol

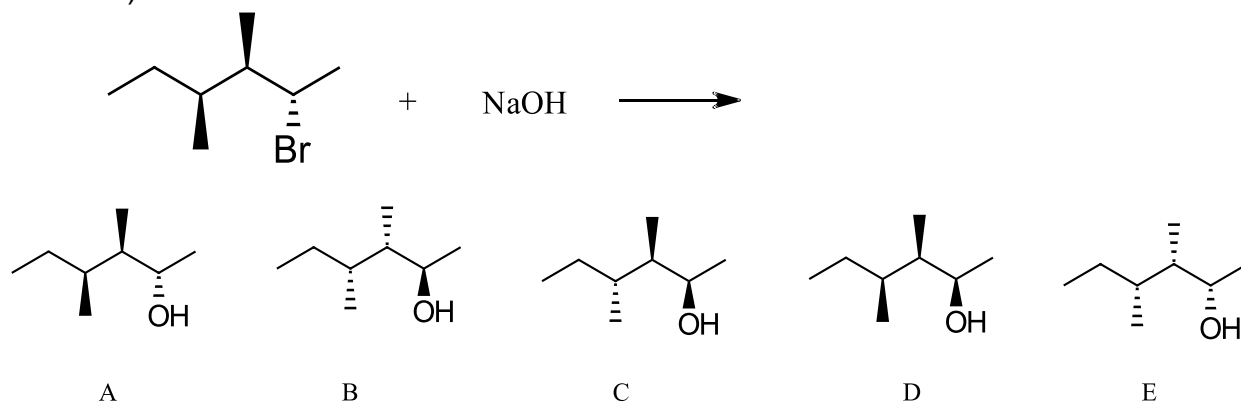
5. The compound shown, when subjected to an E2-type reaction, undergoes a stereospecific elimination to form a single compound. Please draw out the mechanism of this reaction with as much detail as you can for full points. (10 PTS)



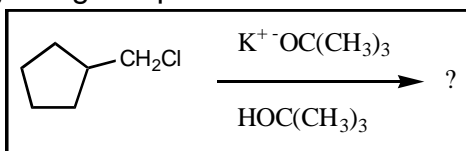
6. From question #5 above, a) write the name the compound and b) draw it in both Fischer and Newman projection forms. (10 PTS)



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

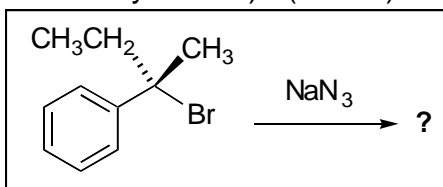


8. What would be the **major** organic product of the following E2 reaction? (5 PTS)



- A) C1CCCC1CO
- B) C1C(OC(C)C)C(C)C1
- C) C1=CCCC1
- D) CC1=CCCC1
- E) C1CCCC1COCC(C)C

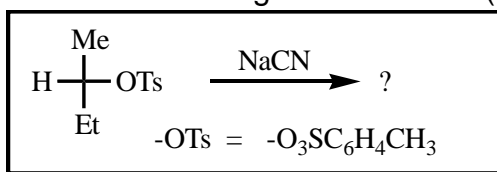
9. The **major** product of the following reaction conditions will result from (Hint: chiral starting compound is 3° alkyl halide): (5 PTS)



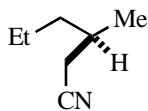
- A) E1
- B) S_N1/E1
- C) E2
- D) S_N2
- E) there is no way to know

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)**

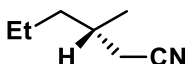
11. Predict the major product of the following S_N2 reaction: (5 PTS)



A)



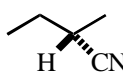
B)



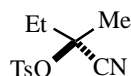
C)



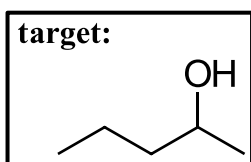
D)



E)



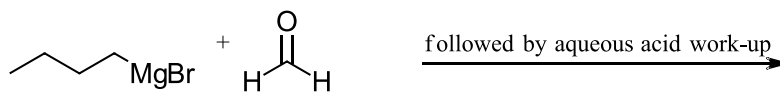
12. To synthesize the target molecule what reaction pathway could be used? (5 PTS)



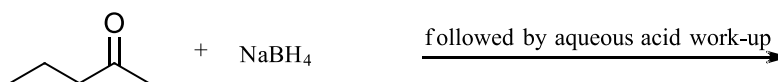
reaction 1:



reaction 2:

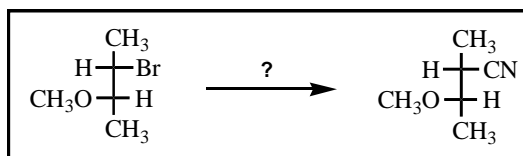


reaction 3:



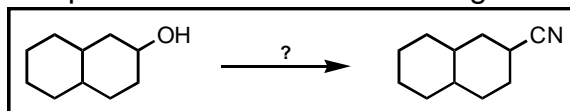
- a) Reactions 1 and 3
- b) Reactions 1, 2, and 3
- c) Reaction 2
- d) Reactions 2 and 3
- e) Reaction 1

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



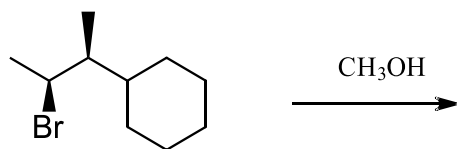
- A) $\xrightarrow[2) \text{ HCN / light}]{1) \text{ NaOMe}}$
- B) $\xrightarrow[2) \text{ NaCN}]{1) \text{ NaI}}$
- C) $\xrightarrow[2) \text{ KCN}]{1) \text{ NaF}}$
- D) $\xrightarrow{\text{NaCN}}$
- E) Simply cannot be done. No way!

14. What reactant(s) are required to achieve the following transformation? (5 PTS)



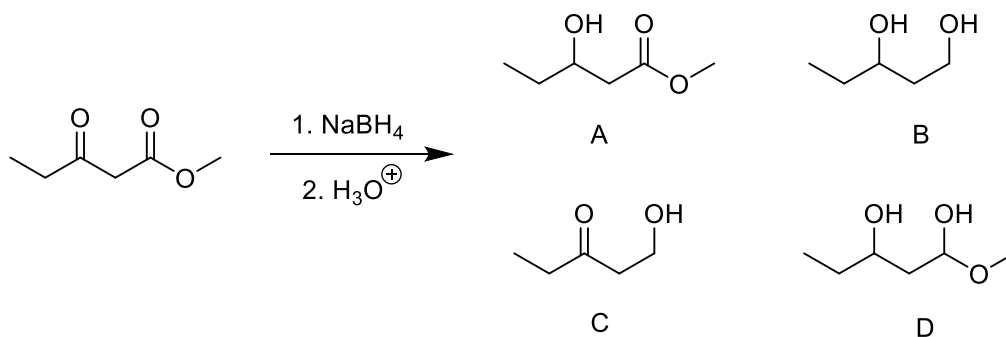
- A) $\xrightarrow{\text{NaCN}}$
- B) $\xrightarrow[2) \text{ KCN}]{1) \text{ NaOH}}$
- C) $\xrightarrow[2) \text{ KCN}]{1. \text{ Cl}-\overset{\text{O}}{\parallel}{\text{S}}-\text{CH}_3, \text{ pyridine}}$
- D) $\xrightarrow[2) \text{ NaCN}]{1) \text{ Br}_2 / \text{ light}}$

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)

