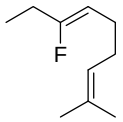
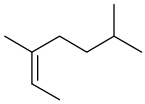
CHM 1321A
Mid Term 2 Version 1 Answers

1. Name the following compounds (**6 points**):

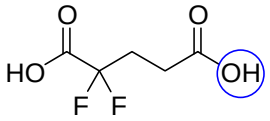
a) 

Z-2-methyl-7-fluorononona-2,6-diene 3

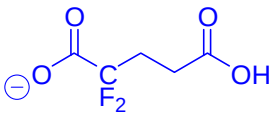
b) 

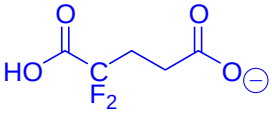
Z-3,6-dimethylhept-2-ene 3

2. a. Compare the two hydrogens shown in this compound and circle the one that is less acidic. (**1 point**)



a. Draw the two possible conjugate bases (**2 points**).

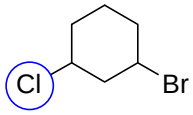




b. For your answer above, identify which of the conjugate bases is more stable and briefly justify your answer (**4 points**)

compound on the left has 2 fluorines next to the C=O that are electronegative
the fluorines are electron withdrawing. They will reduce slightly the negative charge on the oxygen by an inductive effect
reducing the negative charge on oxygen stabilizes this conjugate base and makes it a weak base, this means that the original compound is the stronger acid

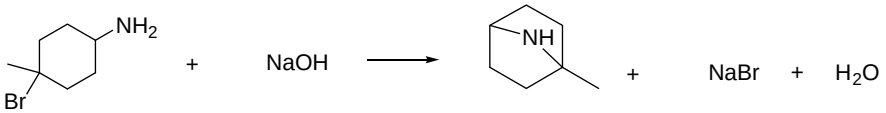
3. a. Compare the two leaving groups shown in this compound and circle the one that is less active. (**1 point**)



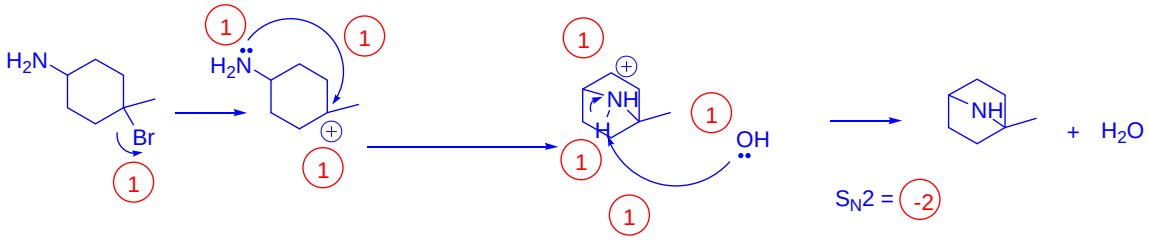
b. Justify your answer for part a (**5 points**)

- Leaving group must stabilize a negative charge
- bromine is lower on the periodic table than Cl
- bromine is larger than chlorine
- bromine can spread the negative charge over a larger volume than Cl can
- Dispersing the negative charge will lower then energy of Br- relative to Cl-

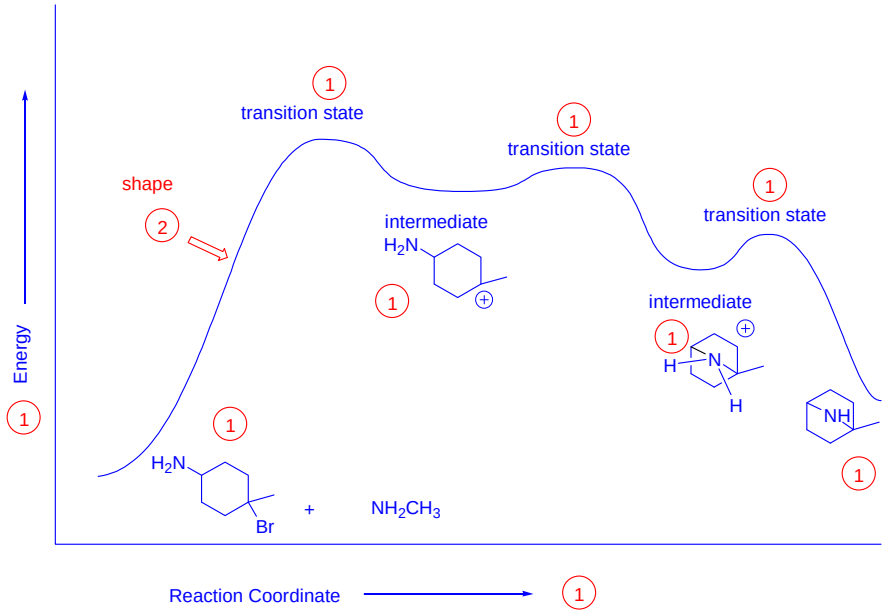
4. Consider the following reaction.



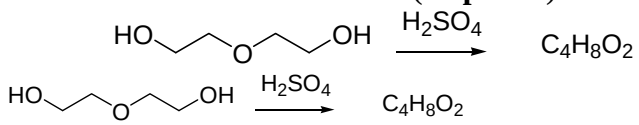
a) Write a detailed mechanism for this transformation (**8 points**).

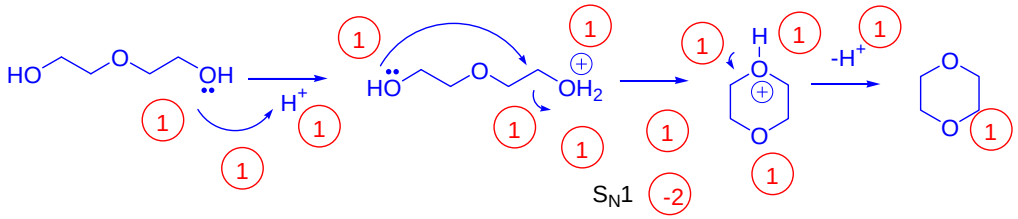


(b) Draw the reaction co-ordinate diagram for the process shown above. Label the starting materials, products, transition state(s) and any intermediate(s). (**11 points**).

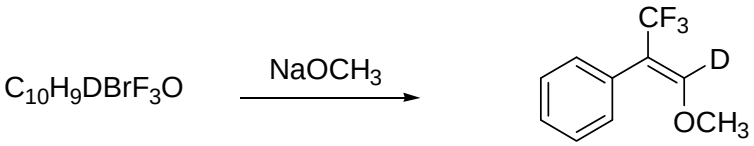


5. Write a <u>detailed</u> mechanism for this transformation (**13 points**).

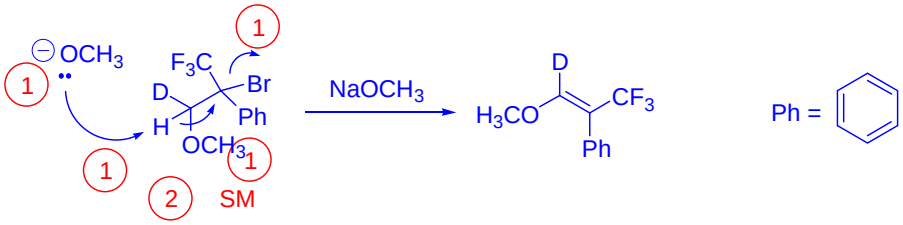




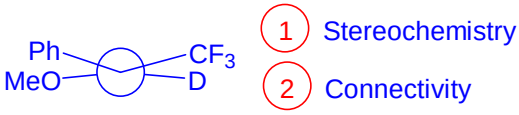
6. Consider the following reaction:



a) Draw the starting material for the process and the mechanism of the reaction, neglecting stereochemistry (**6 points**).

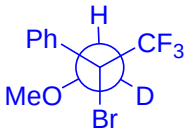


b) Draw the Newman projection of the product (**3 points**).



Structure must match structure in part a

c) Draw the starting material using a Newman projection. (**4 points**).

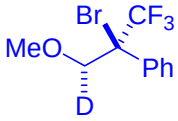


2 Connectivity and onfiguration

1 H and Br antiperiplanar

Match structure in part b (1)

d) Draw the starting material using line notation showing correct relative stereochemistry (**2 points**)



Structure must match structure in part c

e) What is the stereochemical relationship between the hydrogen and leaving group in the transition state? (**1 point**)

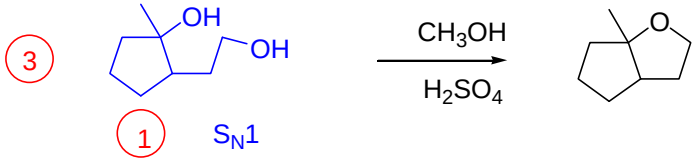
Antiperiplanar

f) What is the configuration of the alkene formed? (**1 point**)

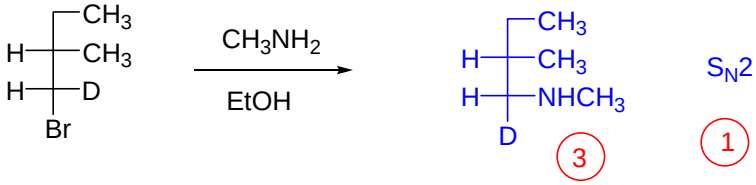
E

7. Supply the missing products or starting materials as necessary. Indicate what type of reaction is occurring for each. (**16 points**)

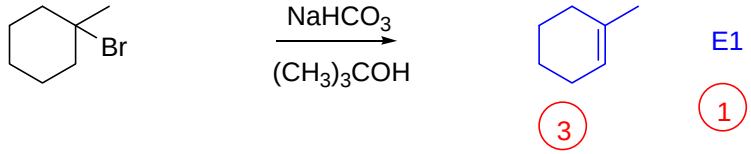
a.



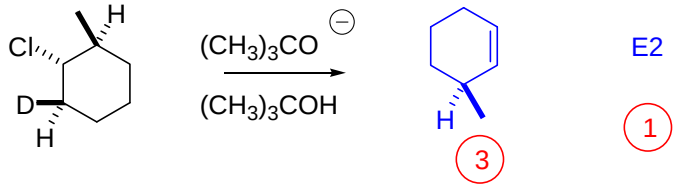
b.



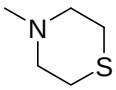
c.



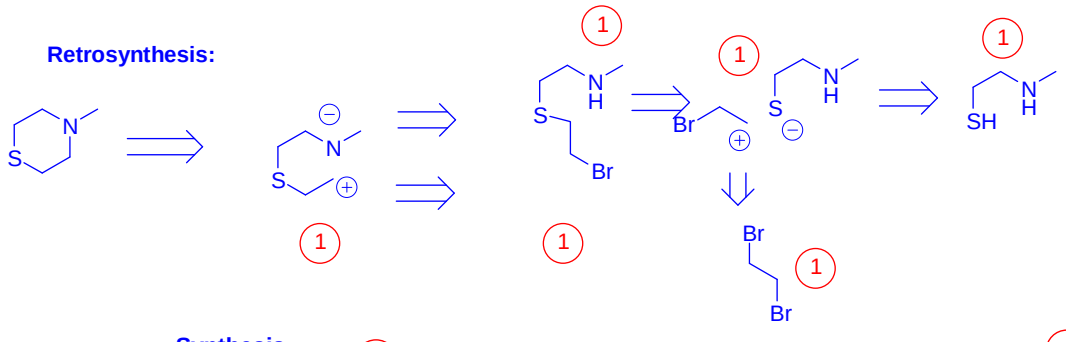
d.



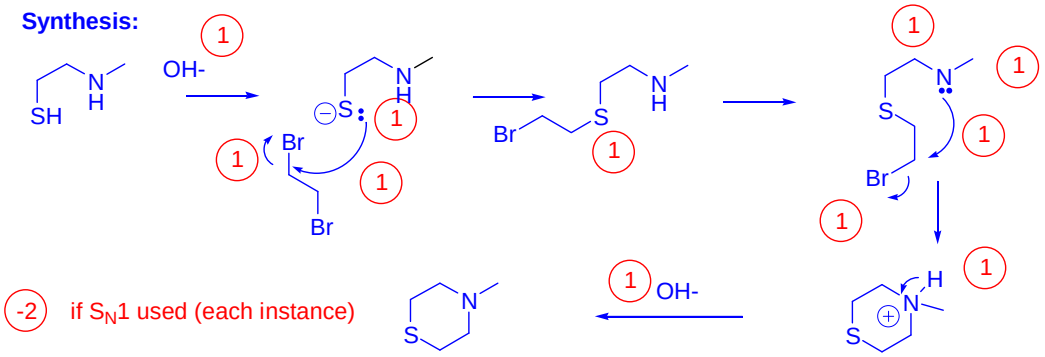
8. Suggest a synthesis of the following compound. You may use any starting material containing three carbons or less. Be sure to include a retrosynthesis. (**17 points**)



Retrosynthesis:



Synthesis:



-2 if S_N1 used (each instance)

Other solutions are possible. The material can be disconnected in different directions and in different orders

Bonus: Give a mechanism to explain the following reaction: (**3 points**)