

Chemistry 35

Exam 2 - April 9, 2007

Put your name and SISD number on **EVERY PAGE** of the exam.

Write all answers on the exam.

There are several blank pages at the end of the exam for you to use as scratch paper.

1 H 1.00797							1 H 1.00797	2 He 4.0026
3 Li 6.939	4 Be 9.0122	5 B 10.811	6 C 12.0112	7 N 14.0067	8 O 15.9994	9 F 18.9984	10 Ne 20.183	
11 Na 22.9898	12 Mg 24.312	13 Al 26.9815	14 Si 28.086	15 P 30.9738	16 S 32.064	17 Cl 35.453	18 Ar 39.948	

1. (14 points) _____

2. (14 points) _____

3. (14 points) _____

4. (20 points) _____

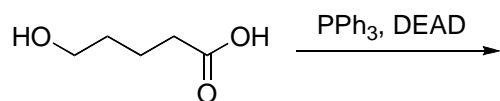
5. (20 points) _____

6. (18 points) _____

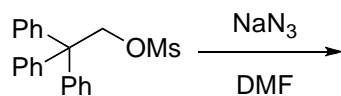
Total (100 points) _____

Problem 1. (14 points) Provide the products for the reactions shown below. Indicate product stereochemistry clearly (if applicable). If no reaction would occur, write NO REACTION.

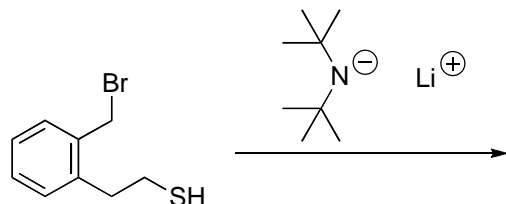
A) (2 points)



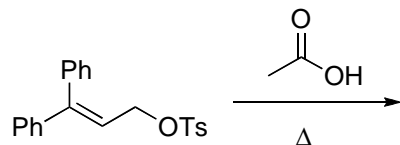
B) (2 points)



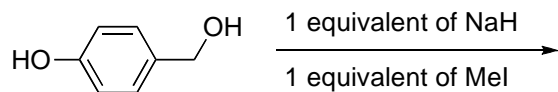
C) (2 points)



D) (2 points)



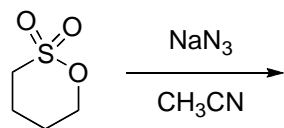
E) (2 points)



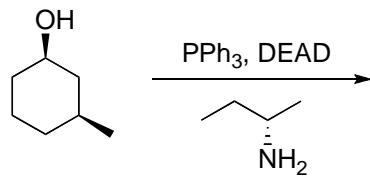
Name _____

SISD _____

F) (2 points)



G) (2 points)

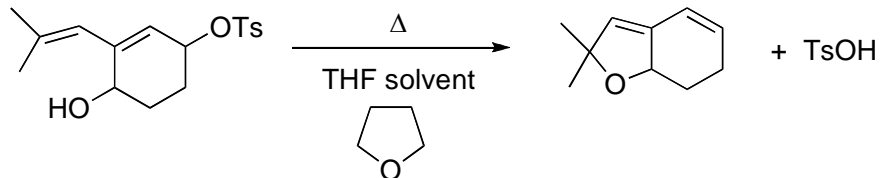


Problem 2 (14 points)

A) (12 points) Provide a detailed, step-by-step mechanism for the following reaction. In this question, we provide the reactants, products and reaction conditions. **YOUR JOB IS TO:**

- 1) Show the individual chemical steps and all intermediates formed in the process of converting the reactant to the product.
- 2) Use curved arrows to show all changes in bonding and lone pair electrons.
- 3) Show all formal charges and all contributing resonance structures.

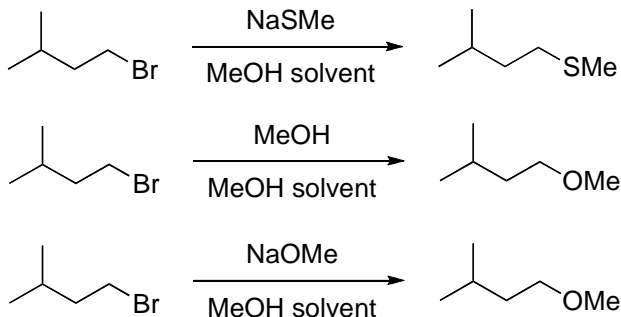
Remember, the sequence of steps you propose must convert the reactant into the product using only the starting material provided. You may not use additional acids or bases, since they are not present in the reaction mixture. The solvent for the reaction is THF, the structure of which is provided below.



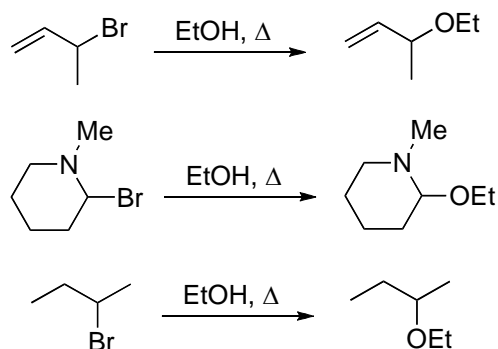
B) (2 points) Based on your mechanism, predict one other ether that might be formed as a product during this reaction.

Problem 3. (14 points) For each set of reactions shown below, CIRCLE the FASTEST reaction and *cross out* the *slowest* reaction.

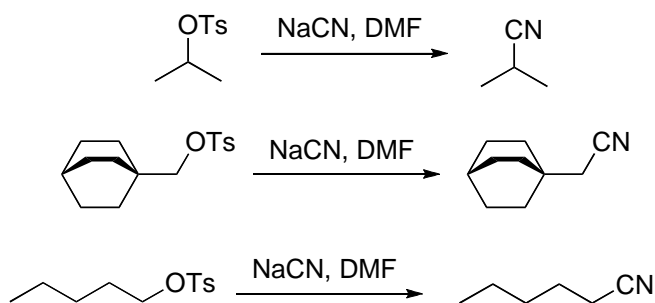
A) (2 points)



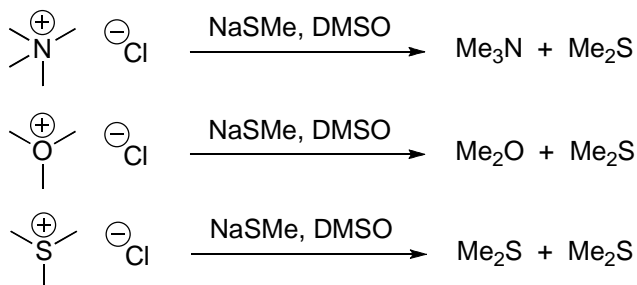
B) (2 points)



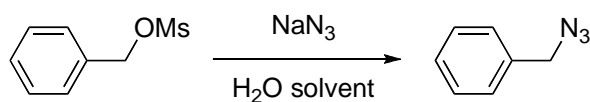
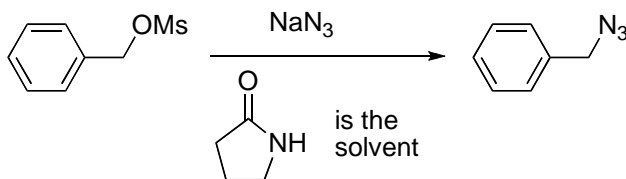
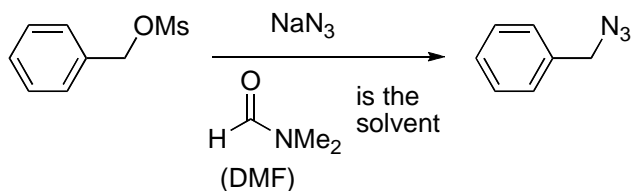
C) (2 points)



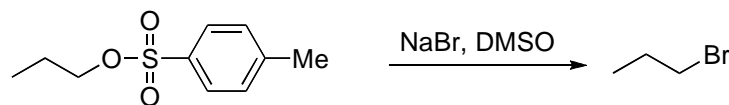
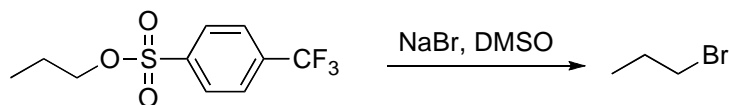
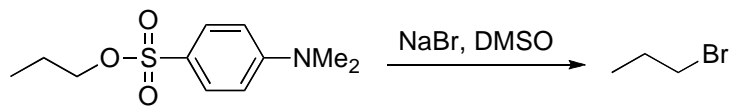
D) (2 points)



E) (2 points)

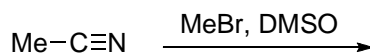
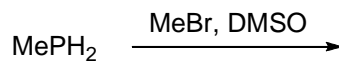
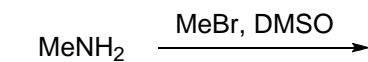


F) (2 points)



G) (2 points)

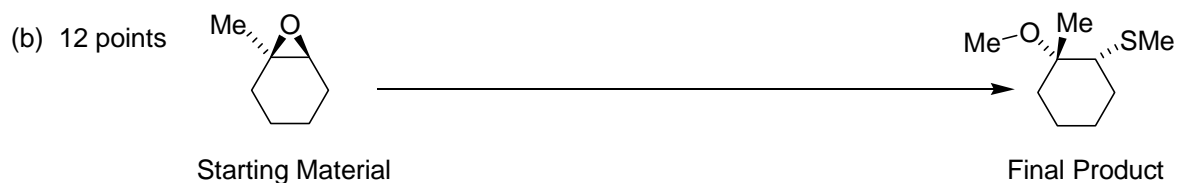
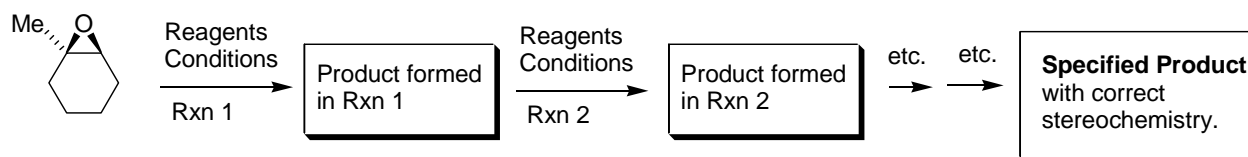
(note - the products of these three reactions are intentionally not provided)



Problem 4. (20 points) For parts (a) and (b) below, propose a series of reactions (reagents and conditions, if necessary) that convert the Starting Material into the Final Product. To get credit, your starting material and product must contain the stereocenters exactly as specified in the problem.

You do NOT need to draw mechanisms for each reaction.

Structure your answer as follows:



Problem 5. (20 points) For the following reactions,

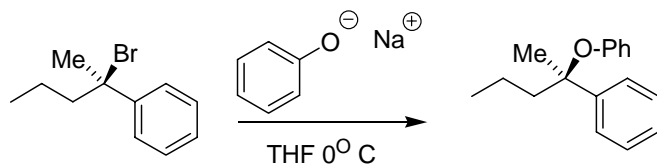
(1) Give the absolute configuration, (R) or (S), of all stereocenters in the reactants and products PROVIDED BY US.

(2) If the reaction is 100% correct as written, write “CORRECT” in the box.

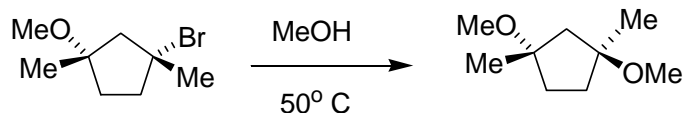
If the reaction product(s) provided are not entirely correct, draw **ALL THE CORRECT PRODUCTS** in the box and **SPECIFY THE SUBSTITUTION MECHANISM(S)**.

If no reaction occurs, write “NO REACTION” in the box.

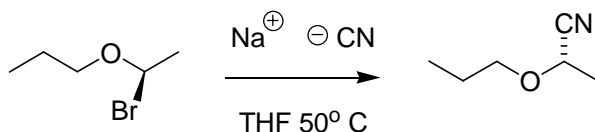
(a)



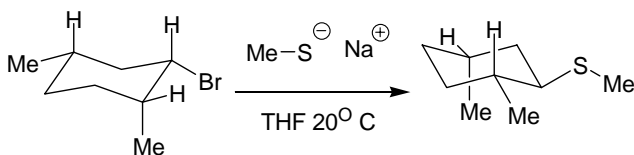
(b)



(c)

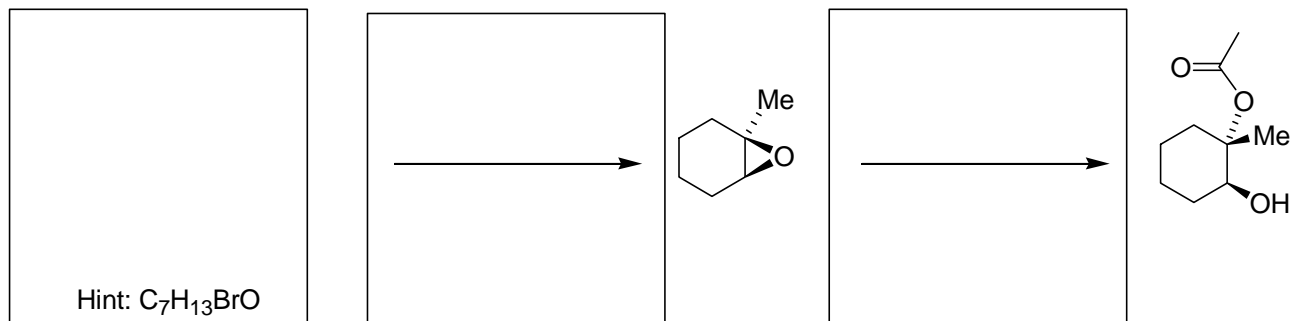


(d)

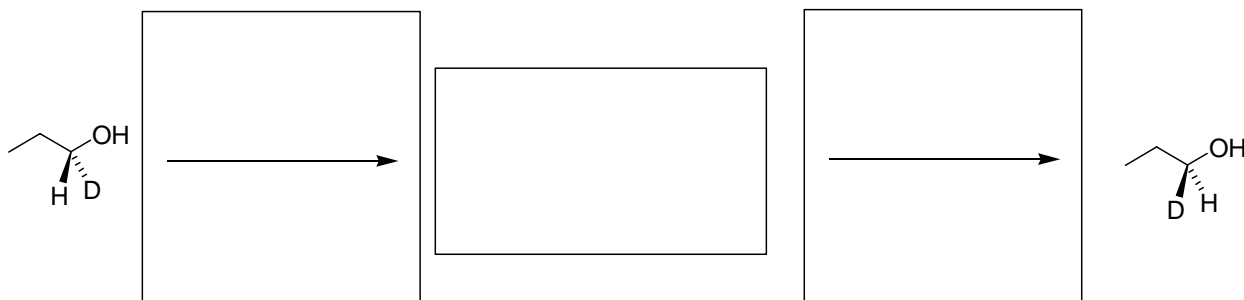


Problem 6. (18 points) Provide the missing starting materials, reagents (box around arrow) or product of first reaction (box in middle) that complete the following reaction sequences.

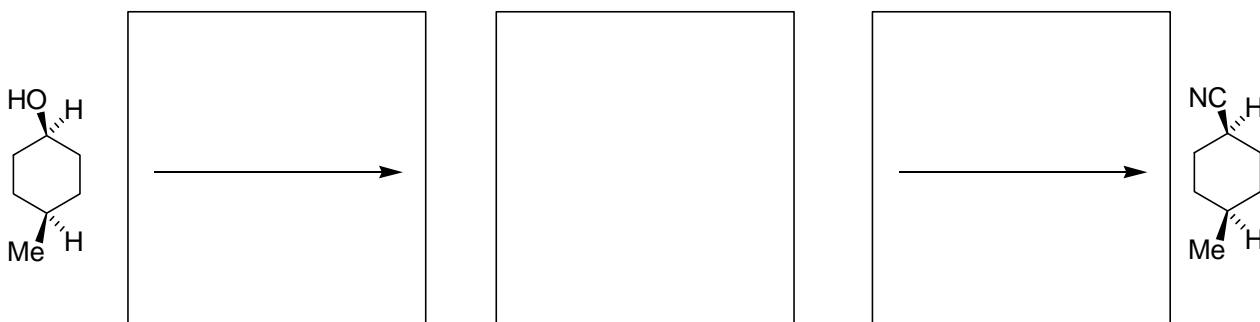
(a)



(b)



(c)



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SISD_____

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