

Name: \_\_\_\_\_

CHEMISTRY 3311, Fall 1991  
Professor Walba  
Third Hour Exam  
12/5/91

scores:

1)

2)

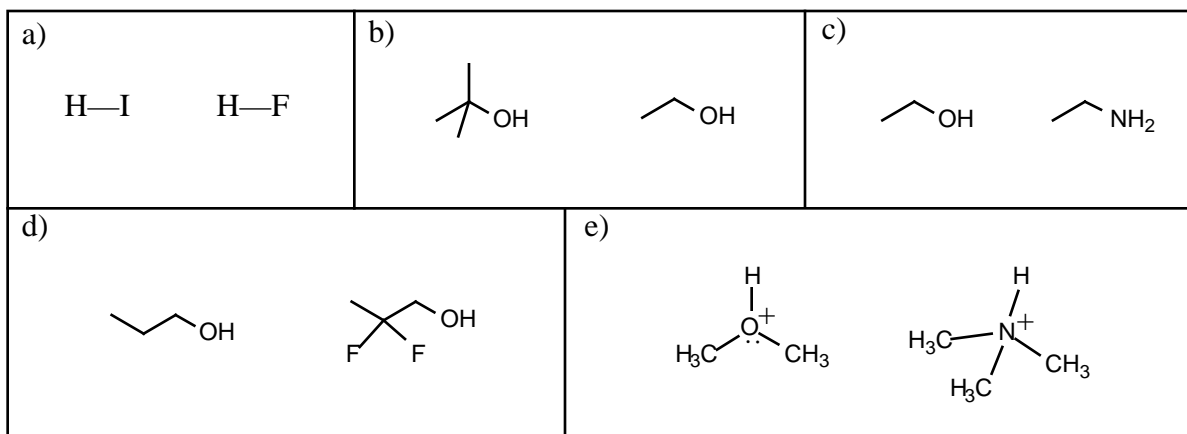
3)

4)

5)

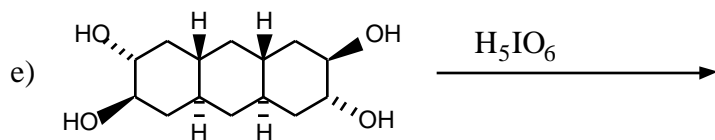
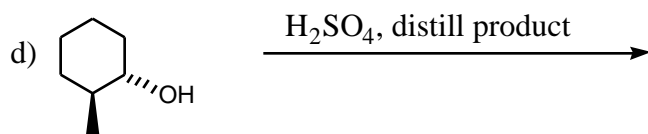
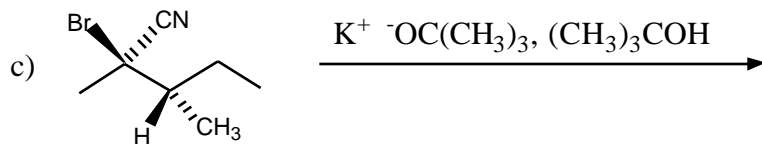
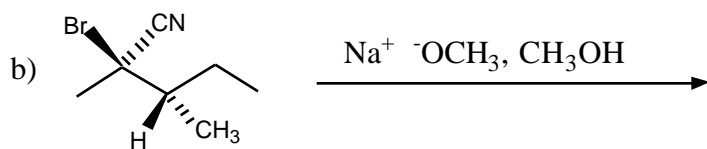
This is a closed-book "open model" exam.  
You may use models, but no notes  
or books. Please put all your answers  
on the test. Use the backs of the pages  
for scratch.

1) (15 pts) For each of the following pairs of compounds, circle the stronger acid in solution.



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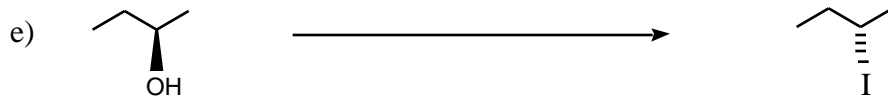
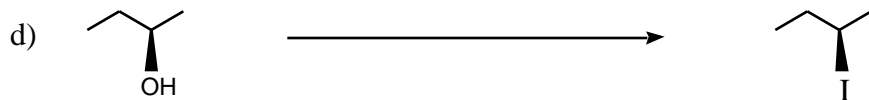
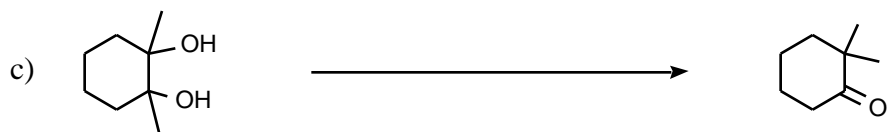
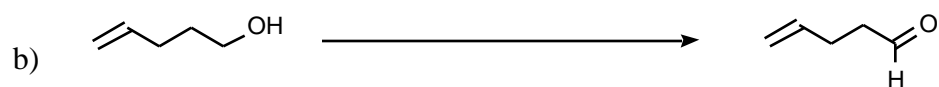
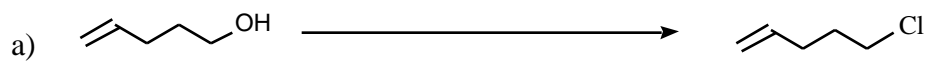
2) (25 pts) Give the single major organic product of each of the following reactions. Show the stereochemistry of the product if there is the possibility of stereoisomerism. If a racemate is formed, show only one of the enantiomers, and label it as racemic.



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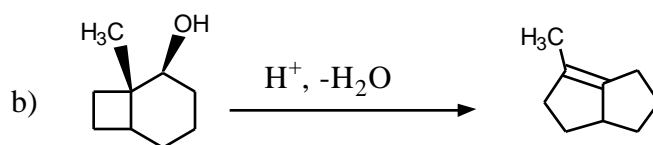
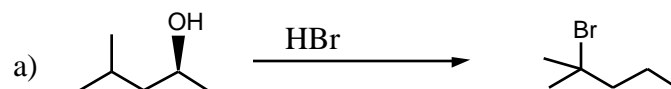
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3) (25 pts) Give reagents for accomplishing the following transformations. Try to make your synthesis efficient (i.e. the desired product should be the single major product if possible).



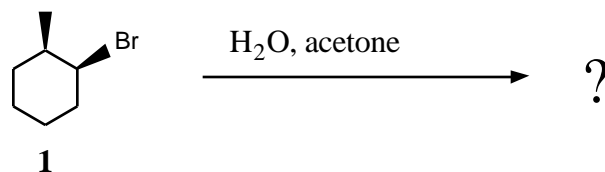
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4) (15 pts) Propose arrow-pushing mechanisms for each of the following reactions. Carefully show the structure of each intermediate in your mechanism, including lone pairs and formal charges.



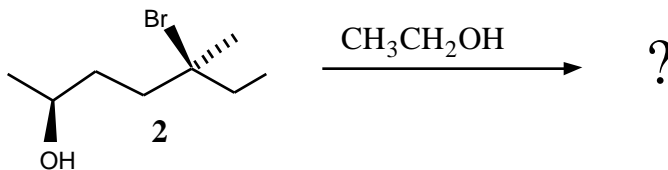
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5) (20 pts) a) Dissolving (1S, 2R) 1-bromo-2-methylcyclohexane (1) in aqueous acetone gives rise to two major products and some minor products. Propose structures for all of the products which could form, and label the two major products.



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Dissolving (2S, 4S)-5-bromo-5-methyl-2-heptanol (2) in ethanol causes a reaction that leads to the formation of two new products. At first, you might think that these products would contain an —OCH<sub>2</sub>CH<sub>3</sub> group. But, analysis of the products by spectroscopy shows that: 1) There is no —OCH<sub>2</sub>CH<sub>3</sub> group in either product (!); 2) There is no —OH group in either product (!!); 3) There is no double bond in either product (!\*#); and 4) The molecular formula of both products is C<sub>8</sub>H<sub>16</sub>O.



b) Propose structures for the two products.

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5) Continued.

c) Propose an arrow-pushing mechanism for formation of both products from 5b. Carefully show the structure of each intermediate in your mechanism, including lone pairs and formal charges.

d) Do you think that the two products are formed in equal amounts or unequal amounts? Why?