

Name: _____

CHEMISTRY 3311, Fall 1992

Professor Walba
Second Hour Exam
11/5/92

scores:

1)

2)

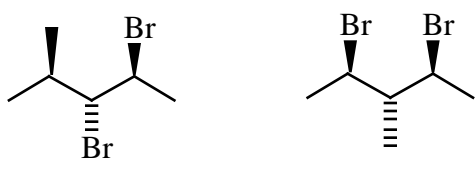
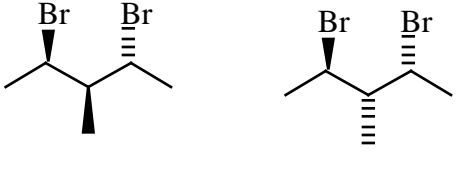
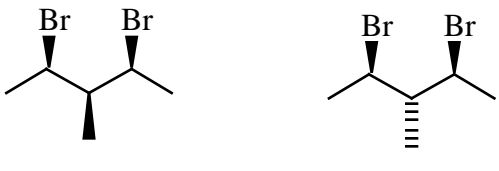
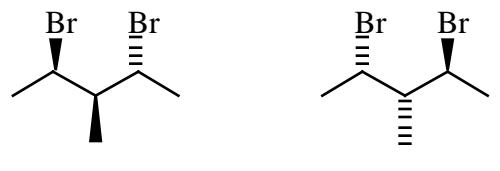
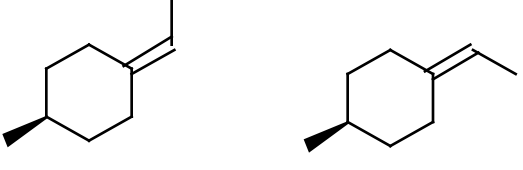
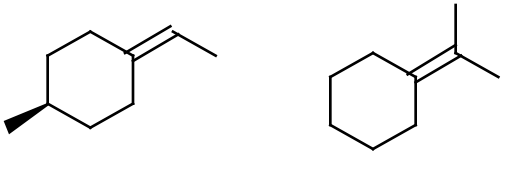
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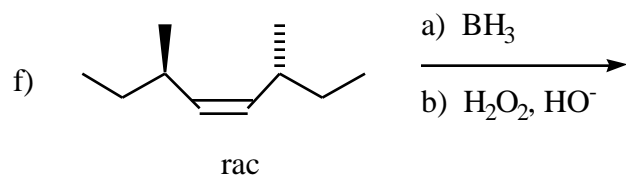
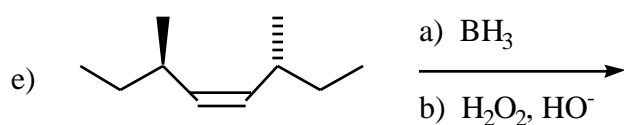
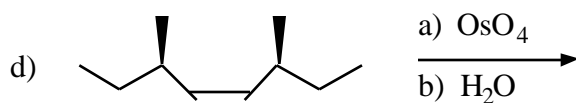
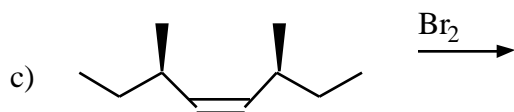
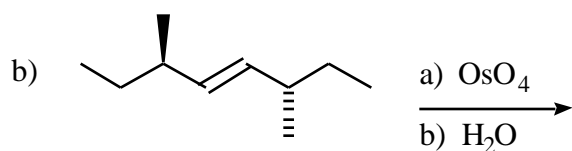
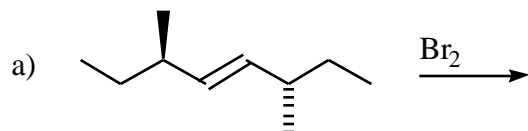
This is a closed-book "open model" exam. You may use models, but no notes or books. Please put all your answers on the test. Use the backs of the pages for scratch.

1) (18 pts) a) Label each of the following pairs of structures as homomers, enantiomers, diastereomers, or constitutional isomers, and indicate whether each compound is chiral or achiral.

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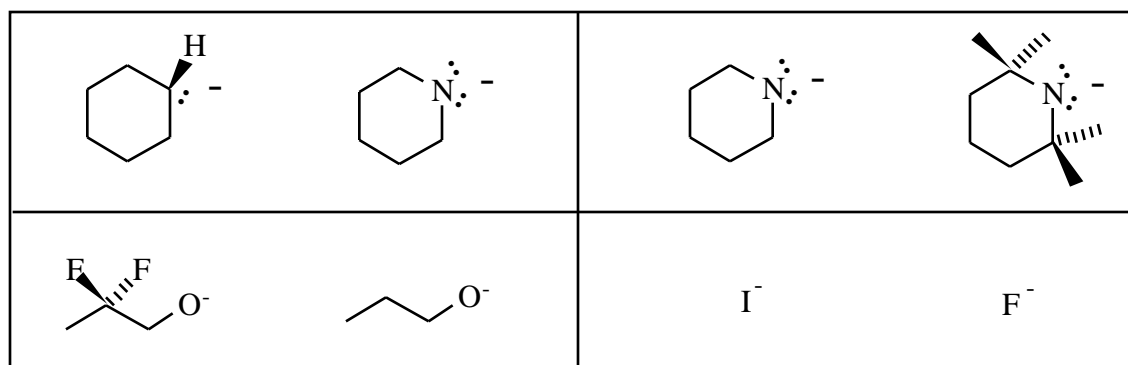
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2) (24 pts) Give the major organic product (or products if more than one major product will be formed) of each of the following reactions. Show the stereochemistry of each product if there is the possibility of stereoisomerism. Show each product only once. If a racemate is formed, show only one of the enantiomers, and label the structure racemic.

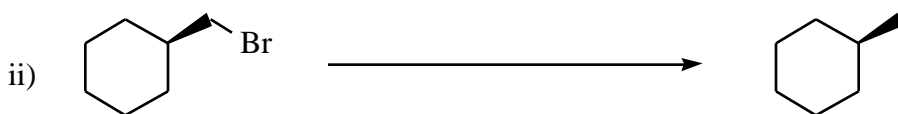


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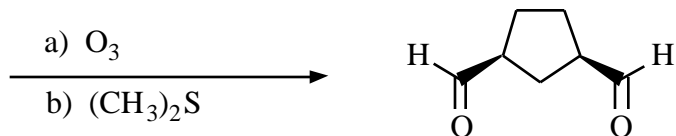
3) (20 pts) a) Circle the stronger base in solution for each of the following pairs of anions.



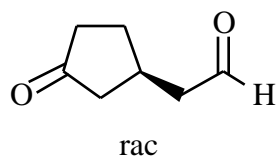
b) Give reagents for accomplishing the following transformations. Try to make your synthesis efficient (i.e. the desired product should be the single major product, with no starting material left). You can use any reagent you want.



c) Using ozonolysis (hint) propose a synthesis of the following dialdehyde starting with any starting material you want.

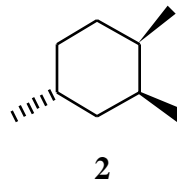
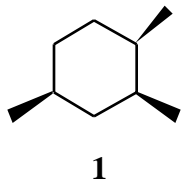


d) It's impossible to synthesize the following dicarbonyl product using ozonolysis. Why?



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4) (23 pts) a) Carefully draw the two chair conformations for both compounds 1 and 2. Give the number of gauche butane interactions and the number of 1,3-diaxial dimethyl interactions causing steric strain for each conformation, and circle the most stable conformation for each compound.



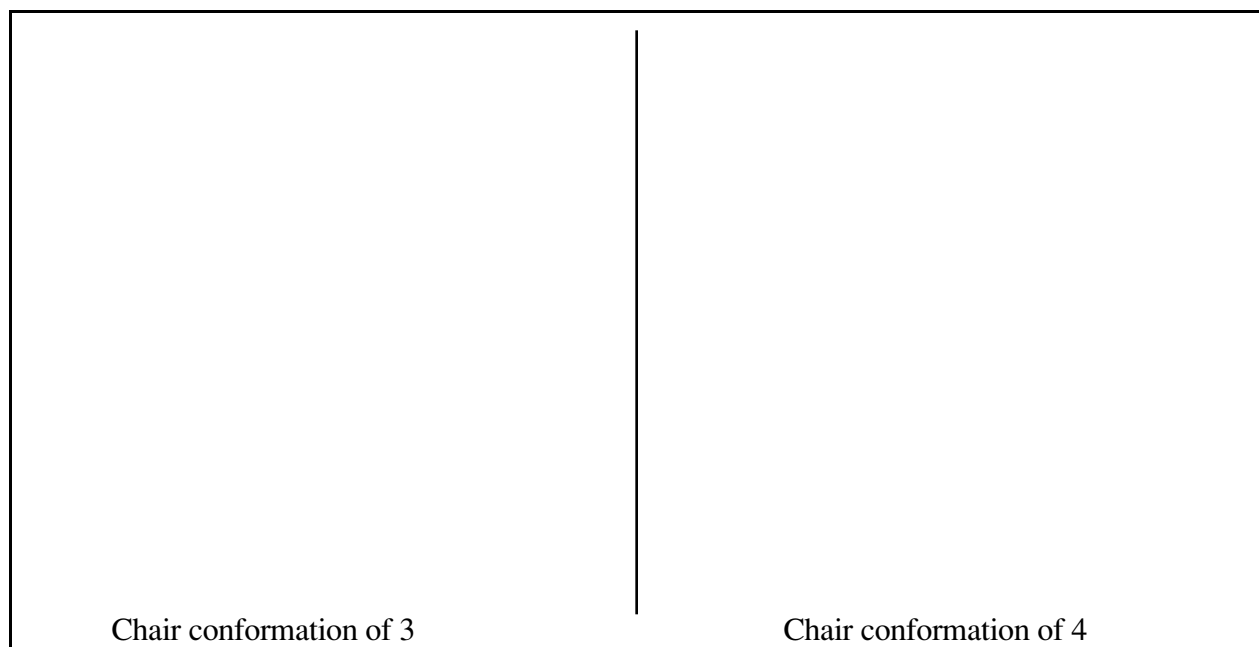
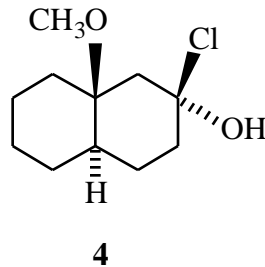
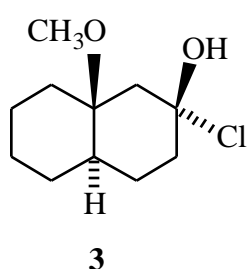
Two chairs for compound 1, number of gauche butane and 1,3-diaxial dimethyl interactions causing strain for each chair, most stable conformation circled

Two chairs for compound 2, number of gauche butane and 1,3-diaxial dimethyl interactions causing strain for each chair, most stable conformation circled

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4) -Continued-

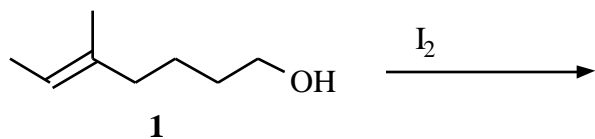
b) Draw a perspective chair conformation for each of the trans decaline derivatives 3 and 4 shown below (hint: you can only draw one for each isomer).



c) At first you might think that both of these isomers would have about the same heat of combustion. But, in fact isomer 3 has a considerably lower heat of combustion than isomer 4, even though Cl is about the same size as OH ! Propose a brief explanation for this observation.

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5) (15 pts) Treatment of compound 1 with iodine gives a single major racemic product with only one I atom in it! The molecular formula of the product is $C_8H_{15}OI$.



Propose a structure for the product showing stereochemistry and propose an arrow pushing mechanism for its formation.