

**Chemistry 2301**  
**Professor Steven Kass**  
**Test 3**  
**November 13, 2006**

Answers

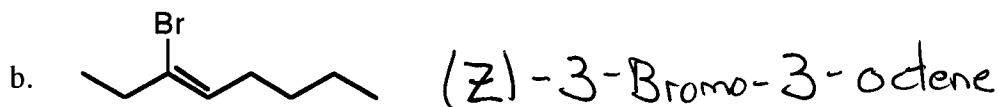
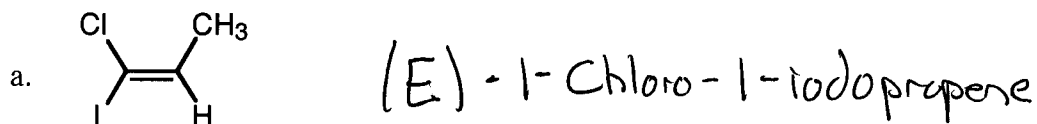
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**(Please Print Your Name)**

**This exam consists of 10 pages (1-10) including this one. Please  
make sure that you have all 10 pages before you get started.**

You have fifty minutes to answer all of the following questions. Note the point values (110 total), be sure to budget your time, and **write all your answers below in ink**. Good luck!

1 (20 Points). Supply the systematic (IUPAC) name or the missing structure for the following compounds.

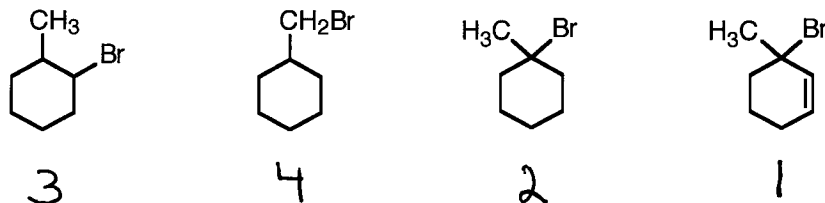


d. (3Z, 6E)-1,3,6-Octatriene

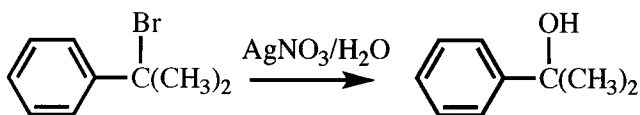
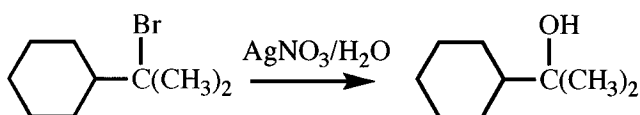


2 (15 Points). Consider nucleophilic substitution and elimination reactions and answer the following questions.

a. Rank the compounds given below from 1 (most reactive) to 4 (least reactive) in terms of their reactivity in  $S_N1$  reactions.

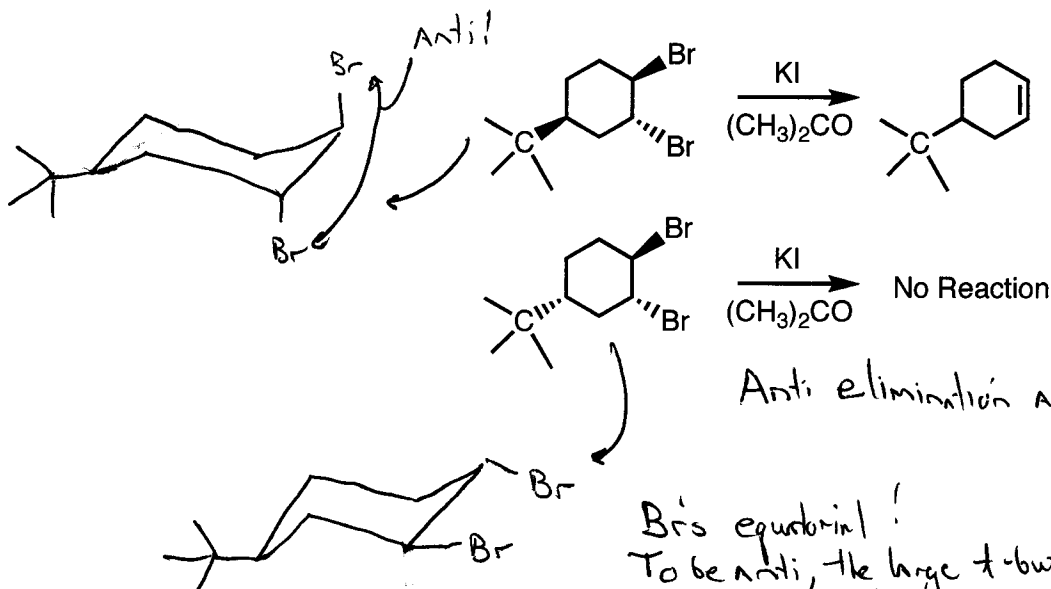


b. Indicate which of the following two reactions takes place more rapidly and briefly (5 words or less) but clearly provide a reason for the difference.



faster, more stable cation intermediate (resonance)

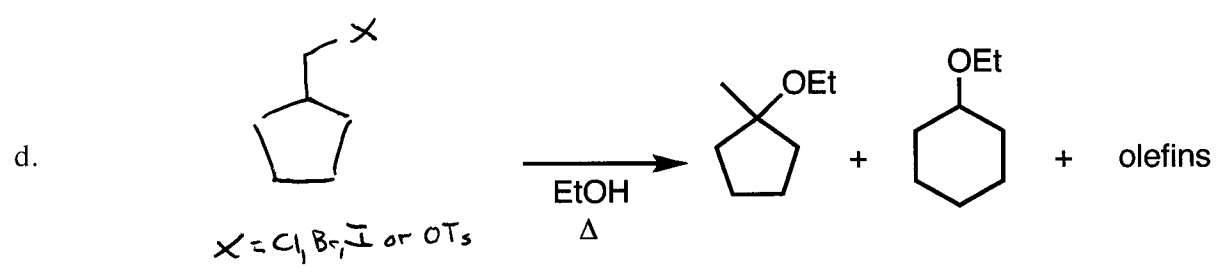
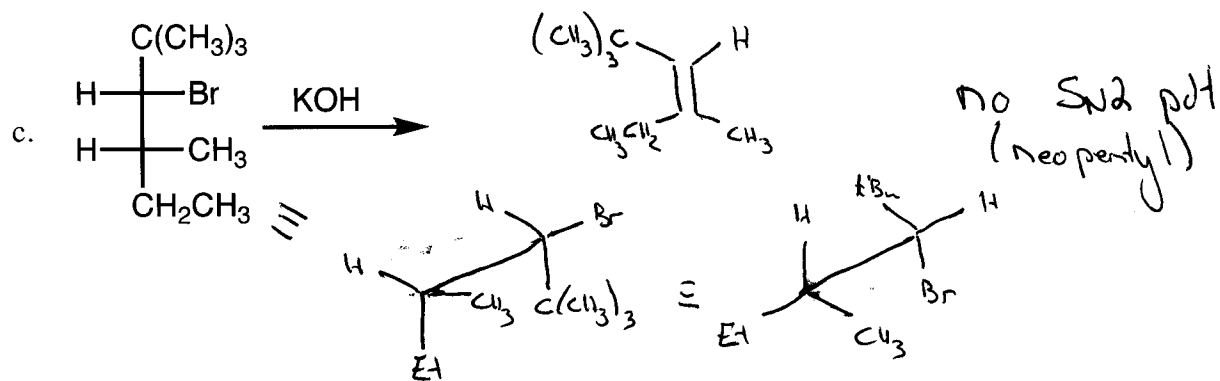
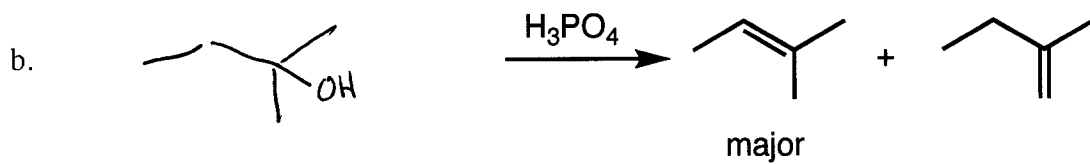
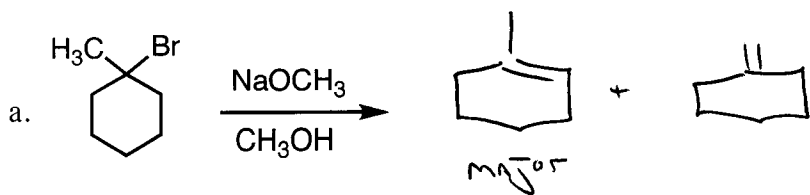
c. Account for the difference in behavior of the two dibromides shown below.

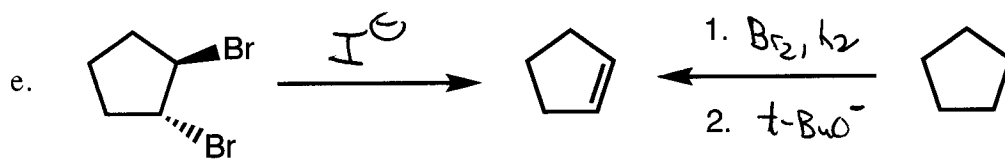


Anti elimination and periplanar arrangement required.

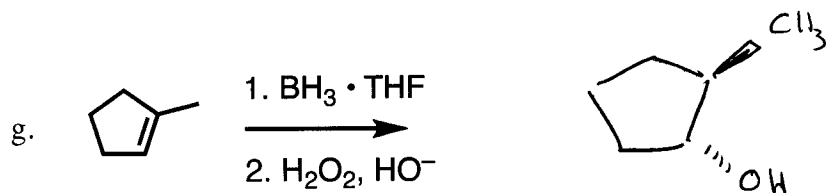
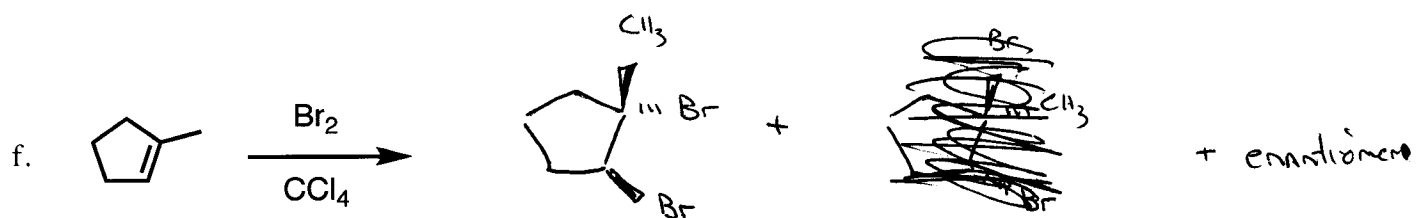
Brs equatorial!  
To be anti, the large *t*-butyl group would need to be axial & which is unfavorable.

3 (35 Points). Provide the missing information (reactant(s), product(s) or reagent(s)) for the reactions shown below.

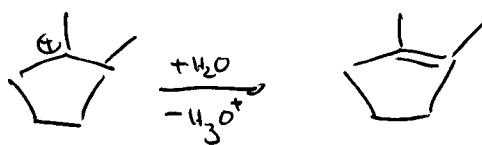
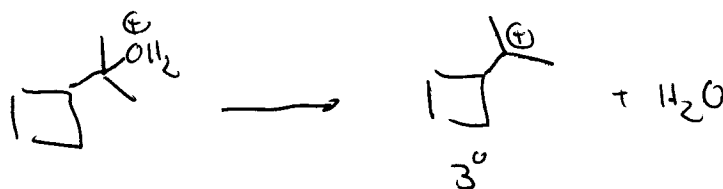
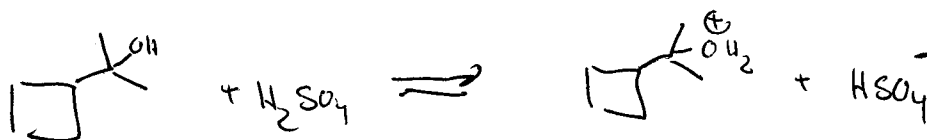
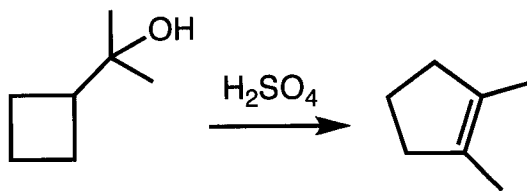




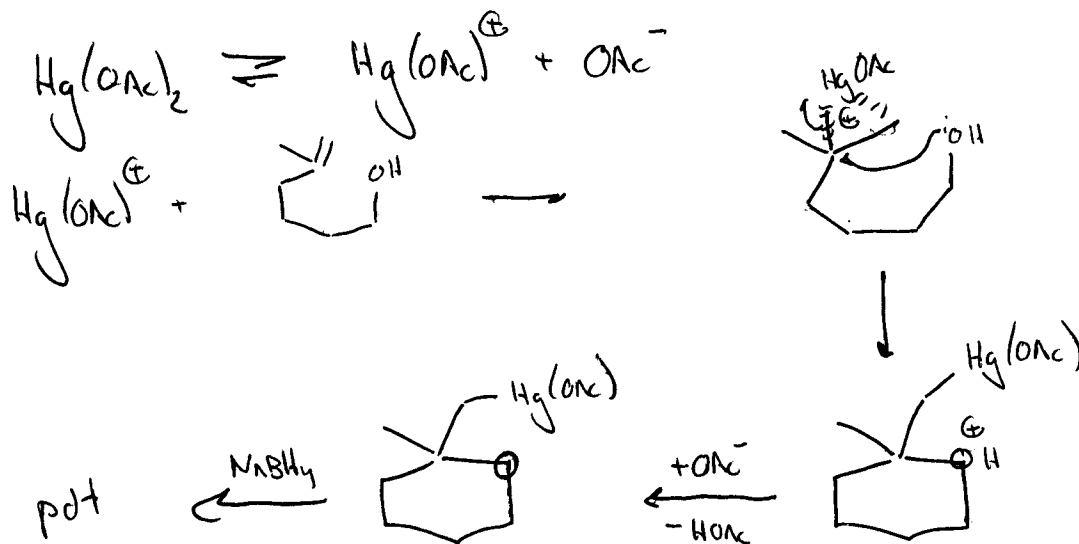
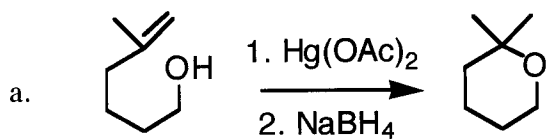
(reagents are needed for both transformations)



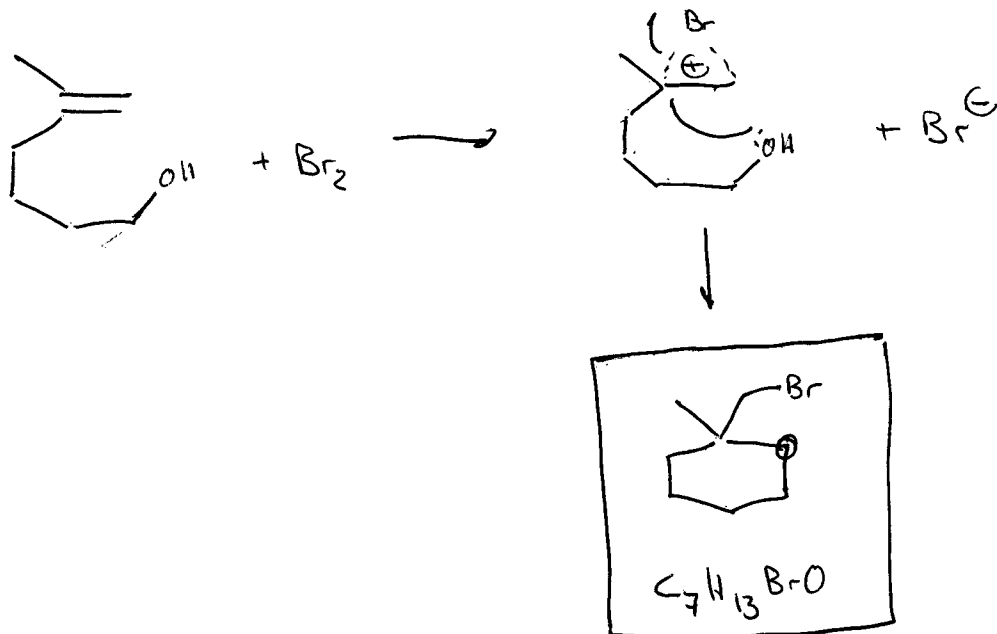
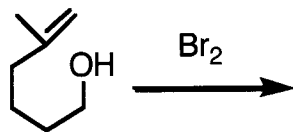
4 (10 Points). Provide a mechanism showing the detailed step by step process by which the reactant is converted to the product for the following reaction.



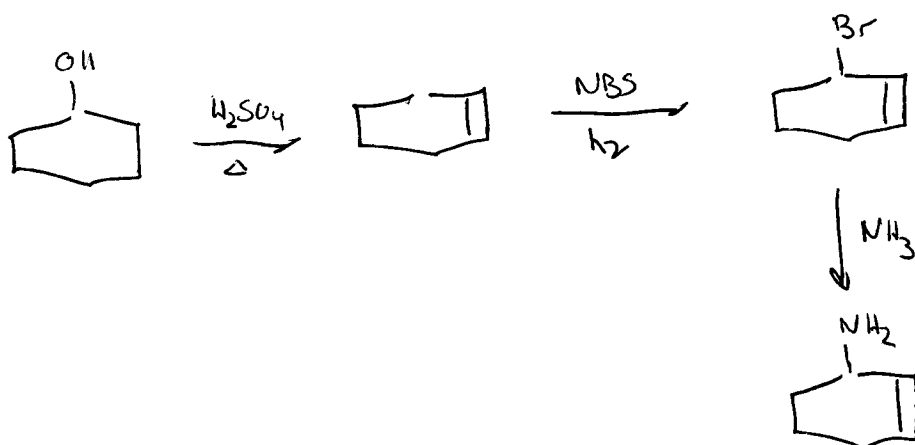
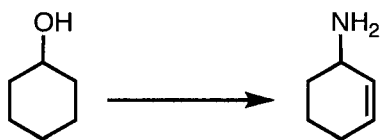
5 (20 Points). Provide a detailed step by step mechanism for the first step of the following two step transformation.



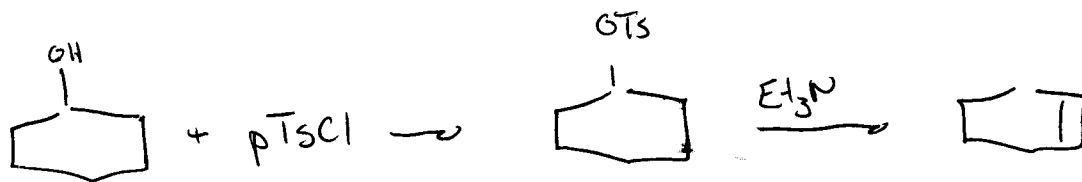
b. Given the observation above, predict the product of the following reaction. Hint - the molecular formula of the product is  $C_7H_{13}BrO$ .



6 (10 Points). Show how to carry out the indicated transformation via a sequence of reactions using any reagents you need (i.e. synthesize the product from the starting material by a series of reasonable chemical reactions).



or



(longer, not as good)