

**Organic Chemistry I (CHM201 C)**  
**The Second In-Class Examination**

October 31<sup>st</sup>, 2008

Name (please print): Answer Key  
last first initial

Signature: \_\_\_\_\_

Cane ID #: \_\_\_\_\_

The exam will begin at **10:10 AM** and end at **11:00 AM**.

**Directions:**

- (1) Please do not start the test till 10:10 AM. Instead, please start bubbling in the scantron for **your name, student ID number, and the consent bubble** if you want your grade posted by your I.D. number.
- (2) Please record your answers on the scantron accordingly to the instruction given on it. It is strongly recommended that the answers be worked out on scratch papers attached at the end of this examination and then transferred to the scantron.
- (3) Periodic Table and Schematic Energy Diagram are provided at the end of this examination.

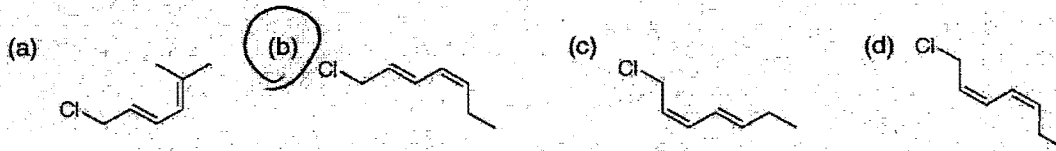
## Questions

1. (4 points). Please choose the correct systematic name (IUPAC) for:

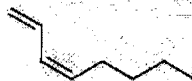


- (a) 1,2-dimethyl-4-cyclohexene (b) 4,5-dimethylcyclohexene  
(c) 1,6-dimethyl-3-cyclohexene (d) 3,4-dimethyl-2-cyclohexene

2. (4 points). Please choose the correct skeletal structure for (2E,4Z)-1-chloro-2,4-heptadiene.

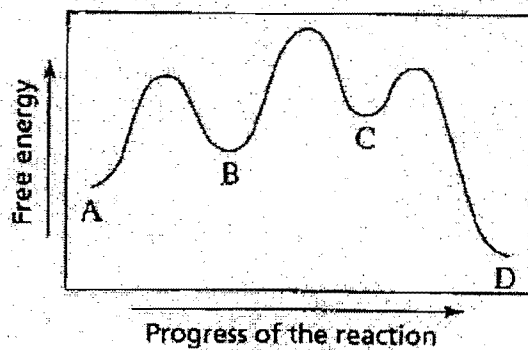


3. (4 points). How many vinylic hydrogen and allylic hydrogen does the hydrocarbon below has?



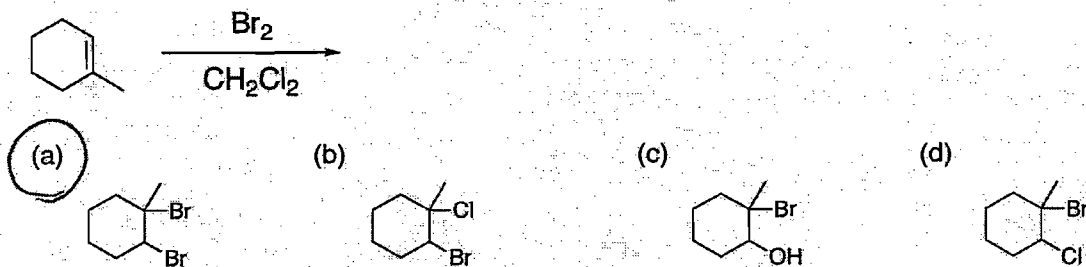
- (a) 2 vinylic and 5 allylic hydrogens (b) 3 vinylic and 4 allylic hydrogens  
(c) 4 vinylic and 3 allylic hydrogens (d) 5 vinylic and 2 allylic hydrogens

4. (4 points). Given the following reaction coordinate diagram for the reaction of A to give D, what is the reactant of the rate-determining step?

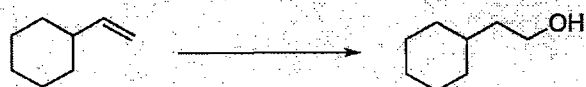


- (a) A (b) B (c) C (d) D

5. (4 points). What is the major product of the following reaction?

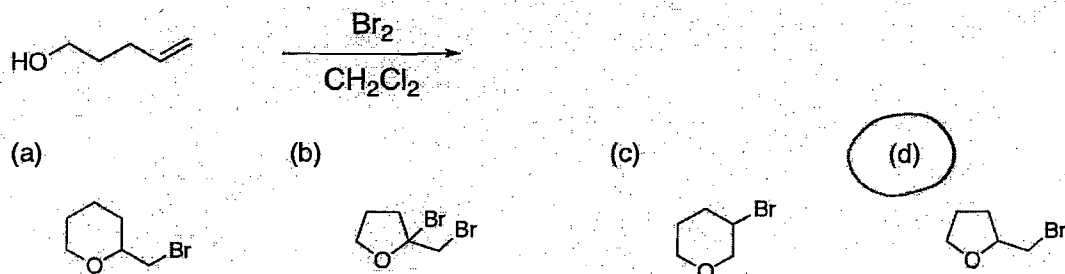


6. (4 points). What reagents are required to synthesize the following alcohol?

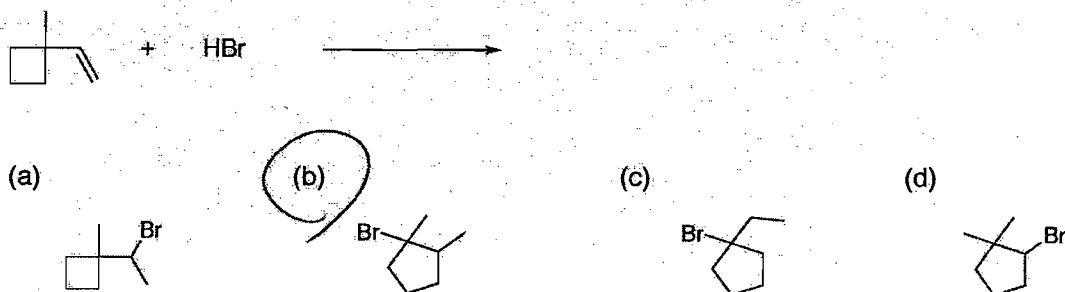


- (a)  $\text{H}_2\text{SO}_4, \text{H}_2\text{O}$     (b) 1.  $\text{Hg}(\text{OAc})_2, \text{H}_2\text{O}/\text{THF}$ , 2.  $\text{NaBH}_4$     (c)  $\text{BH}_3/\text{THF}$ ,  
2.  $\text{H}_2\text{O}_2, \text{HO}^-, \text{H}_2\text{O}$     (d)  $\text{HBr}, \text{H}_2\text{O}$

7. (4 points). What is the major product of the following reaction?



8. (4 points). What is the major product of the following reaction?



9. (4 points). How many stereoisomers are possible for 1,2-dichlorocyclohexane?

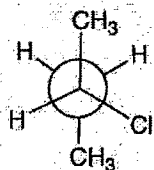
- (a) 1    (b) 2    (c) 3    (d) 4

10. (4 points). Indicate whether the following pair of compounds is identical or enantiomers, or diastereomers, or constitutional isomers.



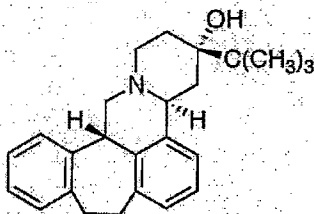
- (a) identical    (b) enantiomers    (c) diastereomers    (d) constitutional isomers.

11. (4 points). Is the following structure (*R*)-2-chlorobutane or (*S*)-2-chlorobutane?



- (a) (*R*)-2-chlorobutane    (b) (*S*)-2-chlorobutane

12. (4 points). How many asymmetric centers does the following molecule have?



- (a) 1    (b) 2    (c) 3    (d) 4

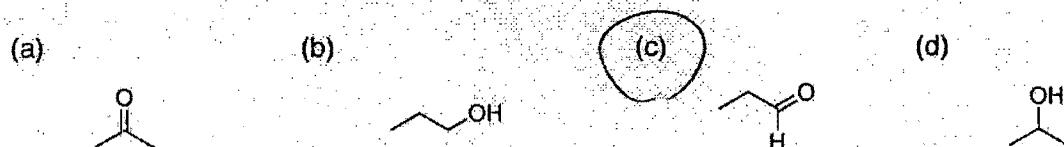
13. (4 points). What will be the major product of the reaction of 1 mol of propyne with HBr (2 mol).

- (a)     (b)     (c)     (d) 

14. (4 points). What will be the major product of the reaction of 1 mol of propyne with  $\text{Br}_2$  (1 mol)/ $\text{CH}_2\text{Cl}_2$ ?



15. (4 points). What will be the major product of the reaction of 1 mol of propyne with disiamylborane followed by  $\text{H}_2\text{O}_2/\text{HO}^-$ ?



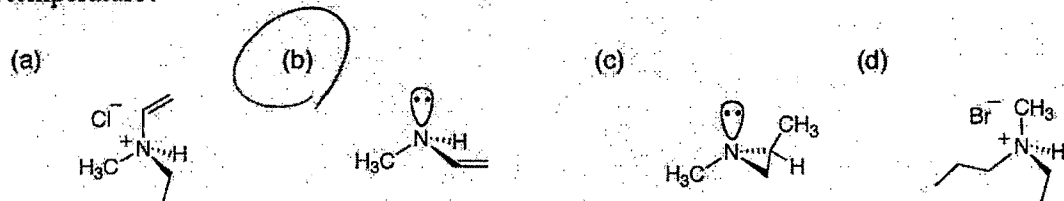
16. (8 points). Which of the following determines the product distribution (relative quantities of reactant and product) for a thermodynamically controlled reaction?

- (a)  $\Delta G^\circ$  (b)  $\Delta H^\circ$  (c)  $\Delta G^\ddagger$  (d)  $\Delta H^\ddagger$

17. (8 points). According to Hammond postulate, the transition state structure of an endergonic reaction more closely resembles the structure of:

- (a) reactant than product (b) product than reactant (c) halfway between reactant and product

18. (8 points). Which of the following compounds is optically inactive at ambient temperature?



19. (8 points). How many stereoisomers does the reaction of *cis*-2-butene with a peroxyacid provide?

- (a) 1 (b) 2 (c) 3 (d) 4

20. (8 points). Which step (A, B or C) in the reaction below is rate determining?

