

Chemistry 333

Examination #1

September 27, 2004

Professor Charonnat

Name: _____

Be certain that your examination has six (6) pages including this one.

Put your name on **each** page of this examination booklet.

By putting your name on this examination booklet you agree to abide by California State University, Northridge policies of academic honesty and integrity.

Molecular models are allowed for this examination. Calculators are unnecessary and are not allowed.

Name: _____

1. (25 points)

Circle the number that corresponds to the correct answer for each of the following five (5) questions.

A. Sodium iodide contains

1. a nonpolar covalent bond
2. a polar covalent bond
3. an ionic bond

B. An orbital typically is drawn with its

1. 50% probability volume shown
2. 95% probability volume shown
3. 100% probability volume shown

C. When two atomic orbitals overlap to form molecular orbitals,

1. two bonding molecular orbitals are formed
2. a bonding and an antibonding molecular orbital are formed
3. two antibonding molecular orbitals are formed

D. A highly endothermic reaction has

1. an early transition state
2. a late transition state
3. neither

E. According to the VSEPR rules, a species with three hybrid orbitals is

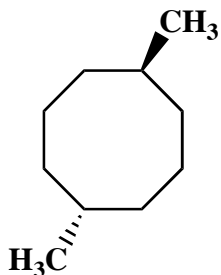
1. linear
2. trigonal
3. tetrahedral

Name: _____

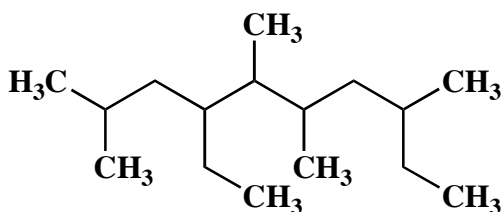
2. (20 points)

Use IUPAC nomenclature to write the systematic name for both of the following two (2) compounds.

A.



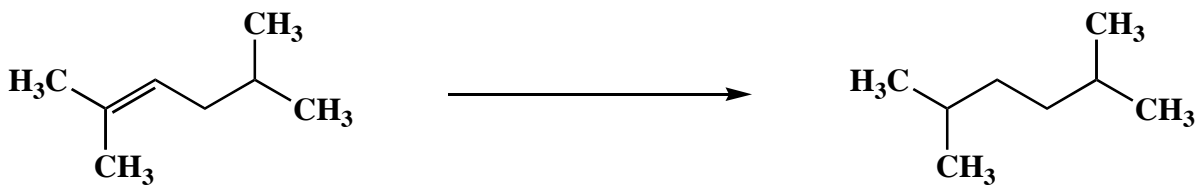
B.



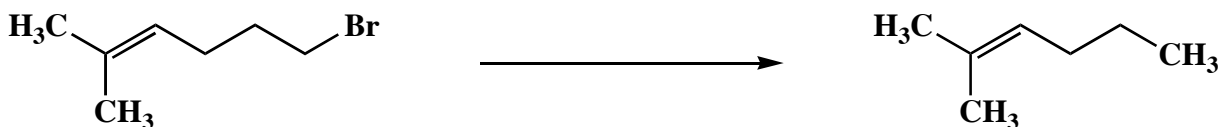
3. (10 points)

Write the specific reagent(s) necessary to effect the following two (2) transformations. If more than one reaction is involved in an answer, be certain to distinguish the individual steps clearly.

A.



B.



Name: _____

4. (20 points)

Draw a specific example for each of the following ten (10) categories.

A. a conformation of an acyclic alkane with torsional strain:

B. a conformation of an acyclic alkane with no torsional strain:

C. a tertiary radical:

D. a Lewis acid:

E. a Lowry-Brønsted base:

F. a bond homolysis:

G. a bond heterolysis:

H. two compounds that are not structural isomers:

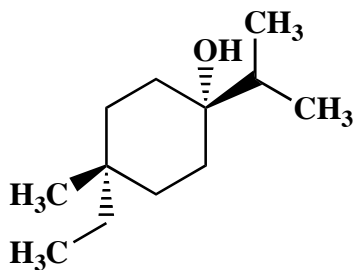
I. two compounds that are structural isomers:

J. a propagation step in the free-radical bromination of propane:

Name: _____

5. (25 points)

Draw the two possible chair conformations of the following cyclohexanol derivative. Clearly denote all 1,3-diaxial interactions for both conformations. Calculate the total strain energy for each conformation. Put a star next to the more stable conformation. Finally, determine the ratio of the two conformations at 298 K. (See tables on page 6.)



Congratulations!

1	/25
2	/20
3	/10
4	/20
5	/25
Total:	/100