

Chemistry 333

Examination #1

September 30, 2009

Professor Charonnat

Name: _____

Be certain that your examination has five (5) 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.

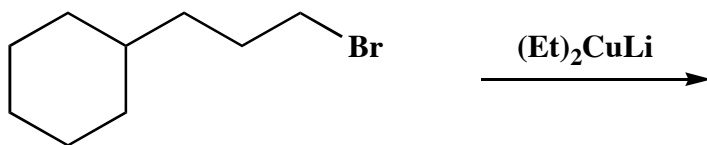
Molecular models are allowed for this examination. All electronic devices, including calculators, are unnecessary and are not allowed.

Name: _____

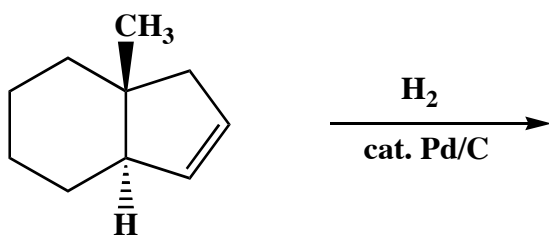
1. (10 points)

Draw the major organic product for each of the following two (2) reactions.

A.



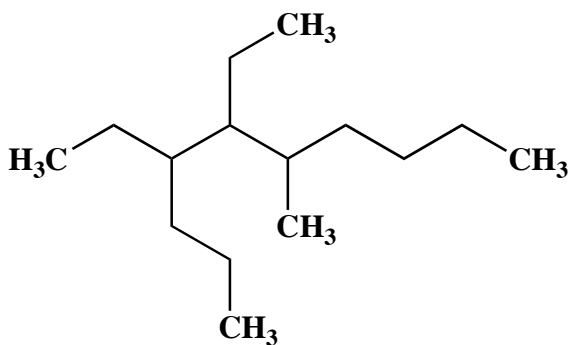
B.



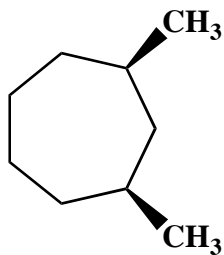
2. (10 points)

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

A.



B.



Name: _____

3. (30 points)

Circle the number that corresponds to the correct answer for each of the following six (6) questions.

A. In photochemical monobromination of propane, there are two alternative transition states.

1. Both transition states are early.
2. Both transition states are late.
3. One transition state is early, and the other one is late.

B. Which of the following species is stable?

1. a primary alkyl radical
2. a tertiary alkyl radical
3. neither

C. Which reactions are entropically disfavored?

1. additions
2. eliminations
3. substitutions

D. Which of the following 1,3-diaxial interactions has the highest value?

1. *t*-butyl/methyl
2. *t*-butyl/hydrogen
3. ethyl/hydrogen

E. Which of the following pairs of orbitals are degenerate?

1. 1s and 2s
2. 2p_x and 2p_y
3. 2s and 2p_x

F. Which of the following compounds has the largest molecular dipole moment?

1. CCl₄
2. H₃CCl
3. H₃CF

Name: _____

4. (20 points)

Answer the following two (2) questions precisely, succinctly, and with correct grammar.

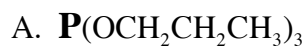
A. Which of the following compounds is the strongest acid? Draw structures to explain your reasoning clearly.



B. What is the primary utility of the Hammond postulate?

5. (10 points)

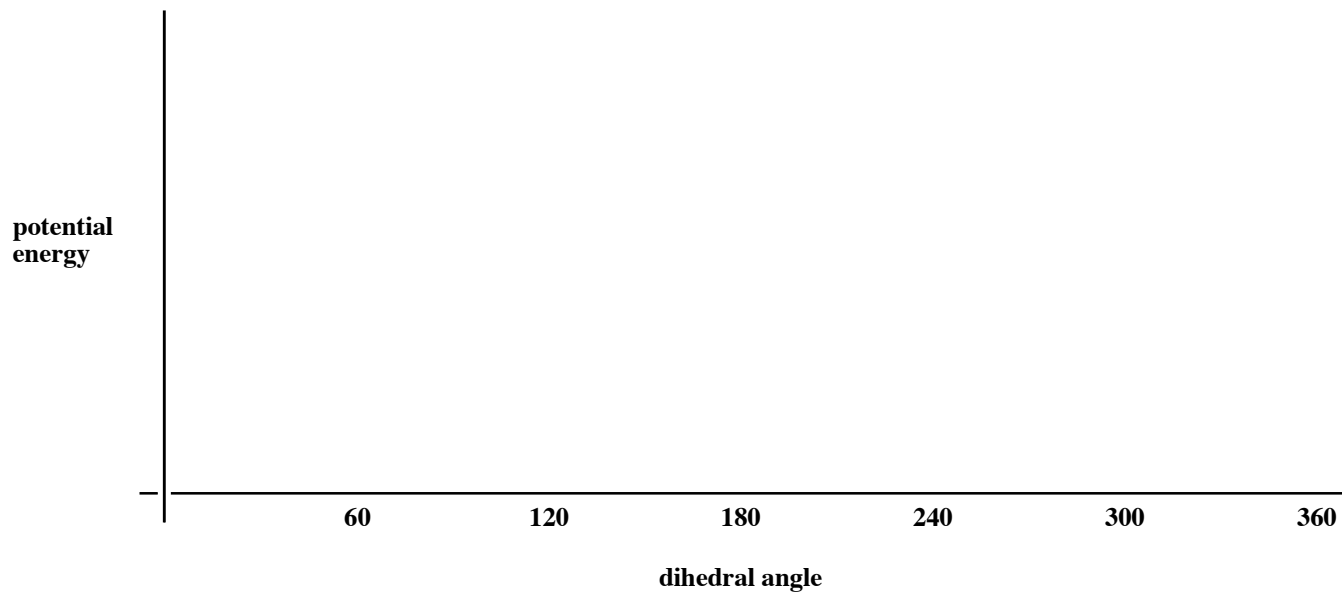
Identify the hybridization of the bold atom for each of the following two (2) compounds. Explain your reasoning clearly.



Name: _____

6. (20 points)

Draw an annotated graph of potential energy versus dihedral angle for rotation about the C2-C3 bond of 2-methylhexane. Include Newman projections for each staggered and eclipsed conformation. For the purposes of this question, consider values for methyl/*n*-alkyl strain (both torsional and steric) to be essentially identical to methyl/methyl strain.



Congratulations!

1	/10
2	/10
3	/30
4	/20
5	/10
6	/20
Total:	<hr/>
	/100