

Chem 341 • Organic Chemistry I

Midterm Exam I • September 21, 2007

NAME _____ **KEY**



Please read through each question carefully and answer in the spaces provided.

A good strategy is to go through the test and answer all the questions you can do easily. Then go back and tackle the more difficult problems.

Please make sure your structures are drawn clearly and indicate any necessary stereochemistry with bold or dashed bonds.

Finally, think about what you know. Common sense and reason can often help you out.

You may use the back of the

pages for scratch paper.

Problem 1 10 pts _____

Problem 6 15 pts _____

Problem 2 12 pts _____

Problem 7 15 pts _____

Problem 3 12 pts _____

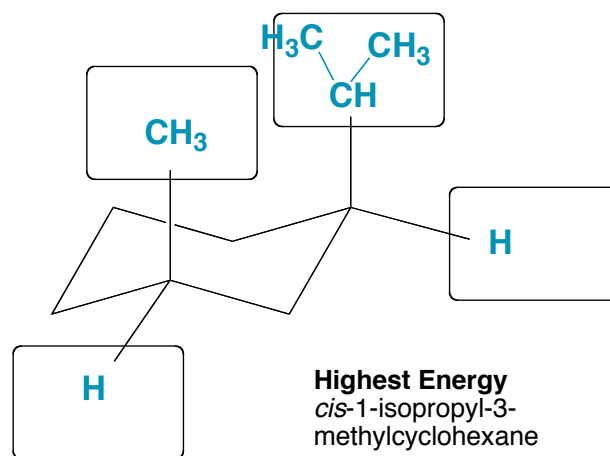
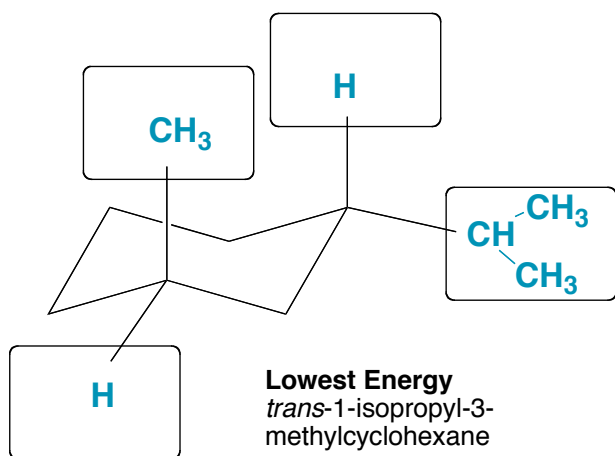
Problem 8 4 pts _____

Problem 4 12 pts _____

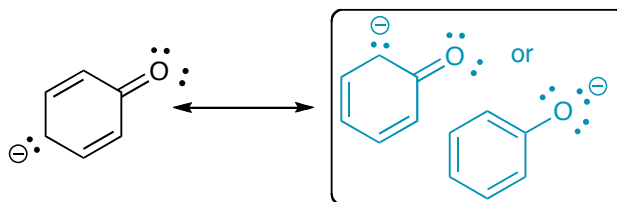
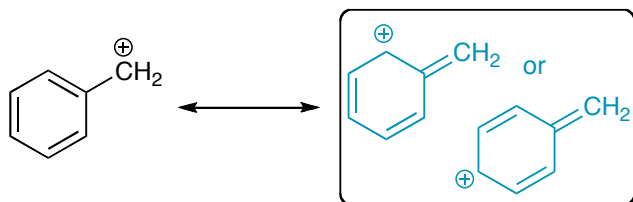
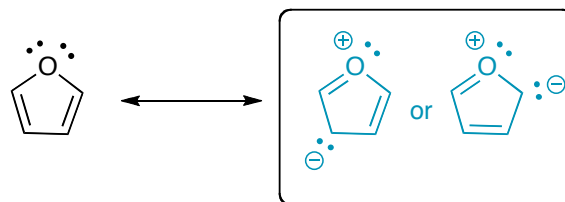
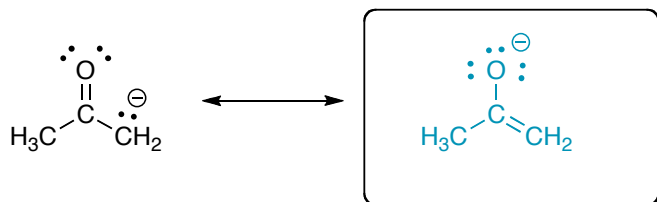
Problem 5 20 pts _____

TOTAL 100 pts _____

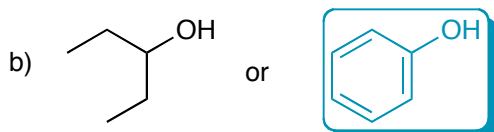
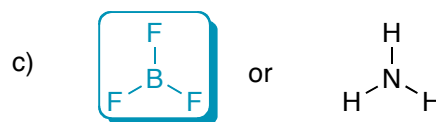
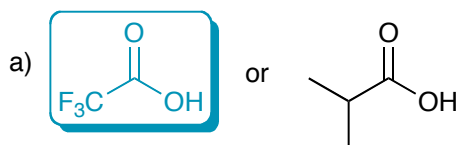
1. In the boxes below place the correct substituents or hydrogens to show the lowest energy conformation of *trans*-1-isopropyl-3-methylcyclohexane (left) and the highest energy conformation for *cis*-1-isopropyl-3-methylcyclohexane (10 pts).



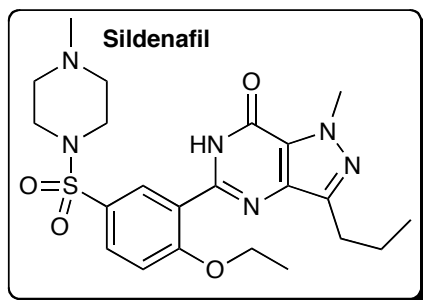
2. For each of the following molecules, draw another correct resonance form (12 pts).



3. For each pair of molecules, circle the one that is the strongest acid (12 pts).



4. The structure of sildenafil is shown below. You've seen this compound appear in your email I'm sure. This is a drug sold under the name of Viagra. Please answer the following questions about this structure (12 pts).



a) How many sp^3 -hybridized **CARBONS** are present?

11

b) How many pi bonds are present?

9

c) How many sp^3 -hybridized **OXYGENS** are present?

1

d) How many sp^2 -hybridized **CARBONS** are present?

11

e) How many sp -hybridized **CARBONS** are present?

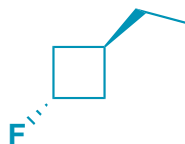
0

f) How many lone pairs are present in the molecule? (note: there are none on sulfur)

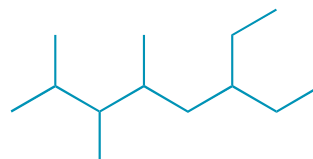
14

5. Draw the structure for the following molecules (20 pts).

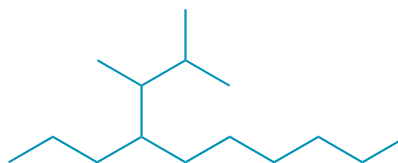
a) *trans*-1-ethyl-3-fluorocyclobutane



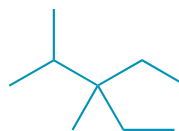
b) 6-ethyl-2,3,4-trimethyloctane



c) 4-(1,2-dimethylpropyl)decane



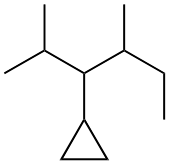
d) 1-bromo-3-ethyl-2,3-dimethylpentane

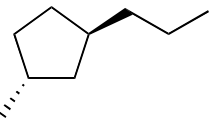


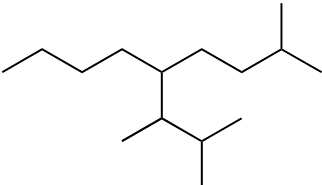
3) *cis*-1,4-dichlorocycloheptane



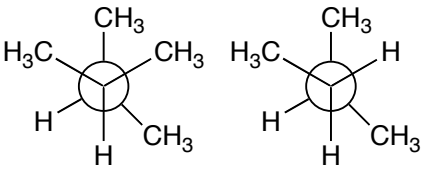
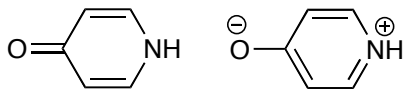
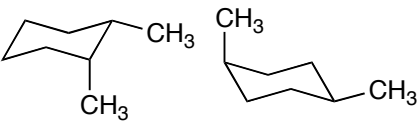
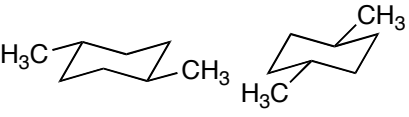
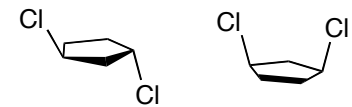
6. Provide the correct IUPAC name for the following compounds (15 pts).

a)  **3-cyclopropyl-2,4-dimethylhexane**

b)  **trans-1-methyl-3-propylcyclopentane**

c)  **2-methyl-5-(1,2-dimethylpropyl)nonane**

7/ Identify the relationship between the following pairs of molecules as Identical, Resonance Forms, Constitutional Isomers, Stereoisomers, Conformers or completely Different compounds (check the appropriate box) (15 pts).

	identical	resonance forms	constitutional isomers	stereo-isomers	conformers	completely different
a) 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) 	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. In the boxes below, indicate whether the carbon is primary (1°), secondary (2°), tertiary (3°) or quaternary (4°) (4 pts).

