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UC San Diego
Chemistry 140A
Professor J.K. Whitesell
Fall 2006
MWF 8:00-8:50

Lecturer: Prof. James K. Whitesell Email: jkw@ucsd.edu
Office: Pacific Hall 6100E Phone: (858) 534-5870
Office hours: MWF 9:00-10:00 M 10:00-11:00 T 11:30-12:30 TH 9:30-11:30

Required Text:
Vollhardt & Schore, "Organic Chemistry," 4th ed. (2003) or 5th Ed. 2006 and "Study Guide and Solutions Manual" that corresponds to you textbook edition. A set of molecular models, which can be shared, is also recommended. The cheapest ball-and-stick models are preferable to the more expensive space-filling ones. Use of textbook or models during exams is cheating.

Adds, Drops, and Waitlists:
All registration matters are taken care of electronically at:
https://tritonlink.ucsd.edu/

Web Site:
During this course, you will have access to a variety of materials (including this syllabus) on the course website:
http://chem-courses.ucsd.edu/CoursePages/UpperDiv/140A_Whitesell/

There is also a class forum where you may post questions or comments for others to see:
http://chem-courses.ucsd.edu/Ceilidh/UpperDiv/140A_Whitesell/

Study Teams:
It is strongly recommended that you form small study groups and that you meet often to work thru exercises in the textbook and to discuss the more difficult topics covered in lecture.

Homework:
There will be weekly homework assignments taken from problems in the textbook as well as some that arise during lecture. They will not be turned in or graded.

Exams:
Two examinations will be given in class during the course of the quarter on the following Mondays: October 16 and November 13. The exams will be available starting at 7:30 am if you would like some extra time. Each exam will represent 25% of the course grade.

Final Exam:
The final exam, accounting for 50% of the course grade, will be comprehensive in its coverage of the material presented in Chemistry 140A. It will be held on Friday, December 8 from 8:00 to 11:00 am.

Important Dates:
Sep. 21 Instruction Begins.
Oct. 06 Last day to ADD a course.
Oct. 20 Last day to DROP without a W. Last day to CHANGE GRADING OPTION.
Nov. 27 Last day to DROP without an F.
Dec. 01 Last day of instruction.
Dec. 11 Last day to file for Incomplete.

1
Structure and Bonding in Organic Molecules

Important Concepts

1-2 Coulomb Forces

Unlike charges attract
Like charges repel
Charges represented as + and – *with* circles, e.g. Å
Attraction/repulsion varies with 1/r2
Attraction > repulsion *until* valence shell is filled
Atoms share electrons until valence shell is filled
In molecules, shared electrons represented as dots *between* atoms

1-3 Ionic and Covalent Bonds 1-4 Lewis Structures

Electronegativity is a measure of electron attraction
Electronegativity increases to the right in the periodic table
Polarized bonds between unlike atoms
Ionic bonds between atoms on opposite sides of table
Form molecules by adding atoms with lower valence to higher valence atoms
Molecular *shape* can be predicted by electron repulsion (VSEPR)
Some molecules (such as BH3) have atoms that do not have a filled valence shell

1-5 Resonance Forms

SKIP

1-6 Atomic Orbitals

Electrons in atoms and molecules are quantized and have specific energies

Atomic orbitals are mathematical descriptions of electron density about an atom

The atomic orbitals (in order of increasing energy) are:

- 1s; 2s; 2px 2py 2pz; 3s; 3px 3py 3pz; five 3d
- The 1s orbital has no nodes
- The 2s orbital has an internal spherical node
- The 2p orbitals have nodal planes (orthogonal to each other)

1-7 Molecular Orbitals

1-8 Hybrid Orbitals

1-9 Structures and Formulas of Organic Molecules

Structure and Reactivity: Acids and Bases, Polar and Nonpolar Molecules

2-1 Kinetics and Thermodynamics of Simple Chemical Processes

Reactions controlled by $\Delta G = \Delta H - T\Delta S$

Organic reactions not affected dramatically by ΔS

Equilibrium positioned controlled by ΔG

2-2 Acids and Bases; Electrophiles and Nucleophiles

pK_a is a measure of acidity and equilibrium in acid-base reactions

2-3 Functional Groups: Centers of Reactivity

Functional groups are collections of atoms that undergo characteristic reactions. Examples:

2-4 Straight-Chain and Branched Alkanes

Carbons can be connected in a straight chain where there are only methyl groups (primary, at the ends) and methylene (secondary) groups in the middle

Carbon chains can be branched where some carbon atoms have 3 (tertiary, methyne) and 4 other carbons

2-5 Naming the Alkanes

Nomenclature rules are straight forward and will be covered only when needed in lecture. Students should learn how to draw a structure from a name.

2-6 Structural and Physical Properties of Alkanes

Physical properties of organic compounds are controlled by structure which impacts intermolecular forces. As molecular weight increases, so does boiling point (in general) and as greater intermolecular attraction increases, so does boing point.

2-7 Rotation about Single Bonds: Conformations

Conformational isomers differ by rotation about sigma bonds

In ethane, the two extremes of rotation differ by 2.9 kcal/mol

2-8 Rotation in Substituted Ethanes

Energy difference between eclipsed and staggered conformations of propane is 3.2 kcal/mol and represents the activation energy for the rotational process.

Increase in energy due to rotation is called torsional energy or torsional strain.

For rotation about the central C–C bond of butane there are two unique staggered conformations differing in the relative position of the two methyl groups. The anti conformation has the methyl groups farthest apart and is 0.9 kcal/mol more stable than is the quache conformation where the methyl groups are close to each other.

The Big Picture

Chemistry 140A
Whitesell
Fall Quarter, 2006
First Midterm Exam, Monday October 16

_____ ____ _____
first name middle initial last name

_____
Student ID Number

Quest	Points	score
1	4	
2	4	
3	4	
4	4	
5	4	
6	4	
7	6	
8	9	
9	10	
10	16	
11	10	
12	11	
13	14	
total	100	

Your answers to this exam are to be *only* your own work. You may use no written information during this test period other than the five pages of this exam. You may not use the back of any pages for answers. Up to one week after your exam is returned you may submit it for regrading if and only if you have made **NO** marks on the exam except for a star (*) next to the number(s) of the question(s) you would like regraded.

_____
your signature **(read the above before signing)**

To request regrading, sign below and check the appropriate boxes.

_____
your signature

I would like the questions marked with a star (*) regraded (check box at right) ☐

If you feel that we have made an addition error in your score, check the box at the right ☐

1 2 3 4 5 6 7 8 9 0

1 2 3 4 5 6 7 8 9 0

1. The activation energy difference necessary to produce a rate difference of 100:1 is:

- ☐ 4.1 kcal/mole
- ☐ 13.5 kcal/mole
- ☐ 1.35 kcal/mole
- ☒ 2.7 kcal/mole

2. The pK_a of H_2O is:

- ☐ 7
- ☐ 60
- ☒ 15.6
- ☐ 14

3. Hybridization of a 2s and a single p orbital results in:

- ☐ 3 sp hybrid orbitals
- ☐ 3 sp^2 hybrid orbitals
- ☒ 2 sp hybrid orbitals
- ☐ 3 sp^3 hybrid orbitals

4. The electronegativity of C is:

- ☒ 2.5
- ☐ 3.0
- ☐ 3.5
- ☐ 4.0

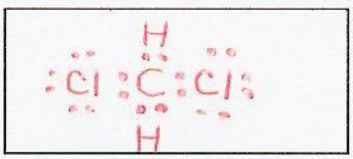
5. The pK_a of H_2O is:

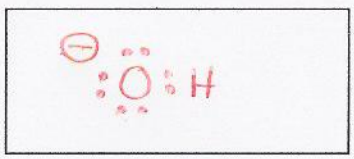
- ☐ 7
- ☐ 60
- ☒ 15.6
- ☐ 14

6. In 2-methylheptane, all of the carbon atoms have hybridization of:

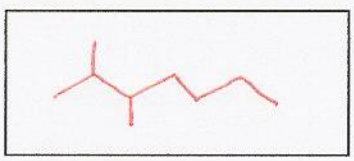
- ☐ sp
- ☒ sp^3
- ☐ sp^2
- ☐ sp^4

7. Draw electron-dot pictures for CH_2Cl_2 and ^-OH including all lone pairs of electrons. Place your answers in the boxes below.

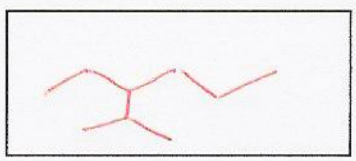




8. Using line notation, draw structures for the following compounds in the boxes provided.



2,3-dimethylheptane

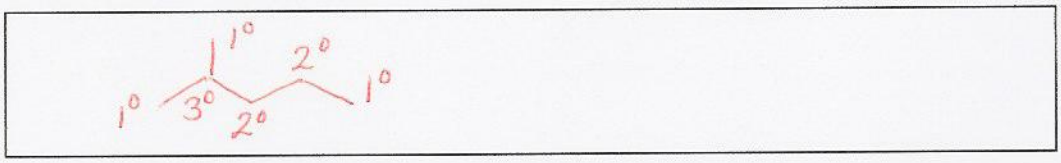


3-isopropylhexane

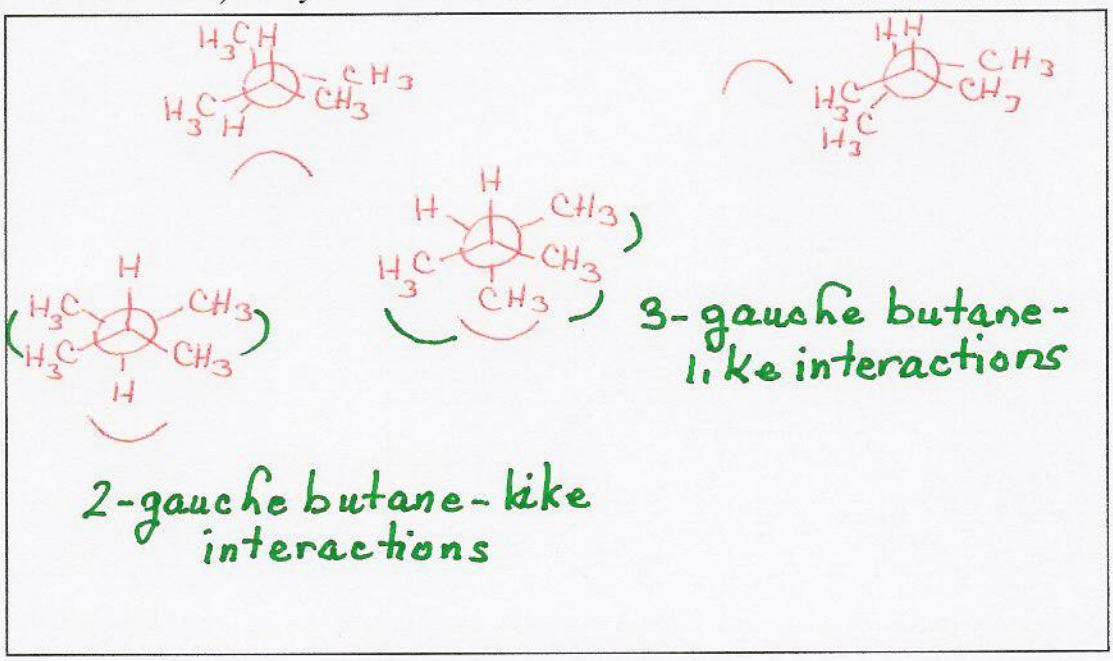
2,2,4,4-tetramethylhexane

Your signature (in ink)_____

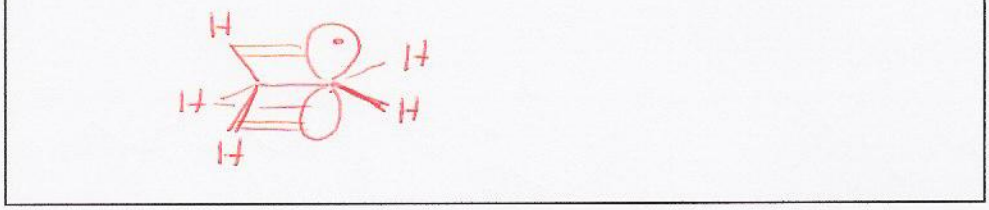
9. Label all carbon atoms in 2-methylpentane as primary, secondary, or tertiary. Place your answer in the box below.



10. Draw the expected potential-energy diagram for the rotation about the C2-C3 bond in 2,3-dimethylbutane. Only relative energy positions are required, you need not and should not include any energy values. Include the Newman projections of each staggered and eclipsed conformation. You should NOT include any duplicates (to save you time-hint: there are only two unique eclipsed and two unique staggered conformations). Put your answer in the box below.

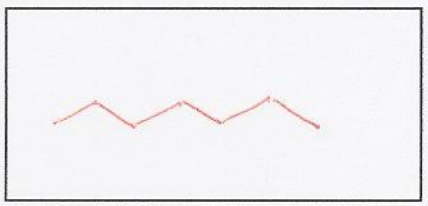
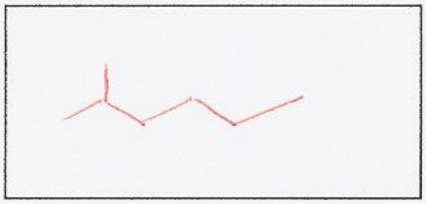
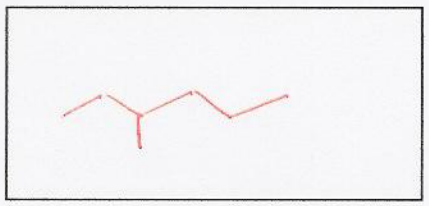
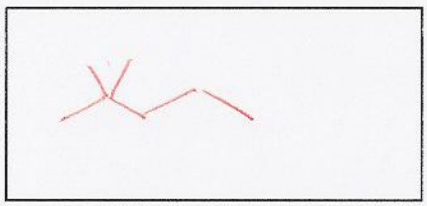
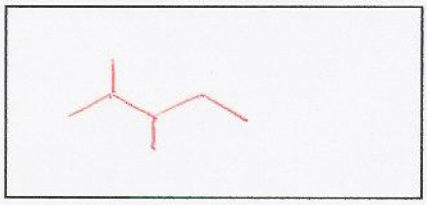
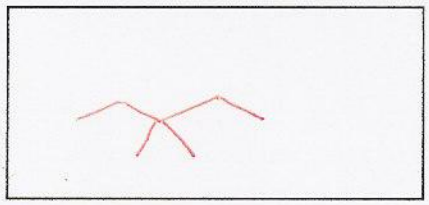
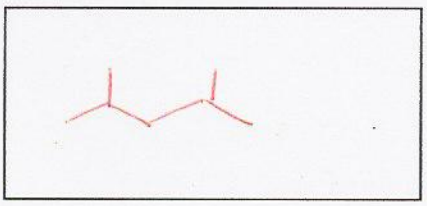
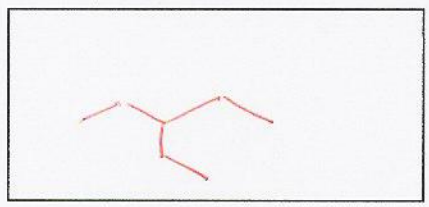
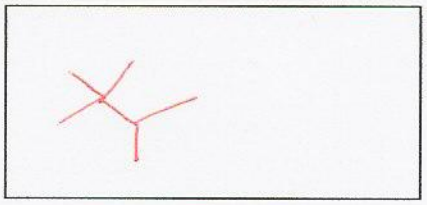


11. Draw a picture of an ethyl radical that shows the hyperconjugation that makes this radical more stable than a methyl radical.



Your signature (in ink)_____

12. Draw all possible isomers of C_7H_{16} (as line notations, no atoms, only bond lines). Put your answers in the boxes below. But one and only one isomer in each of the boxes below. If you duplicate an isomer, neither answer will receive credit. There may be more boxes than you need. A bonus will be award for perfect answers.

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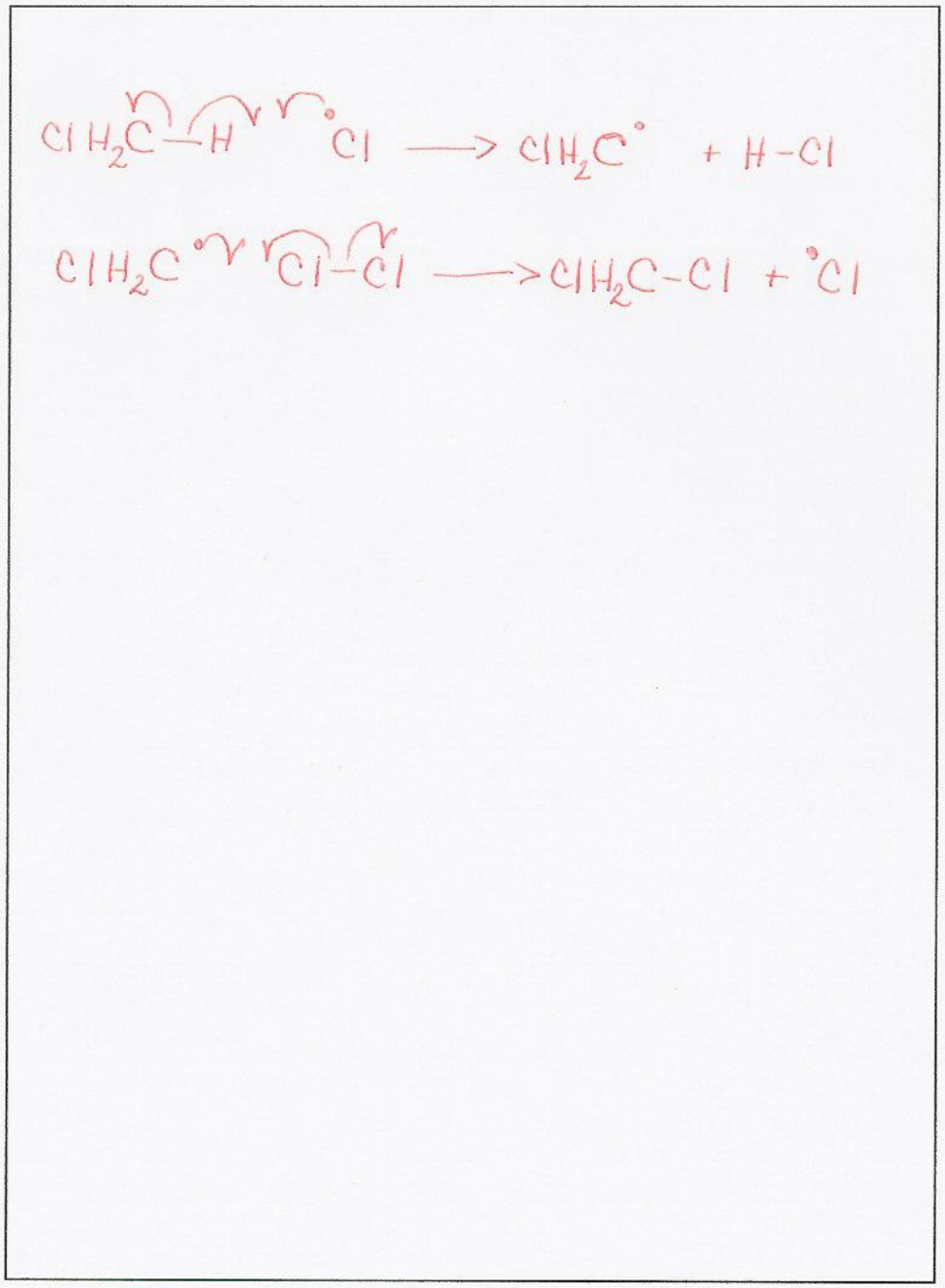
13. Write out the propagation steps of the mechanism for the free radical chlorination of chloromethane (CH_3Cl) to form dichloromethane (CH_2Cl_2). Use the appropriate curved arrows to show the movement of electrons. Put your answer in the box below.



Your signature (in ink)_____

1. The corrected ordering of the rates of reactions of alkyl halides in an S_N2 reaction is:

- ☐ Methyl > 3° > 2° > 1°
- ☐ 3° > 1° > 2° > methyl
- ☐ 3° > 2° > 1° > methyl
- ☒ Methyl > 1° > 2° > 3°

2. The corrected ordering of the rates of reactions of alkyl halides in an S_N1 reaction is:

- ☐ 3° > 1° > 2° > methyl
- ☐ Methyl > 1° > 2° > 3°
- ☒ 3° > 2° > 1° > methyl
- ☐ Methyl > 3° > 2° > 1°

3. Axial methylcyclohexane is less stable than is equatorial methylcyclohexane by:

- ☐ 2.5 kcal/mole
- ☐ 0.9 kcal/mole
- ☒ 1.7 kcal/mole
- ☐ 5.5 kcal/mole

4. The C—C—C bond angle in planar cyclopropane is:

- ☒ 60°
- ☐ 120°
- ☐ 90°
- ☐ 109.5°

5. A molecule with 3 centers of chirality can have at most:

- ☐ 2 stereoisomers
- ☒ 8 stereoisomers
- ☐ 4 stereoisomers
- ☐ 16 stereoisomers

6. In organic chemistry, resolution is:

- ☒ separation of enantiomers
- ☐ formation of radicals
- ☐ marriage counseling
- ☐ separation of diastereomers

7. For a hydrocarbon with no double or triple bonds with the formula C_8H_{10}, the number of rings present is:

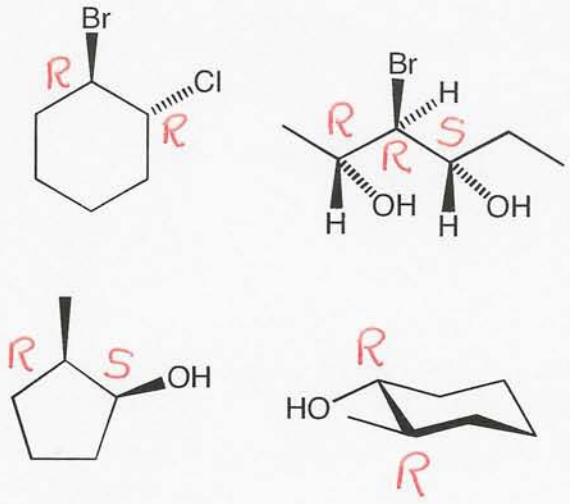
- ☐ 6
- ☒ 4
- ☐ 5
- ☐ 3

8. Iodide ion (I^-) is a:

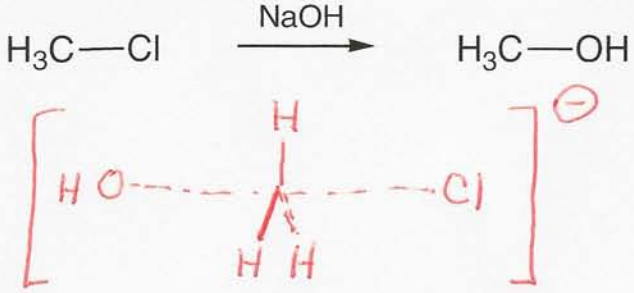
- ☒ good leaving group and good nucleophile
- ☐ good leaving group and poor nucleophile
- ☐ poor leaving group and good nucleophile
- ☐ poor leaving group and poor nucleophile

Your signature (in ink)_____

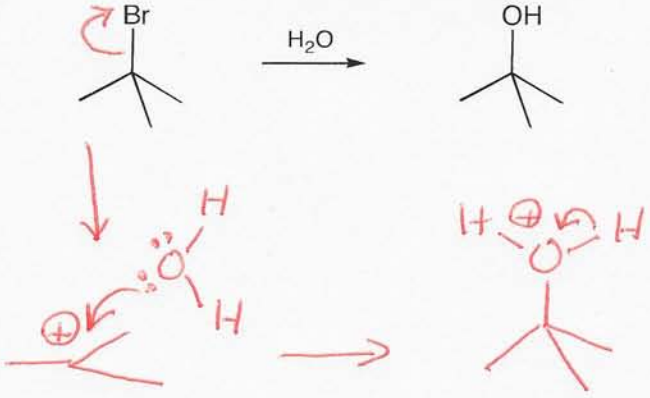
9. Mark each center of chirality with the correct stereochemistry (*R* or *S*). Each is worth 1 point. Do NOT guess as 1 point will be subtracted for each wrong answer.



10. Draw a clear, three-dimensional representation for the transition state for the following reaction.

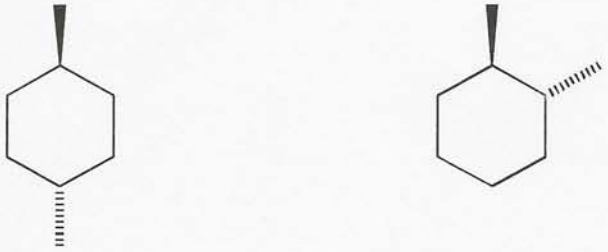


11. Show the mechanism for the following reaction using curved arrows to show the flow of electrons.



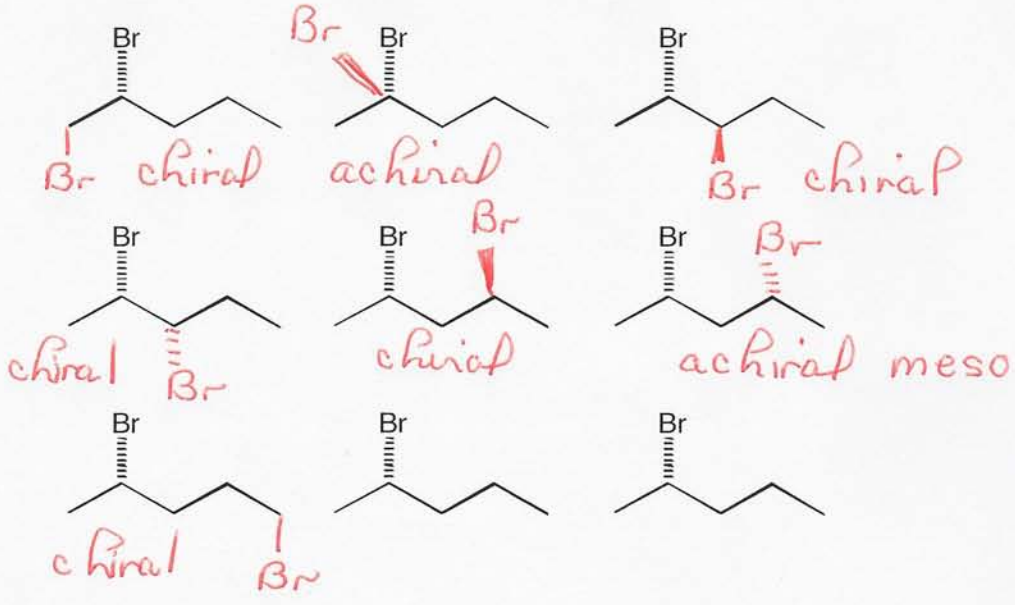
Your signature (in ink)_____

12. Draw the more stable chair conformations of *trans*-1,4- and *cis*-1,3-dimethylcyclohexane (shown below) using the chairs provided.

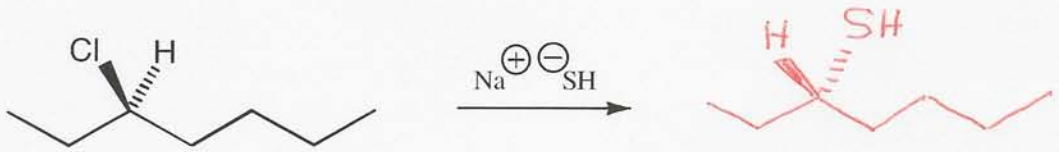


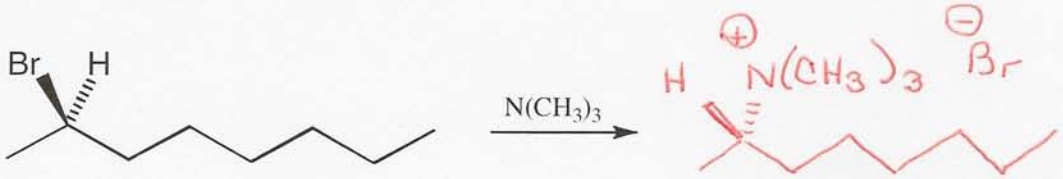
trans-1,2-dimethylcyclohexane

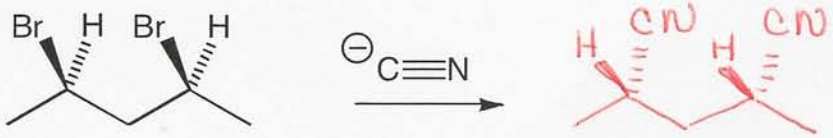
13. Draw the structures, showing all stereochemistry for all of the monobromination products of (*S*)-2-bromopentane using the structures shown below (caution: there are more structures provided than there are products). Indicate for each structure if it is chiral or achiral and indicate if any compound(s) is meso. Do not guess. If you mark a chiral molecule as achiral (or the other way around or mark a non-meso as meso), you will have a point subtracted from your score for this question.

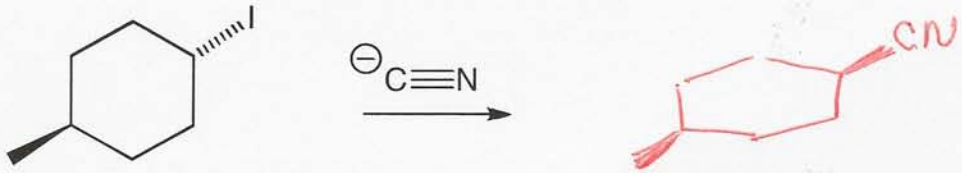


14. Provide the expected major organic product for each of the following reactions:

a) 

b) 

c) 

d) 

Your signature (in ink)_____

Chemistry 140A
Whitesell
Fall Quarter, 2004
Second Midterm Exam, Monday November 15

first name ____ middle initial ____ last name

Student ID Number

Regrade	Quest	Points	score
	1	15	
	2	8	
	3	6	
	4	5	
	5	5	
	6	10	
	7	8	
	8	10	
	9	15	
	10	8	
	11	10	
	total	100	

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your signature **(read the above before signing)**

To request regrading, sign below and check the appropriate boxes.

your signature

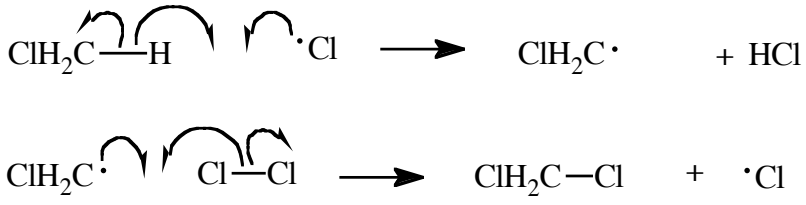
I would like the questions marked with a star (*) regraded (check box at right) ☐

If you feel that we have made an addition error in your score, check the box at the right ☐

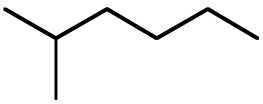
1 2 3 4 5 6 7 8 9 0

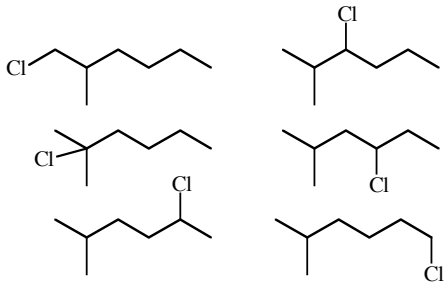
1 2 3 4 5 6 7 8 9 0

1. Write out the propagation steps of the mechanism for the free radical chlorination of chloromethane (CH_3Cl). Use the appropriate curved arrows to show the movement of electrons (Exercise 3-4).

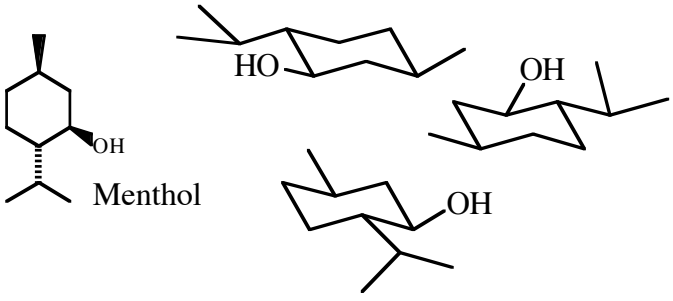


2. Draw all of the possible constitutional isomers that could be formed in monochlorination of the hydrocarbon at the right (*NO* stereoisomers) (exercise 3-7, modified).





3. Draw the more stable chair conformation of menthol (use the chair representation provide at the right) (Exercise 4-11).

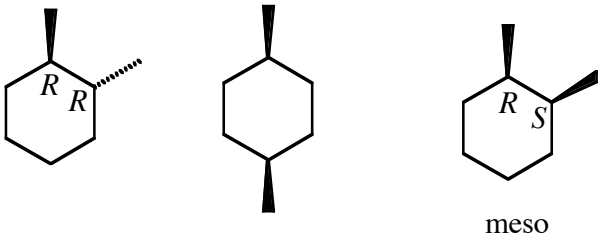


Your signature (in ink)_____

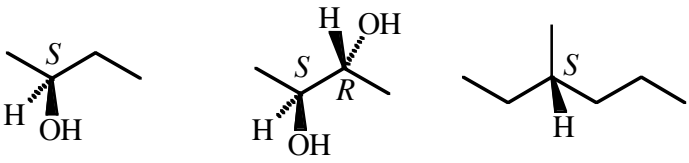
4. The C—C—C bond angle in cyclopropane is approximately:
(a) 60˚ (b) 109.5˚ (c) 180˚ (d) 90˚ (e) 360˚

5. The C—C—C bond angle in cyclopentane is approximately:
(a) 60˚ **(b) 109.5˚** (c) 180˚ (d) 90˚ (e) 360˚

6. Assign the absolute stereochemistry (*R* or *S*) to all stereocenters in the following molecules (not all molecules have stereocenters). Indicate which are meso isomers (like Exercise 5-19).

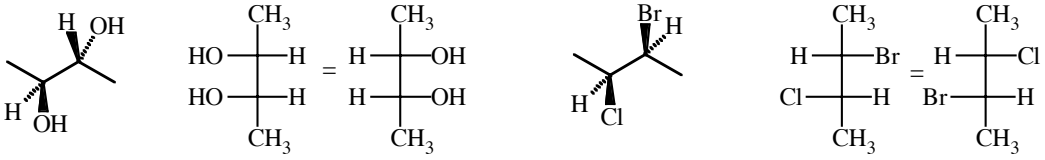


meso

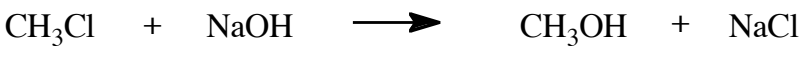


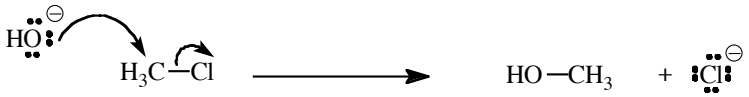
meso

7. Finish correctly the following Fischer projections to correspond to the molecule to the left of each (like Exercise 5-15).

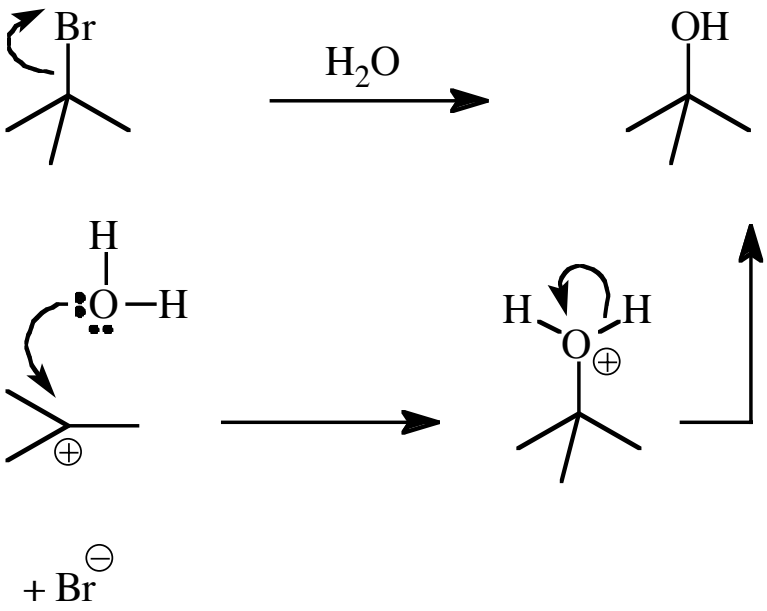


8. Write out the mechanism for the reaction shown below. Use curved arrows to account for all bond breaking and bond making steps.



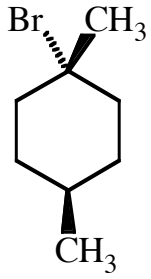


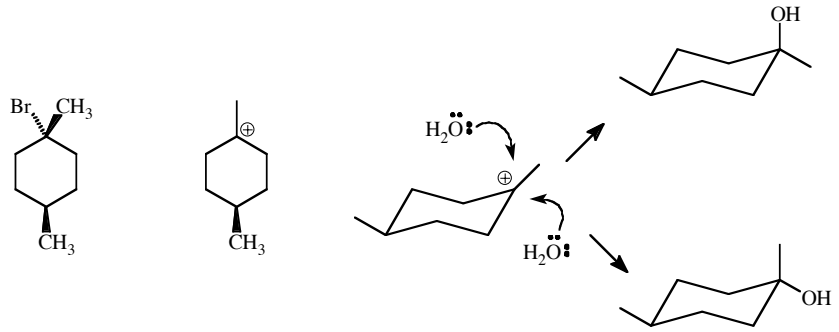
9. Write out the mechanism for the reaction shown below. Use curved arrows to account for all bond breaking and bond making steps.



Your signature (in ink)_____

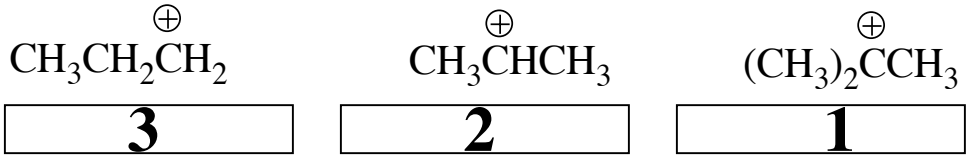
10. Reaction of the bromide at the right, below, with water in a solvolysis reaction gives two alcohols. Give structures for the two products and explain clearly how they are formed (pictures here are worth LOTS of words) (like Exercise 7-3).



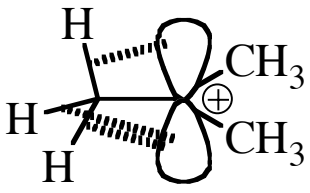


This must be an SN1 substitution as tertiary alkyl halides do not undergo SN2 reactions. The intermediate cation has lost the stereochemistry of the starting material and the water can approach either from the side opposite the remote methyl group or from the same side leading to two stereoisomeric alcohols.

11. Within the following series carbocations, rank in order of decreasing stability with numbers 1,2, and 3 from MOST stable to least and sketch an orbital picture of the most stable cation, showing the hyperconjugation.



3	2	1



Your signature (in ink)_____

Suggested Exericses

Chapter					EOC	EOC
1 4th	3, 4, 5, 6	10, 11			21, 22	
1 5th	3, 4, 5, 6	10, 11			22, 23	
added	9/27	10/02			10/04	
2 4th	3, 6cde, 7abc, 8	11, 12, 13, 15	17, 18		31 (no names), 33 (no names), 37	32
2 5th	3, 6cde, 7abc, 8	12, 13, 14, 16	18, 19		32 (no names), 34 (no names), 38	33
added	10/02	10/04	10/08		10/08	10/10
3 4th	2, 3, 4, 9					
3 5th	2, 3, 4, 9					
added	10/11					
4 4th	2 (no names), 3, 8, 9	10, 11			22	
4 5th	2 (no names), 3, 9, 10	11, 12			23	
added	10/20	10/23			10/23	
5 4th	8, 9	16 (2-4), 17, 18, 19, 20, 23 (no names)			30, 31, 32, 33, 34	
5 5th	8, 9	16 (2-4), 17, 18, 19, 20, 23 (no names)			30, 31, 32, 33, 34	
added	10/25	10/30			10/30	
6 4th	1, 10, 11, 13, 15, 18, 23, 24				34, 36, 37, 38	
6 5th	1, 10, 11, 13, 15, 18, 23, 24				34, 36, 37, 38	
added	11/03				11/11	
7 4th	1, 3	4, 6, 7	8, 9, 10, 11, 12		27, 28a,c	
7 5th	1, 3	4, 6, 7	8, 9, 10, 11, 12		27, 28a,c	
added	11/09	11/15	11/29		22/29	
8 4th	1, 6 (not b), 7, 9, 10, 11, 13, 14, 15, 18					
8 5th	1, 6 (not b), 7, 9, 10a, 11, 13, 14, 15, 18					
added	11/27					

9 4th	1, 3	4, 11, 12, 14, 15, 16, 17, 20				
9 5th	1, 3	4, 11, 12, 14, 15, 16, 17, 20				
added	11/29	12/01				

Chemistry 140A (S07)- GENERAL INFORMATION

Instructor:

Jerry Yang, 6100C Pacific Hall
Email: jerryyang@ucsd.edu
Office Hours: Tu and **Th** 12:30PM-1:30PM in 6100C Pacific Hall

Teaching Assistants:

		Section (See **Discussion Section** also)
Patrick Corpuz:	pcorpuz@ucsd.edu	A06
Christopher Edwards:	c1edward@ucsd.edu	A04
Jerry Isaacson:	jcisaacs@ucsd.edu	A01, A02, A03
Thomas Jan:	thjan@ucsd.edu	A05
Mark Rubinshtein:	mrubins@ucsd.edu	A08, A09, A10
Weihan Wang	w1wang@ucsd.edu	A07

Lectures:

TuTh 11 AM-12:20 PM, Peterson 108
From April 3th (Tu) through June 7th (Th)

Discussion Section:

Sections are to help you understand the material and to verify that you really do understand. They are strongly recommended, and regular attendance will definitely be to your advantage. GO!!! You may attend whichever one(s) you wish, subject to room capacity. You will benefit more if you come prepared to ask and answer questions. No part of your grade depends on your performance in Section, so don't be ashamed to ask questions or to propose and comment on answers. Additional help may be obtained during your TA's office hours, which will be announced in Section.

A01:	**M**	12:00-12:50 PM	Solis 110
A02:	**M**	1:00-1:50 PM	Solis 110
A03:	**M**	3:00-3:50 PM	Solis 110
A04:	**M**	4:00-4:50 PM	Solis 110
A05:	**M**	5:00-5:50 PM	Solis 110
A06:	**W**	8:00-8:50 AM	Solis 109
A07:	**W**	9:00-9:50 AM	Solis 109
A08:	**W**	10:00-10:50 AM	Solis 109
A09:	**F**	8:00-8:50 AM	Solis 111
A10:	**F**	9:00-9:50 AM	Solis 111

Chemistry 140A (S07)- GENERAL INFORMATION

Texts:

Organic Chemistry, 5th Ed. by K. P. C. Vollhardt and N. E. Schore
W.H. Freeman & Co.; ISBN: 0716772353

Study Guide and Solutions Manual for Organic Chemistry 5th Ed. by N. E. Schore
W.H. Freeman & Co.; ISBN: 0716761726

These books are **required**. A Molecular Model kit is *highly* recommended.

Material Covered:

You are responsible for material in the textbook and in lectures, which will clarify the textbook, emphasize the important topics, and rarely present additional material.

DO NOT FALL BEHIND!

Read the textbook in advance of the lectures, so that you won't need to take lecture notes that duplicate examples that are in the book. As you read, do the problems. Your answers are not to be handed in, so you are encouraged to discuss and compare them with other students (but not during exams!). **There is no other way to learn organic chemistry. It is highly unlikely for you to pass this course if you don't do the problems regularly.** The questions on the exams will be similar to those on last year's exams.

Examinations:

First Midterm: April 24th (Tu) in class (will cover Ch 1-3)
Second Midterm: May 22rd (Tu) in class (will cover Ch 4-6)
Final Exam: June 12th (Tu) at 11:30 AM-2:30 PM, room to be announced (will cover Ch 1-9)

Examinations will cover all of the material from the text, the lectures, and the problem sets to that point in the course. Be prepared to show a picture ID at all exams. **No exams will be taken without a photo ID card.** There will be two midterm examinations (100 pts each) to be taken at locations to be announced in class. The midterm exams will last approximately 70 minutes each. A 200 pt final exam will cover the entire course, but will emphasize material covered since the second midterm exam. Sign every page of the exams in the top right hand corner. *No points will be given for problems on pages which are not signed.* The examinations are not open book or open notes. If you need to leave the exam room, you will need to empty your pockets and an exam proctor will accompany you. Calculators and cell phones are not permitted in the exam room. If a student wishes to have an exam regraded, they must write a note on the first page of the exam requesting a regrade and the entire exam will then be regraded. All requests for a change in grade or exam score must be made at the class immediately following the one at which exams are returned to the class. No regrades will be allowed

for exams worked in pencil or erasable ink, or for exams with "white-out" material on a page. ***There will be no make-up examinations.***

Web Page:

Ancillary materials such as practice exams, exam answer keys and other pertinent information will be regularly posted on the Chem 140A web page: (http://webct6web.ucsd.edu).

Discussion Forum:

A discussion forum has been set up so that you may post your questions for the class any time (http://webct6web.ucsd.edu). Please post all non-administrative questions regarding the class to this forum and refrain from individually emailing questions to the instructor or the TA's. Students are encouraged to try to help each other answer questions. The TA's and the instructor will monitor this forum regularly to try to answer as many questions as possible.

Others:

Please be aware of the **UCSD Policy Academic Dishonesty** (UCSD General Catalog). It is important that you avoid the appearance of cheating during an exam. Any notes, papers, or other aids visible to a student or exam proctor during an exam are considered clear evidence of cheating. Any student found cheating on an exam will receive an **F** in the course and a letter explaining the reasons for this grade will be sent to the appropriate college provost with a recommendation that you be expelled from the University. Remember that you may not drop or withdraw from a course while a dishonesty case is pending, or if found guilty. Also, be aware that the graded exams may be duplicated by the instructor before the exams are returned to the students.

CHEMISTRY 140A

Organic Chemistry, Spring (4/2-6/7), 2007

Instructor: Jerry Yang, Pacific Hall 6100C
jerryyang@ucsd.edu

Office Hours: Tu and Th 12:30 – 1:30 PM in Pacific Hall 6100C
Lecture: TuTh 11:00 AM -12:20 PM in 108 Peterson

Tentative Schedule for Spring 2007

April		
3	Tu	Ch.1: Structure and Bonding
5	Th	Ch.1: Structure and Bonding
10	Tu	Ch.1: Structure and Bonding
		Ch.2: Structure and Reactivity
12	Th	Ch.2: Structure and Reactivity
17	Tu	Ch.2: Structure and Reactivity
		Ch.3: Reactions of Alkanes
19	Th	Ch.3: Reactions of Alkanes
24	Tu	**Midterm Exam - 1 (100/400) in class** (108 Peterson)
26	Th	Ch.3: Reactions of Alkanes
		Ch.4: Cyclic Alkanes
May		
1	Tu	Ch.4: Cyclic Alkanes
3	Th	Ch.5: Stereochemistry
8	Tu	Ch.5: Stereochemistry
10	Th	Ch.5: Stereochemistry
		Ch.6: Properties and Reactions of Haloalkanes
15	Tu	Ch.6: Properties and Reactions of Haloalkanes
17	Th	Ch.7: Nucleophilic Substitution and Elimination
22	Tu	**Midterm Exam – 2 (100/400) in class** (108 Peterson)
24	Th	Ch.7: Nucleophilic Substitution and Elimination
		Ch.8: Hydroxy Functional Groups
29	Tu	Ch.8: Hydroxy Functional Groups
31	Th	Ch.8: Hydroxy Functional Groups
		Ch.9: Chemistry of Alcohols and Ethers
June		
5	Tu	Ch.9: Chemistry of Alcohols and Ethers
7	Th	Ch.9: Chemistry of Alcohols and Ethers

Final Exam (200/400)

June 12th (Tuesday) at 11:30 AM – 2:30 PM

The room for final exam will be announced soon.

READING ASSIGNMENT AND SUGGESTED HOMEWORK FOR CHEM140A (S07) IN VOLLHARDT & SCHORE, 5TH ED.

READ IN ADVANCE the sections assigned below, as well as the "Keys to the Chapter" in the Study Guide. The sections "Important Concepts" and "New Reactions" at the end of chapters are especially helpful in organizing the material. You are not responsible for history, for personalities, for the stories in the "Chemical Highlight" sections ("Boxes"), or for the captions to photographs, but you will enjoy reading some of this material.

Key to symbols:

! = difficult or important or both; don't just skim
() = for your enjoyment or general edification
\+ = plus additional material in lecture
– = partial coverage (pay attention to emphasis in lecture, skim text if unclear)
? = don't believe all you read (or misprint in Exercise, Problem, or Answer)
X = except

Apr 3 to Apr 10: **CHAPTER 1** (Use either Lewis or Kekulé, but always show lone pairs.)
Sections: Preface!, 0, (1)!, 2±, 3!–, 4!+, 5+!, 6!–, 7+!, 8±!, 9!
Exercises: 1, 2, 3, 4, 6!, 7!, 8, 9!, (12), 13, 14!, 15, 16, 17, 18
Problems: 19, 20, 21, (22), 23, 24!, 25!, 26, 27!, 28, 30, 31, 32, 37!, 38!, 39, 40ab, 42!, (43), 44!, (45), (46), 47, 48, 49, 50

Apr 10 to Apr 17: **CHAPTER 2**
Sections: (0), 1, 2!, Table2!("Memorize"), 3, Table3!("Memorize"), 4, 5-, Table5("Memorize" names to *n*=8), Table6("Memorize"), [*Nomenclature*: Be sure that you can draw the correct structure from a molecule's name and can provide a name that corresponds to only one structure (hopefully, the structure you wish to name)], 6-, 7!, 8!
Exercises: (1), (2), (3), (4), (5), 6, 7, 8, 9, 11, 12a!, (13), 14, 15, 16, 17, 18ab, 19
Problems: (20), (21), (22), 23Xiii, 24, (25), 26!, 27!, 28, 29, 30, 31, 32, 33, 34–, (35), 36, 39, (41), (42), (43), 46, 47, 48, 49

Apr. 17 to Apr 26: **CHAPTER 3**
Sections: 0, 1!, Table1!, 2+!, (3), 4±!, 5, 6, 7, 8, (9), (10)
Exercises: 2, 3a(b), 4, (5), 6, 7, 8, 9!
Problems: 11a(b), 13, 14(a)b(c), (17), 18, 19a, 20!, 21a(bc), 22!, 24, 25, (28), 29bc, (30), (31), (34), 35, 41, 43, 44

Apr 26 to May 1: **CHAPTER 4**
Sections: 0, 1!–, 2, 3!, 4, 5, 6–, 7
Exercises: (1), 2–, 3, (5), (6), (7), 8!, (9), (10), 11, (12), 13
Problems: 14ab(c), 16!, (17), 18!, 22!, (23), 24!, 27, (29), 32a(b), 34, (36), (39), (42), 47, 48, 49, 50

May 3 to May 10: **CHAPTER 5**
Sections: 0!, Figure1("Memorize"), 1!+ (Box1), 2!–, 3! (Box2), (4)[*Warning*: <u>Do not use Fischer projections!</u>], 5!, 6, 7!+ (Box4), (8) (Box5)

Exercises: 1, 3, (4), 5!, (6), (7), 8, 9!, 10, 15b, 16bcd, 17**zigzag**,asFig.2-4e, 19?, 20?, 21, 22, 23!
Problems: 24!, 25!, (26), (27), 28!(Xdg), 29!, 30, 31?, 32, 33, 34!, 35, 36, 37!, 38, 39, 43, 44, (45), 49!, 50, 51, 52, 53, 54, (55), 56, 57, 58, 63 (throughout, no"bowties"!)

May 10 to May 15: **CHAPTER 6**
Sections: 0, 1–, 2!, Table3!, 3!, 4, 5, 6, 7!, Table4!, 8!, Table7examples!, 9
Exercises: 1!, 2, 3!, 4, 5, 6, 7, (8), 9, 10, 11, 12!, (13), 15, 16, 17, 18, 19, 20, 21, 22!, 23, 24
Problems: 25, 26ab, 28, 29–, 30–, 31, 32!, 34, (35), 36, 37Xa, 38, 39!, 40!, 41Xb, 42, 43!, 44, (45!), 47, 48, 49, 50, 52, 55, 56, 58, 59

May 17 to May 24: **CHAPTER 7**
Sections: 0, 1, 2, 3, 4, 5, Table2, 6, 7, 8!, 9!, Table4("Memorize")
Exercises: 1, (2), 3, 4, (5), 6, 7, 8, 9, 10, (11), 12, 13ab, 14, 15, 16, 17, 18, 19
Problems: 20, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 34, 35abcd?, 36, 37Xc, 38Xh, 40?Xc, 41, 42, 43, 44!, 47, (48), (49), 51, 52, 53, 54, 56, 57, 58, 59, 60

May 24 to May 31: **CHAPTER 8**
Sections: 0, 1, 2, 3, (4), 5, 6! (Box1), 7! (Box2), 8!, 9!
Exercises: 1, (2), 3, 4, (5), 6, 7, 9, 10, 11, 12, 13, 14!, 15, (16), 17, 18
Problems: 19, (20), 22, (25), 26a, 27bc, 28, (30), 31, 32, 33, 34, 35!, (36), 37, 38, 39, 40, 41, 42, (43), 44, 45!, 46, 47, 48, 49, 50, (52), (53), (54), (55), (56), (57), (58), 59, 60

May 31 to Jun 7: **CHAPTER 9**
Sections: 0, 1, 2, 3!, 4–, 5–, 6, 7, 8, Box2, 9, 10–, (11) (Box4)
Exercises: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18!, 19, 20, 21, 22(a)b
Problems: 23!, 24!, 25, 26, 27, 28, 29, 30, (31), 32, 33, 34!, 35!, 36!, (38), 39!, 40, 41, 42a, 43, 44, 45, 46, 49, 50, 52, 53, 54, 55, (56), 58a, 59!, 60, (61), (62), (63), (64), (65), 70, 71, 72

This schedule, *with any changes*, is also available on the Web at
http://chem-courses.ucsd.edu/CoursePages/UpperDiv/140A_Yang/
and you are responsible for keeping informed of any changes.

1. Dept./Course Name/Number:
Dept. of Chemistry and Biochemistry
Organic Chemistry I/CHEM 140A

2. Course (Catalogue) Description:
An introduction to organic chemistry, with emphasis on material fundamental to biochemistry. Topics include bonding theory, isomerism, stereochemistry, chemical and physical properties, and an introduction to substitution, addition, and elimination reactions.

3. Prerequisite(s):
Chem. 6C or equivalent course in general chemistry

4. Course Textbook(s):
Organic Chemistry: Structure and Function, 5^{th} ed., Vollhardt & Schore

5. Course Objectives:
First of three-quarter sequence in organic chemistry for science and engineering majors

6. Course Topics:
See course (catalogue) description

7. Implementation (lecture, discussion, lab hours, etc):
3 hrs lecture, 1 hr discussion per week
Methods of evaluation (homework, midterms, etc):
homework, quizzes, exams, final exam

8. & 9.
In the following, we list a set of desired course outcomes and address how such outcomes are accomplished and assessed.

Desired Outcome	**Emphasis:** 0 not addressed 1 Addressed but not emphasized 2 Emphasized	**Method(s) used to address**	**Assessment:** 0 = not assessed 1 = assessed	**Method(s) used to assess**
Apply knowledge of math and physics	1	What little math is needed in this course is covered in lecture or readings	0	
Design and conduct experiments as well as to analyze and interpret data	0		0	
Design a system, component or process to meet desired needs	0		0	
Function on multidisciplinary teams	0		0	
Ability to identify, formulate and solve engineering problems	0		0	
Understanding of professional and ethical responsibility	0		0	
Communicate effectively	1	Work in groups in discussion section	0	
Broad education necessary to understand the impact of engineering solutions in a global and societal context	0		0	
Recognition of need for and ability to engage in life long learning	1	Lecture emphasizes how science is changing	0	
Contemporary issues	1	Many contemporary issues can be addressed in the context of organic chemistry lecture and readings	0	
Use techniques, skills and tools necessary for engineering practice	0		0	

10. Preparer/Date of Preparation:
Barbara Sawrey; May 30, 2007