Chem 3311 Sammakia Fall 2009 Midterm 2

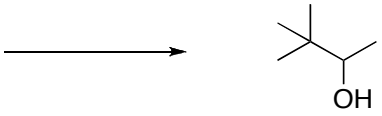
Student ID _____

page	points:
2	_____(20)
3	_____(24)
4	_____(22)
5	_____(18)
6	_____(16)
Total	_____(100)

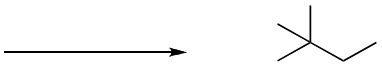
Periodic Table

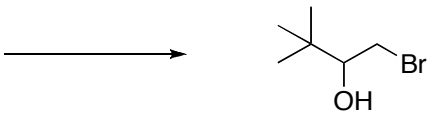
H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Ha	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac															

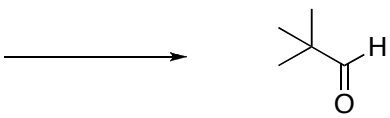
1 Complete the following syntheses starting with any alkene you want. All chiral products are racemic mixtures (4 pts each).

A) 

B) 

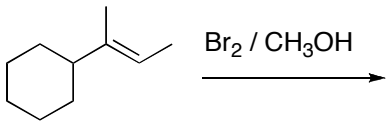
C) 

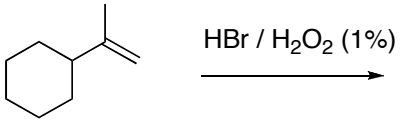
D) 

E) 

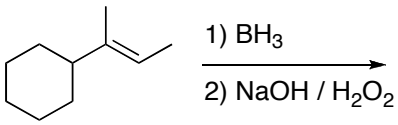
preare this from a starting material that would produce no other aldehyde or ketone byproducts

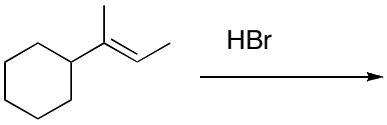
2) Provide the products and mechanisms for the following reactions. Show every intermediate and all the arrows required for each step of the reaction. Indicate the stereochemistry of the products, and for reactions that produce stereoisomers, draw all possible stereoisomers that would be formed and indicate if they would be produced in equal or unequal amounts. You do not have to draw the mechanism for all stereoisomers, just one mechanism, and then draw any other stereoisomers that would be produced and give the ratio.

A) (11 points) 

B) (13 points) 

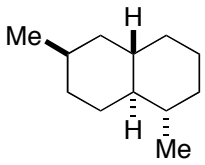
2 (continued) Provide the products and mechanisms for the following reactions. Show every intermediate and all the arrows required for each step of the reaction. Indicate the stereochemistry of the products, and for reactions that produce stereoisomers, draw all possible stereoisomers that would be formed and indicate if they would be produced in equal or unequal amounts. You do not have to draw the mechanism for all stereoisomers, just one mechanism, and other stereoisomers that would be produced and give the ratio.

C) (13 points) 

D) (9 points) 

3a) Draw the molecule shown below in its lowest energy conformation. Draw EVERY hydrogen on the cyclohexane rings and be sure that all the bonds that are supposed to be parallel are parallel. If you're structure is not drawn neatly, points will be deducted (7 pts).

3b) Draw the molecule again, this time without hydrogens, and identify every gauche interaction by drawing a line between the carbons that make up the gauche interaction (6 pts).



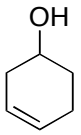
4a) The molecule shown above has a specific rotation (i.e., [α] value) of +62 degrees. What is the specific rotation of the enantiomer of this molecule that is 100% ee? (I pt)

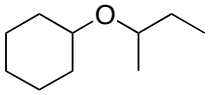
4b) What is the specific rotation of a sample of the enantiomer that is 50% ee? (1 pt)

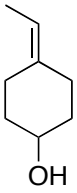
4c) What is the ratio of the major to minor enantiomer in the 50% ee mixture? (1 pt)

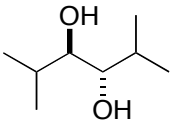
Major = _____% Minor = _____%

4) You have bottles with labels as shown below. Are the molecules in the bottle **chiral**, **achiral**, **meso**, or **none of the above**? (2 pts each)









5) Label the pairs of molecules below as **identical**, **enantiomers**, **diastereomers**, **constitutional isomers**, or **none of the above** (2 pts each).