EXAM 3

CHEMISTRY 220a

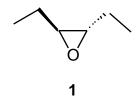
Friday, November 10, 2000

NAME (print):			
TA:	Day:	Time:	
Take a few moments	s to look over the exam. Ans	swer each question on the exam paper.	
Write your name on	the top of each page where i	ndicated.	
Important items are i	n bold .		
A Periodic Table	is on page 10.		
Do all preliminary will not be graded.	drawing or computations or	n the work sheets (pgs. 7-9). The wo	ork sheets
The exam is 55 minu	utes.		
STOP writing and h	nand in your exam when you	ı are asked to do so.	
REMEMBER: Nea	atness is to your advantage.		
1. (20 pts)			
2. (20 pts)			
3. (20 pts)			
4. (20 pts)			
5. (20 pts)			
Total (100 pts)			

Name:		
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1) (20 pts.) Optically-active compound **A** (C₁₀H₁₆) reacts with Pt/H₂ to afford optically-active compound **B** (C₁₀H₂₀). Ozonolysis of **A** and dimethyl sulfide reduction provides a **single** compound **C** (C₅H₈O₂), (R)-2-methylbutanedial [i.e., (R)-2-methyl butane **dial**dehyde]. What are the structures of **A-C**? Explain your reasoning.

2) (20 pts.) Design a synthesis of **racemic** epoxide **1** starting from 2-butyne and ethylene as your only sources of carbon. You are obliged to use **both** of these sources of carbon in your synthesis. All other reagents are available to you.



a) The reagents, or pairs of reagents, that give a meso compound with (Z)-3-hexene.

Br₂ OsO₄/H₂O₂ cold, dilute KMnO₄ 1) peracid 1) Cl₂, H₂O 2) H₃O⁺ 2) aqueous NaOH

b) The base(s) that will deprotonate 1-pentyne greater than 90%.

NaNH2 CH3CH2ONa CH3CH2CH2Li KNH2 NH3

c) The most highly oxidized structure(s).

d) The complete hydrogenation of 3-hexyne ($H_f^o = +25.2 \text{ kcal/mol}$) is exothermic by 65.2 kcal/mol. What is the **best estimate** of the H_f^o of n-hexane in kcal/mol?

90 39 -41 -89 +41

Name:	

4) $(5 \times 4 \text{ pts.} = 20 \text{ pts.})$ In each of the following reactions, provide **either** the reactant, reagents, or product as required. When reagents are missing, more than one reagent may be required to prepare the product. **Pay attention to stereochemistry**.

c)
$$\frac{1) O_3}{2) (CH_3)_2 S}$$
 + $\frac{O}{O}$

Name:

- 5) (20 pts.) Provide a mechanism for **one** of the following reactions. Use the curved arrow formalism. **Pay attention** to stereochemistry where it applies.
 - a) The conversion of (E)-2-butene to 2-butanol (sec-butanol) via hydroboration.
 - b) The epoxidation of (Z)-butene via the halohydrin route.
 - c) The formation of 2-butanone (methyl ethyl ketone) by the mercuric ion catalyzed hydration of 1-butyne.

Work Sheets

Work Sheets

Work Sheets

Periodic Table