EXAM 4

Organic Chemistry

Chemistry 220a

Friday, December 3, 1999

NAME (print): _____

TA:_____ Day:_____ Section Time:_____

Important points are in **bold**.

Complete the section above and put your **name** on pages 2-5.

Take a few moments to look over the exam. Answer each question on the exam paper.

Do all **preliminary** drawing or computations on the **Work Sheets** at the end of the exam. **They will not be graded.**

A **Periodic Table** is on page 6 of the exam should you need it.

The exam is 55 minutes.

STOP writing when you are told to do so.

REMEMBER: Neatness is to your advantage.

1. (28 pts) _____

2. (28 pts) _____

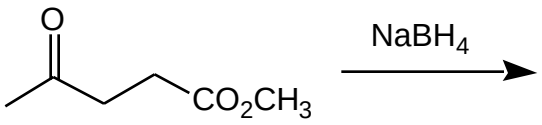
3. (22 pts) _____

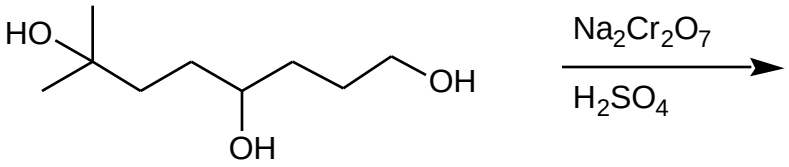
4. (22 pts) _____

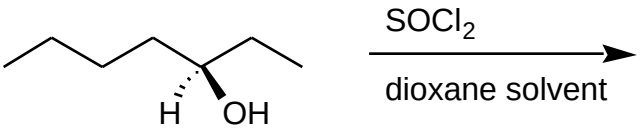
_____

Total (100 pts)

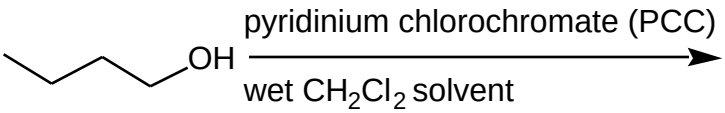
1) (28 pts) Provide the structure of the expected product in **four** of the following five reactions. If you do five of them, **cross out the one you do not want graded**. [Otherwise the choice is ours!]

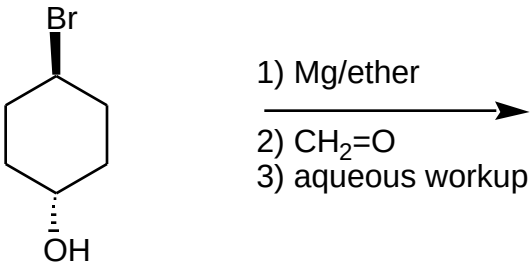
a) 

b) 

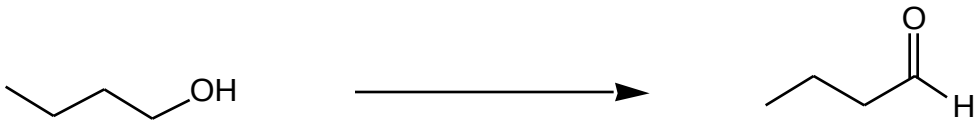
c) 

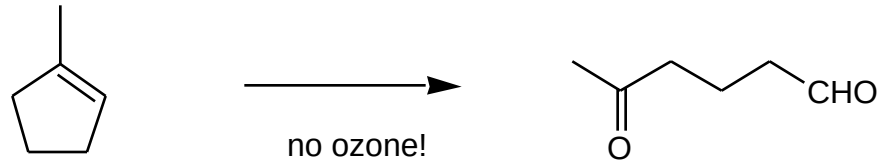
opt. act.

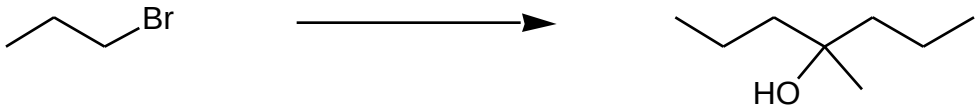
d) 

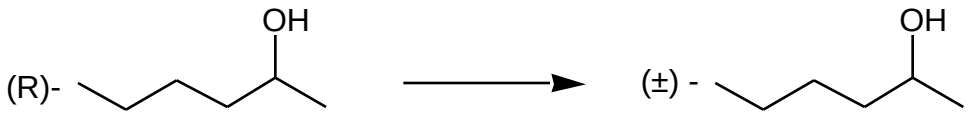
e) 

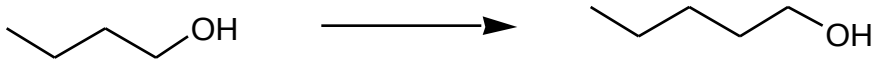
2) (28 pts) Provide conditions for the completion of **four** of the following five reactions. If you do five of them, **cross out the one you do not want graded**. [Otherwise the choice is ours!] All reagents and any other carbon sources you may need are available to you. Place the numbered reagents (as shown in question 1e) above and below the arrow.

a) 

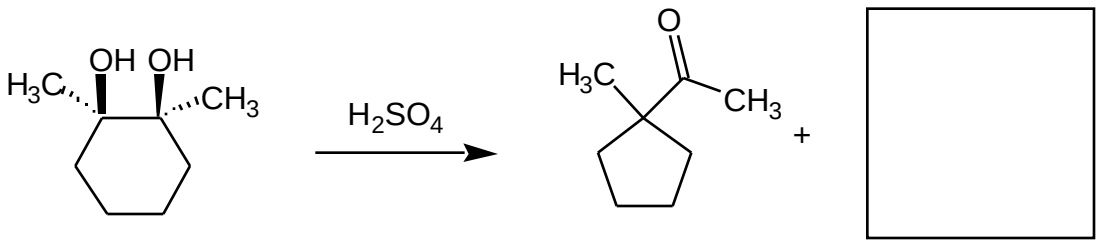
b) 

c) 

d) 

e) 

3) (22 pts) In the acid-catalyzed rearrangement of pinacol (2,3-dimethylbutan-2,3-diol), only the ketone pinacolone (3,3-dimethyl-2-butanone) is formed. However, the acid-catalyzed rearrangement of 1,2-diol **1** gives ketone **2** (major product) and a second pinacol rearrangement product, ketone **3**.



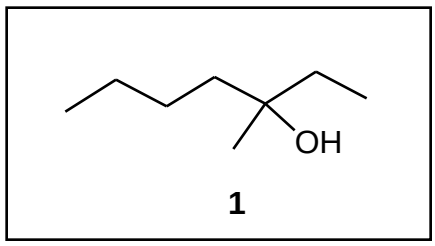
1 **2** **3**

a) (9 pts) Provide a mechanism (curved arrows) for the formation of **2** from **1**.

b) (9 pts) What is the structure of **3**? Place it in the box.

c) (4 pts) What alkyl group migrates, i.e., rearranges, in the formation of **3**?

4) (22 pts) A chemist requires a sample of racemic 3-methyl-3-heptanol (**1**). Fully aware of the chemistry of Grignard reagents, she designs and executes a synthesis of **1** using 1-butene as the sole source of carbon. Show how she may have accomplished her goal. Naturally, all reagents were available to her as they are to you.



1

Periodic Table

Work Sheets --- They will not be graded

Work Sheets --- They will not be graded

Work Sheets --- They will not be graded