CHEM 346 – Organic Chemistry I – Fall 2014

Instructor: Paul Bracher

Quiz #4

Due: Saturday, November 8th, 2014

6:00 p.m. (in Monsanto Hall 103)

Student Name (Printed)	
Student Signature	

Instructions & Scoring

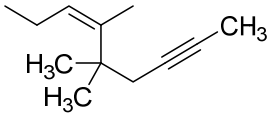
- Please write your answers on the official answer sheet. No answers marked in this booklet will be graded. You must submit a hard copy of your answer sheet. Answer sheets submitted electronically will not be graded.
- You may use any resources you wish and collaborate with others.
- Any questions should be posted to the Blackboard discussion board so all students have equal access to the information.
- Your quiz answer sheet may be photocopied.

Problem	Points Earned	Points Available
I		25
II		24
III		18
IV		13
V		20
TOTAL		100

This quiz focuses on Chapters 9 through 12 in Janice Smith's *Organic Chemistry*, 4th ed.

Problem I. Multiple choice (25 points total; +5 points for a correct answer, +2 points for an answer intentionally left blank, and 0 points for an incorrect answer). For each question, select the best answer of the choices given. Write the answer, legibly, in the space provided on the answer sheet.

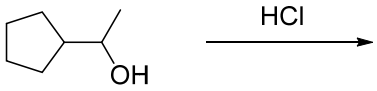
(1) _____ What is the best name for compound **A**?

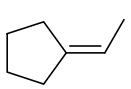


A

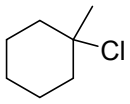
(a) (6*Z*)-5,5,6-trimethyl-6-nonen-2-yne
(b) (6*E*)-5,5,6-trimethyl-6-nonen-2-yne
(c) (3*Z*)-4,5,5-trimethyl-3-nonen-7-yne
(d) (5*Z*)-1,4,4,5-tetramethyl-5-octen-1-yne
(e) (5*E*)-1,4,4,5-tetramethyl-5-octen-1-yne

(2) _____ Which of the following compounds would you <u>least</u> expect to observe as a product of the following reaction?

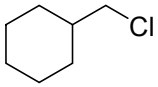




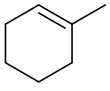
(a)



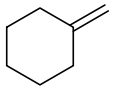
(b)



(c)

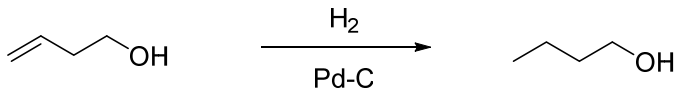


(d)



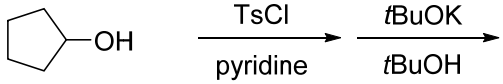
(e)

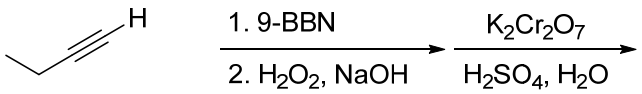
(3) _____ What statement best describes the role of Pd-C in the following reaction?

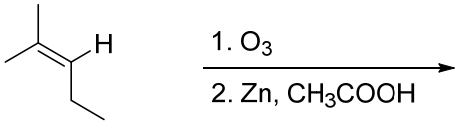


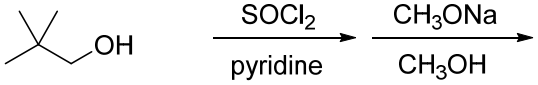
(a) it makes the reaction more exothermic and drives the equilibrium right
(b) it increases the rate of the reaction
(c) it prevents the hydroxyl group from serving as a nucleophile
(d) statements (a) and (b) are both correct
(e) statements (a), (b), and (c) are all correct

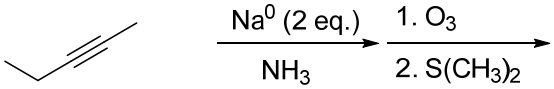
(4) _____ Which of the following reaction sequences does <u>not</u> generate a major product that contains a π bond?

(a) 

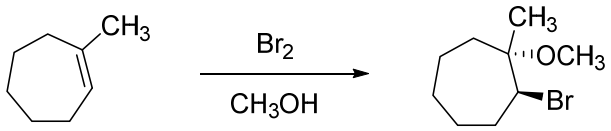
(b) 

(c) 

(d) 

(e) 

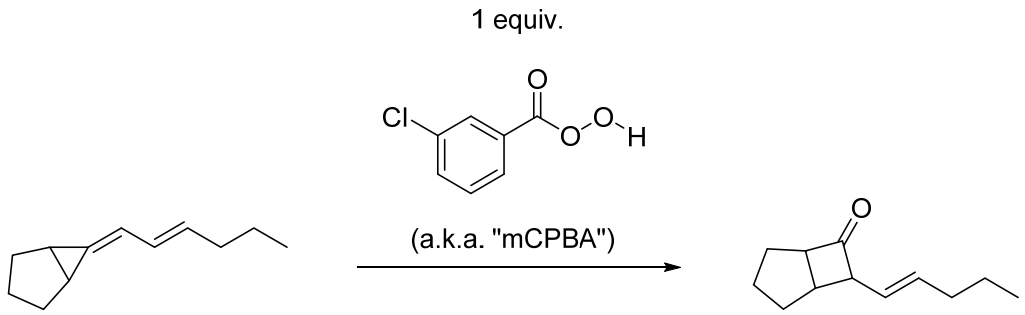
(5) _____ What statement does <u>not</u> accurately describe the following reaction?



(a) H^+ and Br^- are byproducts of the reaction
(b) the reaction produces another diastereomer, not shown
(c) at least one carbon atom is oxidized
(d) at least one bromine atom is reduced
(e) the reaction mechanism involves a bridged bromonium intermediate

Problem II. Mechanism (24 points).

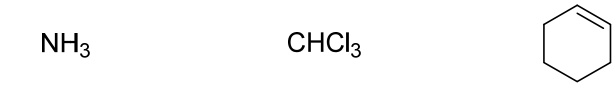
(1) (18 points) Draw a sensible mechanism for the following reaction. Remember to use proper "curved arrow notation" to account for the redistribution of electrons in the making and breaking of bonds. Show all significant resonance forms that account for the stability of the intermediates in the reaction.



B **C**

61% yield

(2) (6 points) Which of the following three compounds would make the best choice as a solvent for this reaction? Write your choice in the box and explain your choice in three sentences or fewer.

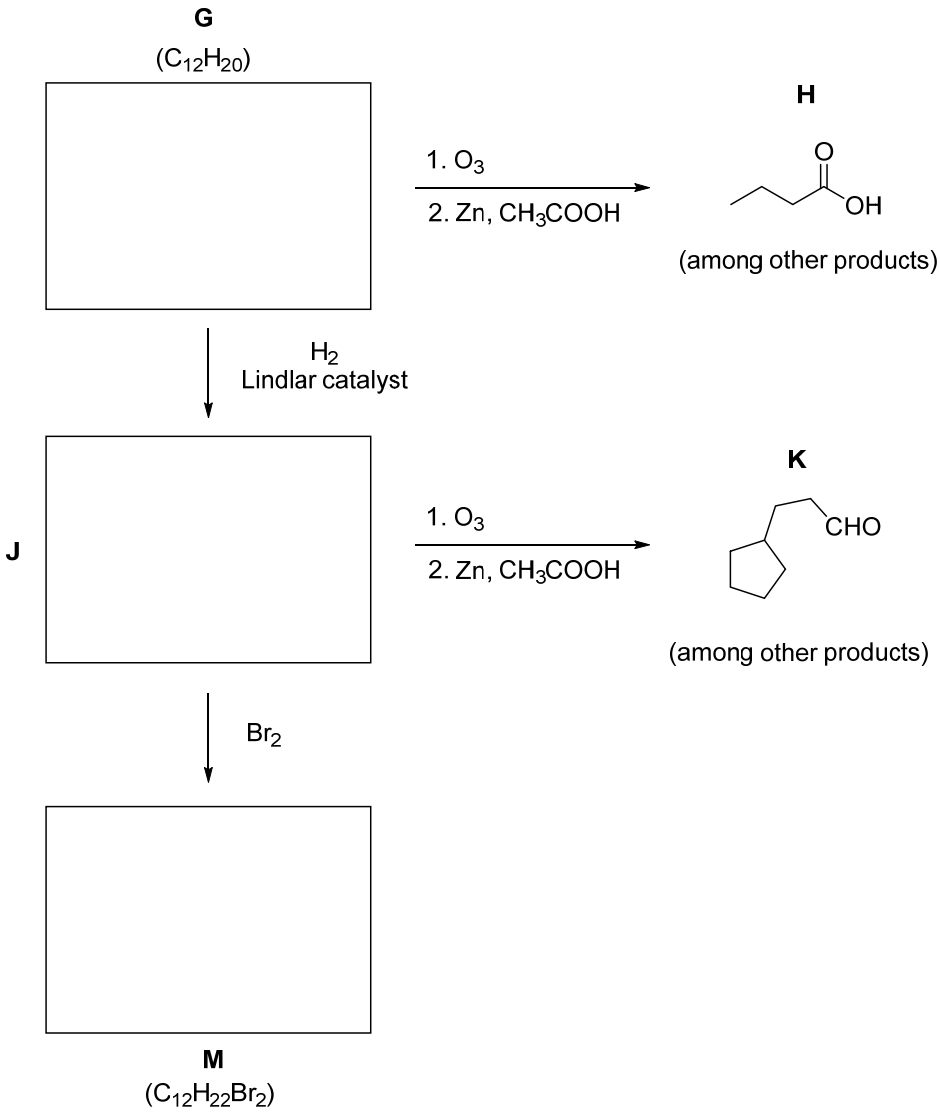


D **E** **F**

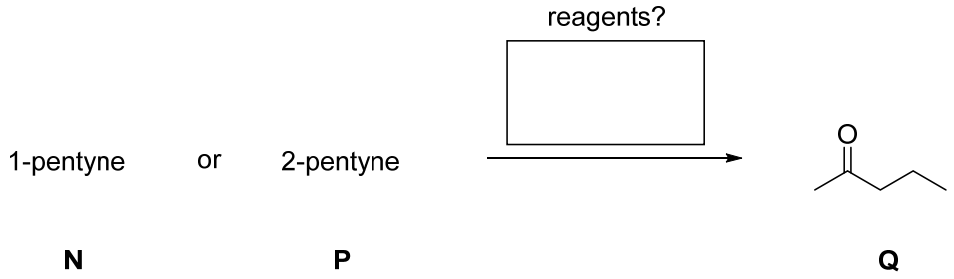
ammonia chloroform cyclohexene

Problem III. (18 points) Roadmap Problem. Provide structures for compounds **G**, **J**, and **M** given the information listed below.

Compound **G** has the molecular formula $C_{12}H_{20}$. When **G** is subjected to ozonolysis with a reductive workup, compound **H** is one of the fragments isolated from the reaction. When compound **G** is treated with H_2 in the presence of Lindlar catalyst, compound **J** is formed. When **J** is subjected to ozonolysis with a reductive workup, compound **K** is one of the fragments isolated from the reaction. When compound **J** is treated with elemental bromine, the orange color disappears and yields a racemic mixture of product **M** with molecular formula $C_{12}H_{22}Br_2$. On your answer sheet, provide structures for compounds **G**, **J**, and **M** that are consistent with these data.

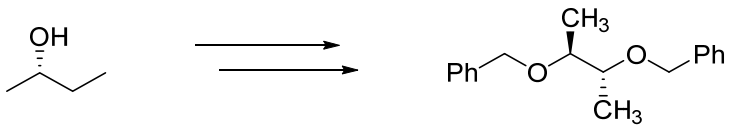


Problem IV. Explanations (13 points). Of compounds **N** and **P**, which is the better choice of starting material to synthesize 2-pentanone (**Q**)? Mark the letter of your selection in the box marked "choice" and the reagents required for the transformation in the box marked "reagents"



N **P** **Q**

Problem V. Synthesis (20 points). Provide a synthetic route—i.e, a sequence of reactions—to produce compound **U** using (*S*)-2-butanol (**T**) as the starting material and any other compounds and reagents you wish. (Just don't violate the spirit of the problem by not using compound **T** as one of the sources of carbon atoms in **U**).



T **U**