



# Chem 341 • Organic Chemistry I

Midterm Exam 3 • November 16, 2007

**N A M E** \_\_\_\_\_ **K E Y** \_\_\_\_\_



Please read through each question carefully and answer in the spaces provided.

A good strategy is to go through the test and answer all the questions you can do easily. Then go back and tackle the more difficult problems.

Please make sure your structures are drawn clearly and indicate any necessary stereochemistry with bold or dashed bonds.

Finally, think about what you know. Common sense and reason can often help you out.

You may use the back of the pages for scratch paper.

Problem 1    12 pts    \_\_\_\_\_

Problem 6    6 pts    \_\_\_\_\_

Problem 2    15 pts    \_\_\_\_\_

Problem 7    6 pts    \_\_\_\_\_

Problem 3    21 pts    \_\_\_\_\_

Problem 8    6 pts    \_\_\_\_\_

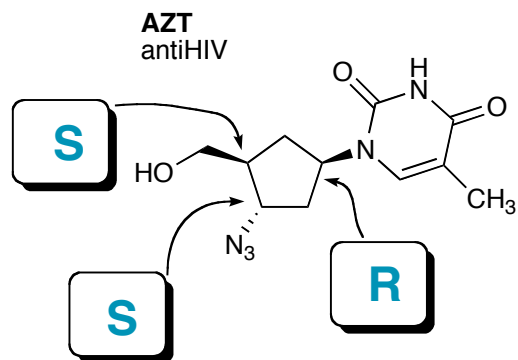
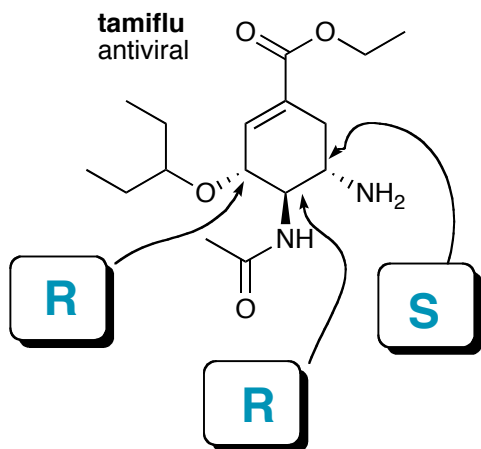
Problem 4    18 pts    \_\_\_\_\_

Problem 9    10 pts    \_\_\_\_\_

Problem 5    6 pts    \_\_\_\_\_

TOTAL    100 pts    \_\_\_\_\_

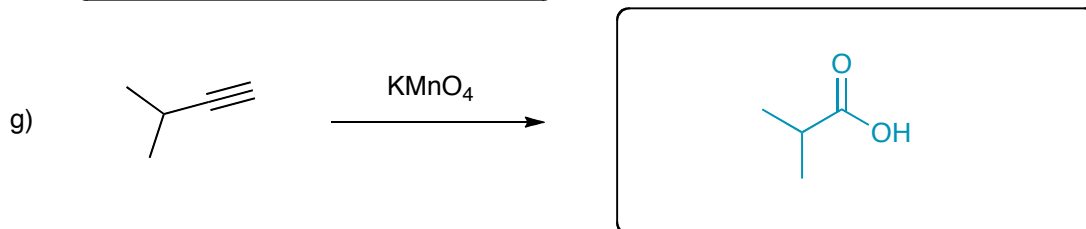
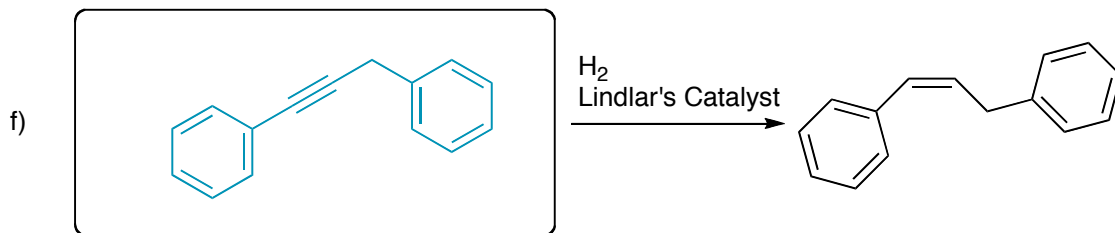
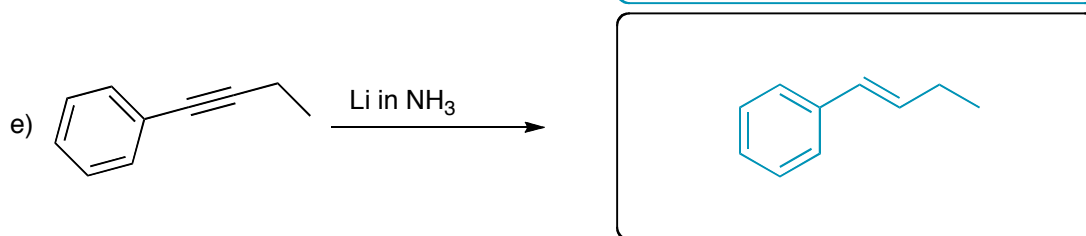
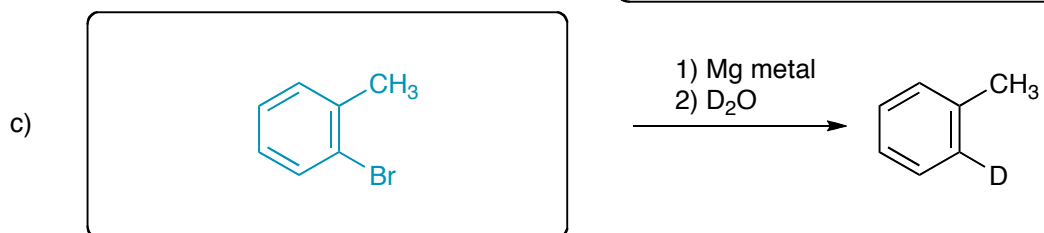
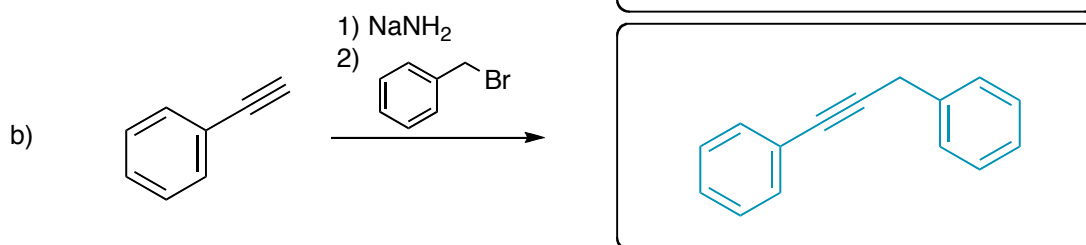
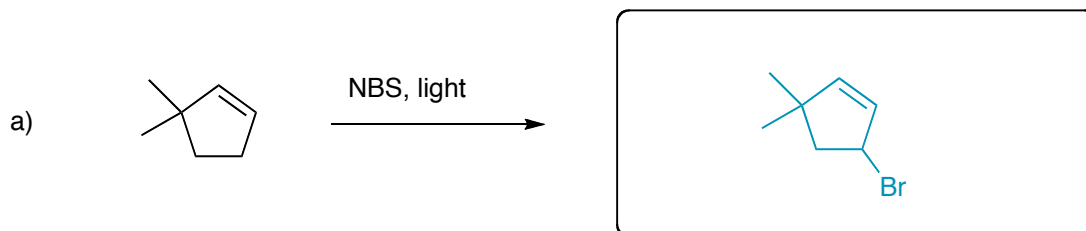
1. For the following drug molecules, identify the R or S configuration of the stereogenic carbons. Place your answer in the indicated box. (12 pts)



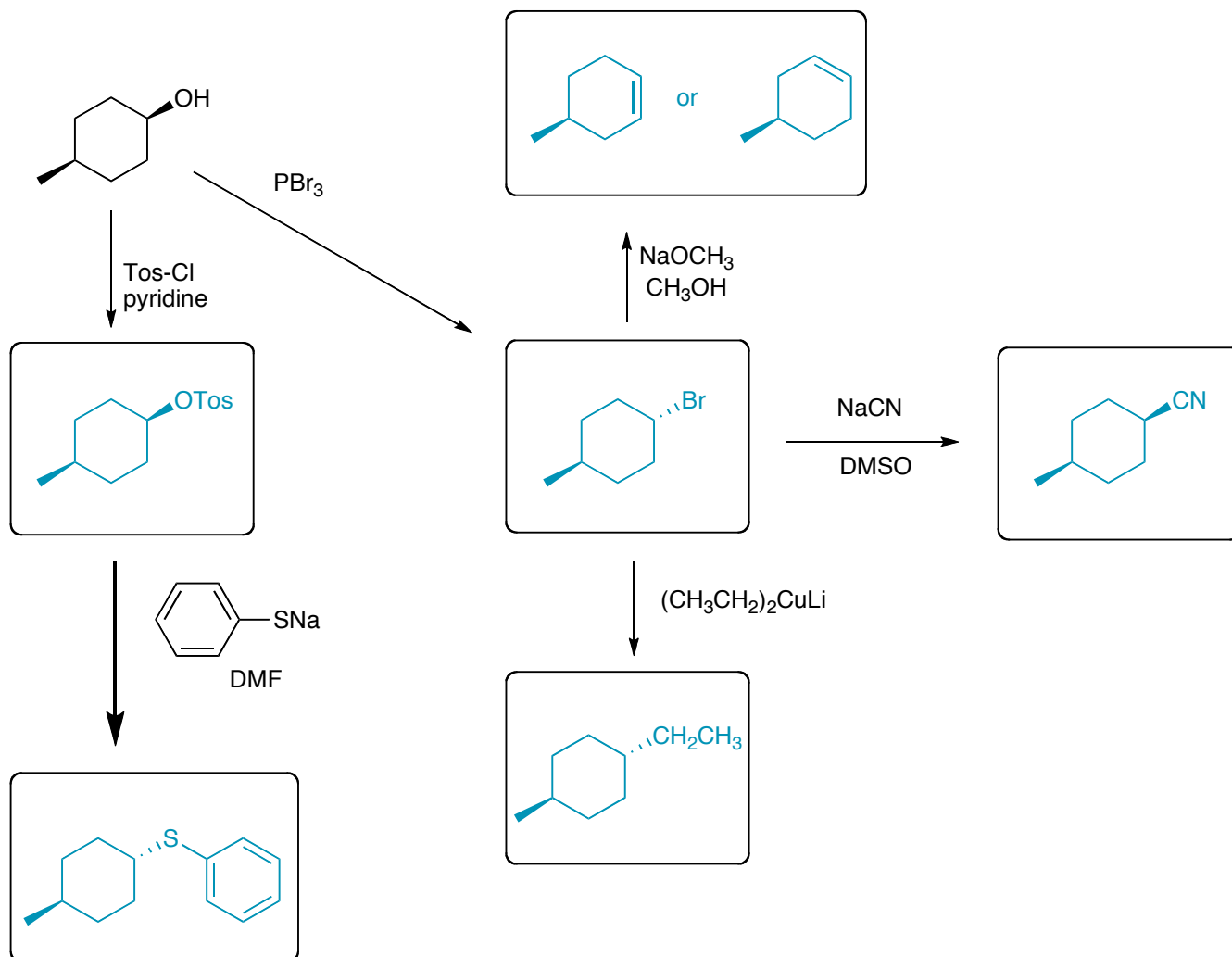
2. For the following pairs of molecules, check the appropriate box that describes their relationship. Indicate whether or not it is a meso compound. (15 pts)

		identical	check one		Is this a Meso compound (circle Y or N)	
			enantiomers	diastereomers		
		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Y	<input checked="" type="checkbox"/>
		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N
		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N
		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Y	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Y	<input checked="" type="checkbox"/>

3. Please provide the structure for the major organic product or the missing starting material in each of the following reactions. (21 pts)

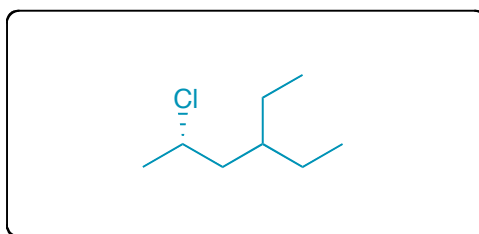


4. Fill in the missing structures for the following reactions. (18 pts)

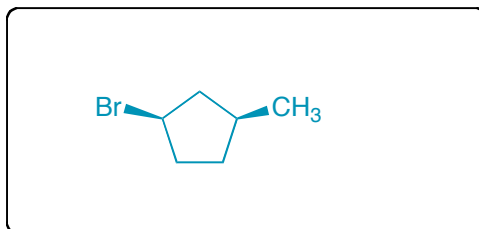


5. Draw the structure for the following compounds. Please show stereochemistry clearly. (6 pts)

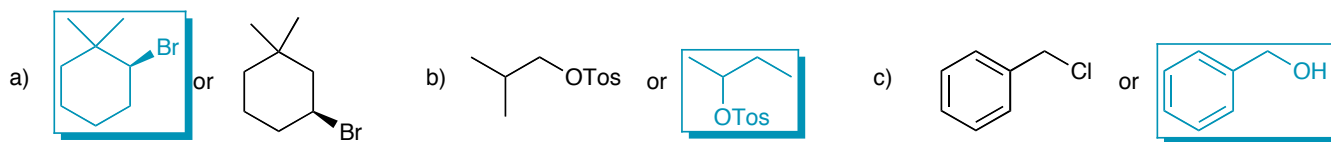
a) (*S*)-2-chloro-4-ethylhexane



b) (1*R*,3*S*)-1-bromo-3-methylcyclopentane



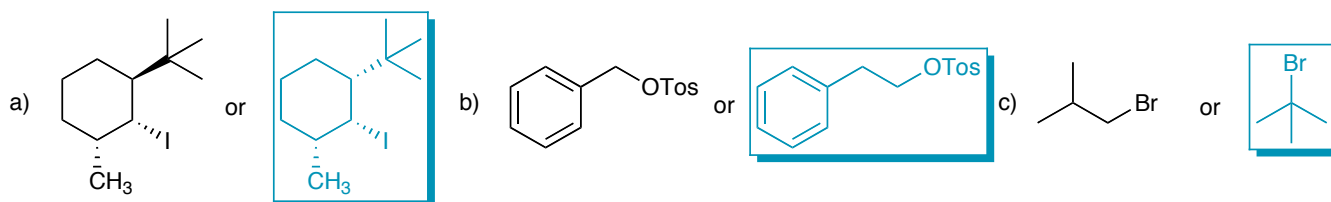
6. For each pair of molecules below, circle the compound that would be **worse** for an  $S_N2$  substitution reaction. (6 pts)



7. For each pair of molecules below, circle the one that would **best favor** a  $S_N1$  substitution reaction. (6 pts)



8. For each pair of molecules below, circle the one that would **best favor** an  $E2$  elimination reaction. (6 pts)



9. Indicate whether the following statements are TRUE or FALSE. (10 pts)

a)  $S_N1$  substitution often competes with  $E1$  elimination.

    T    

b)  $E1$  elimination reactions require an antiperiplanar alignment of the leaving group and adjacent hydrogen.

    F    

c) Allylic halides can only do  $S_N2$  substitution reactions.

    F    

d) Free radical halogenation is regioselective for substitution of an allylic or benzylic hydrogen.

    T    

e) Polar aprotic solvents are best for  $S_N1$  substitution reactions.

    F