

Scratch paper

Do not write any answers you wish to be graded on this page

CAS CH 203
Exam 3

Organic Chemistry I
2 December 2010, 8:00 A.M.–9:20 A.M.

Name _____

ID Number _____

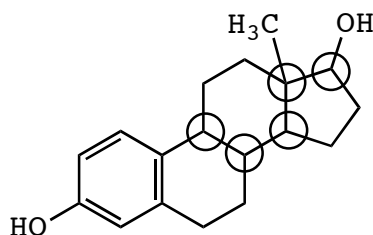
Instructions

- (A) Make sure you have 5 pages with 8 questions.
- (B) Write all answers on the pages provided.
- (C) Only answers written in ink will be considered for regrading.
- (D) Good luck!

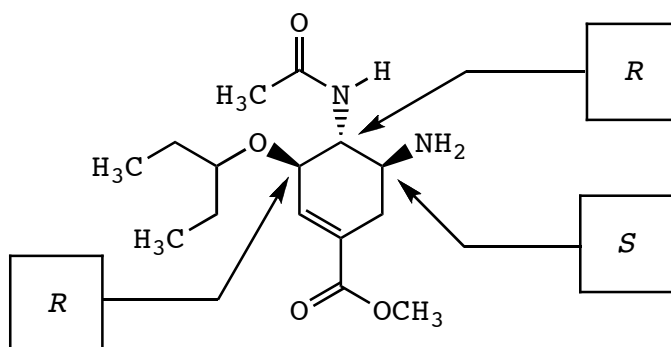
| | | | | | | | |
|----------|-----------|------------|-----------|----------|-----------|------------|-------------|
| I | II | III | IV | V | VI | VII | VIII |
| H | | | | | | | He |
| Li | Be | B | C | N | O | F | Ne |
| Na | Mg | Al | Si | P | S | Cl | Ar |
| K | Ca | Ga | Ge | As | Se | Br | Kr |
| Rb | Sr | In | Sn | Sb | Te | I | Xe |

| Page | Score |
|--------------|-------------|
| 1 | /20 |
| 2 | /21 |
| 3 | /24 |
| 4 | /24 |
| 5 | /11 |
| | |
| Total | /100 |

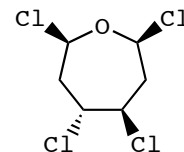
(1) Circle the chirality centers in the female sex hormone estradiol. (5 points)



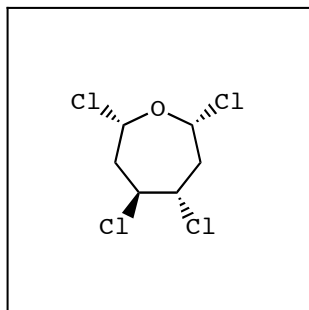
(2) Determine the absolute configuration (*R* or *S*) of the indicated chirality centers in the antiviral drug Tamiflu; write your answer in the boxes provided. (6 points)



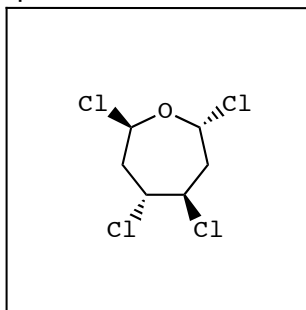
(3) In the appropriate box draw (a) the enantiomer, (b) an optically active diastereomer, and (c) an optically inactive diastereomer of the structure at right. (9 points)



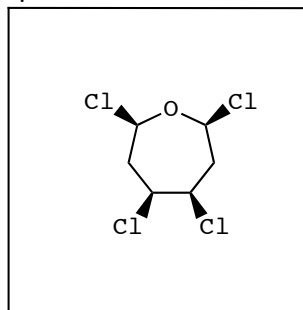
enantiomer



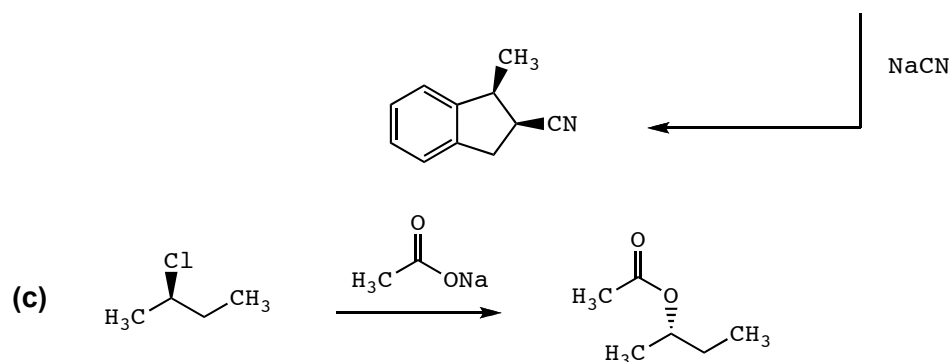
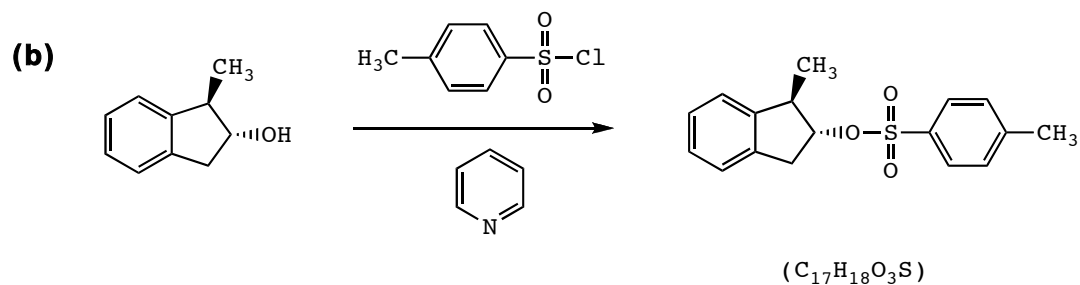
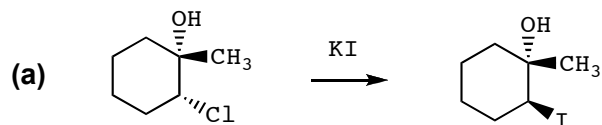
op. act. diastereomer



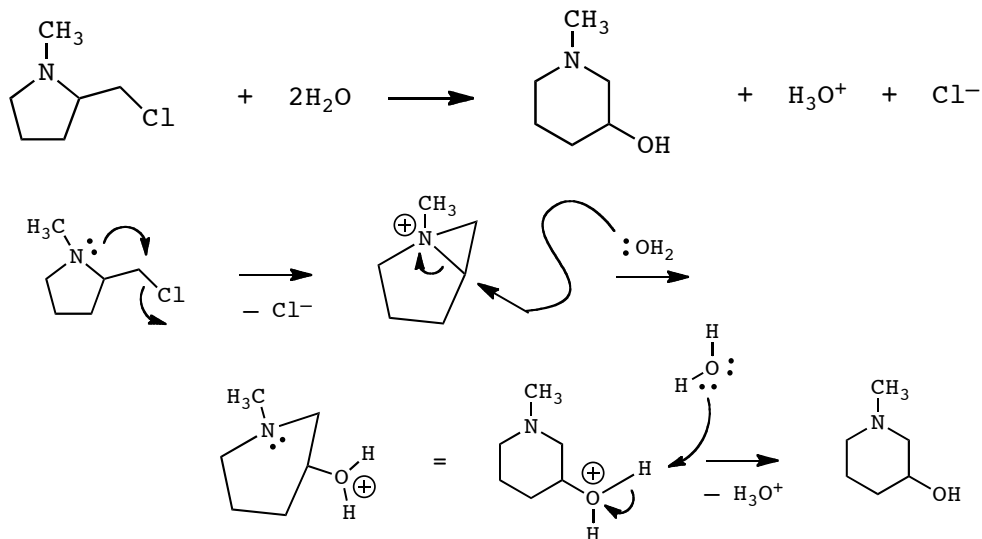
op. inact. diastereomer



(4) Draw the structure of the major organic product of these reactions and reaction sequences; clearly show the major product's stereochemistry using dashed-and-wedging. **Note** The formula of the major product is supplied in some cases as a hint. (12 points)

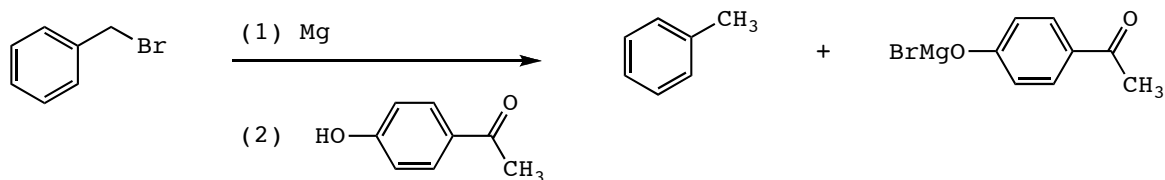


(5) Write a mechanism of this reaction; use curved arrows to show the movement of electrons. (9 points)

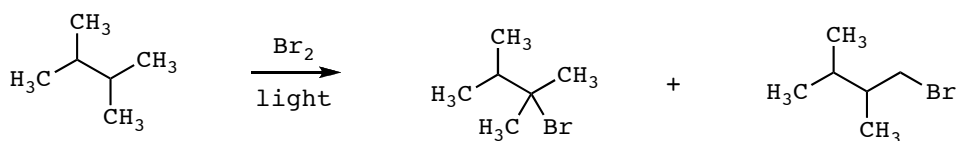


(6) All of these reactions and reaction sequences afford significant amounts of **two** organic products: draw the structures of both of them. In those reactions marked § clearly show the products' stereochemistry using dashed-and-wedging. (24 points)

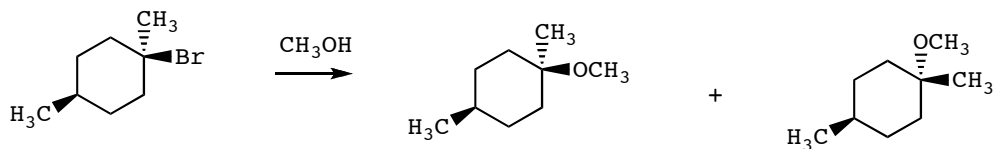
(a)



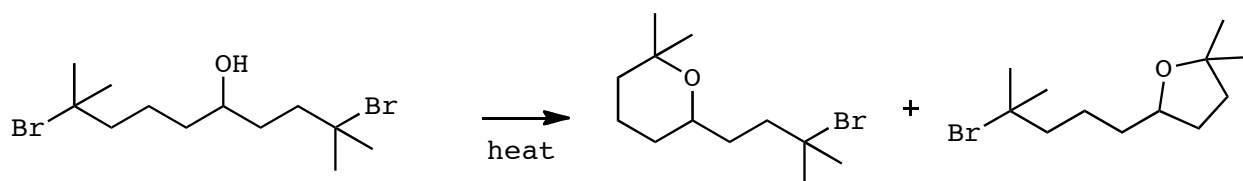
(b)



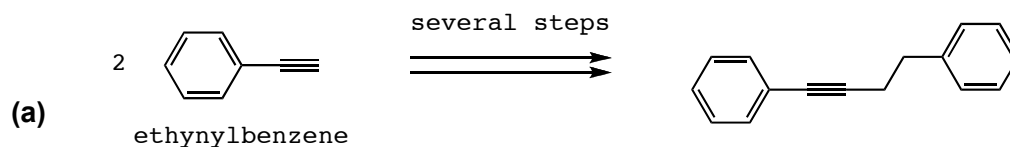
(c§)



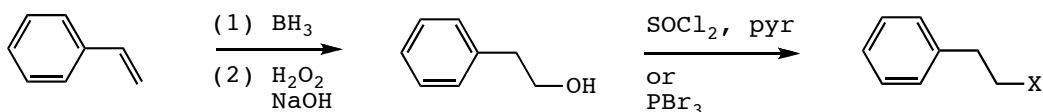
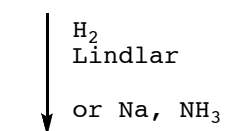
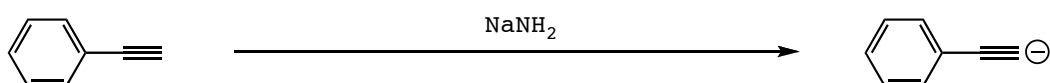
(d)



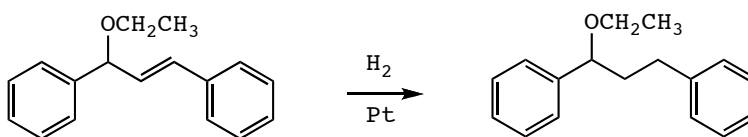
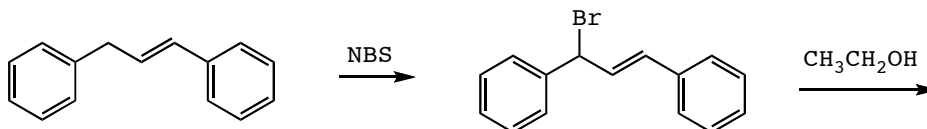
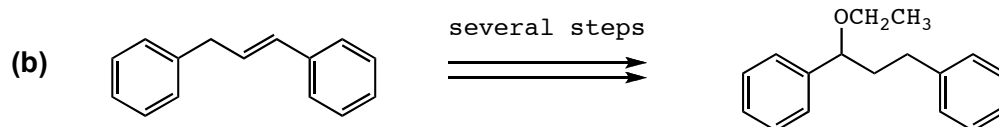
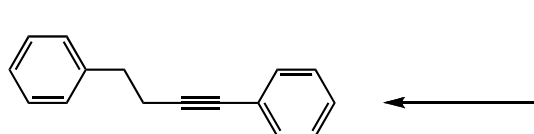
(7) Propose a sequence of reactions that efficiently converts the indicated starting material(s) to the target molecule. Show the reagents needed in each step and draw the product formed after each step. Do not present mechanisms. (15 + 9 = 24 points)



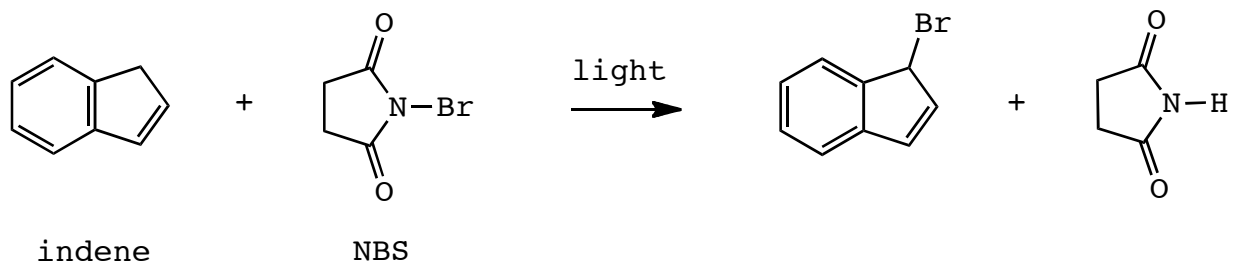
Note All of the carbons in the target must come from ethynylbenzene.



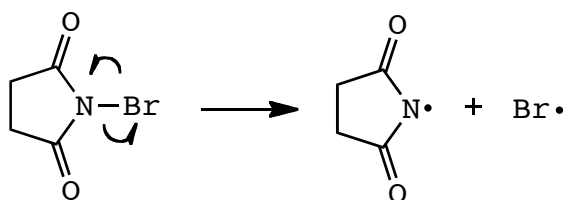
(X = Cl or Br)



(8) Write a mechanism for the following reaction; use curved arrows whenever possible to show the movement of electrons. (11 points)



Initiation (2 points):



Propagation (3 points each):

