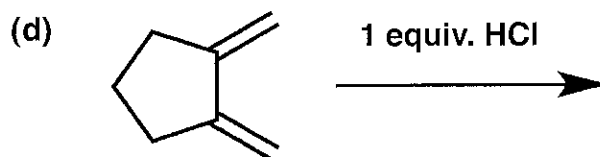
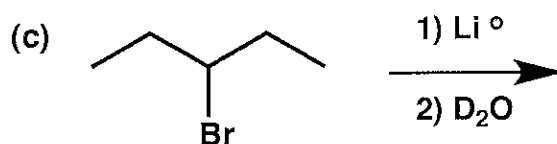
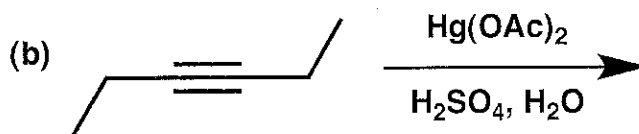
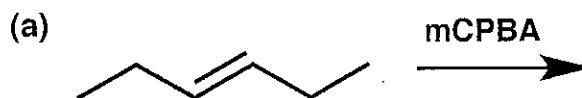


General Instructions:

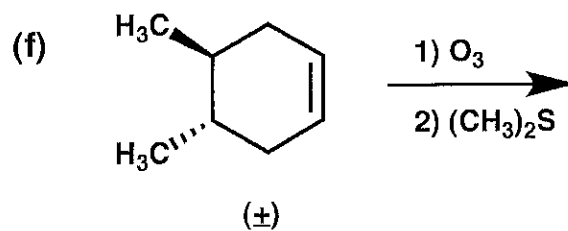
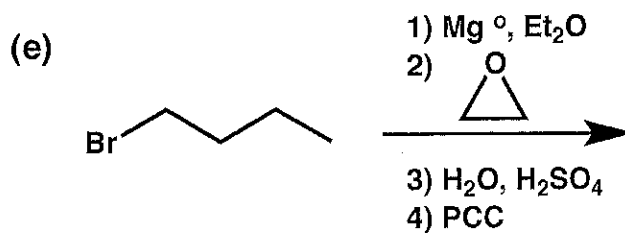
- (i) Use scratch paper at back of exam to work out answers; final answers must be recorded at the proper place on the exam itself for credit. Models are allowed.
- (ii) Print your name on each page.
- (iii) Please keep your paper covered and your eyes on your own work. Misconduct will lead to failure in the course.

1. (39 points) Show the major product or products expected from each reaction.

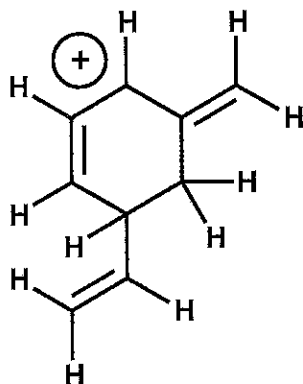


(continued on next page)

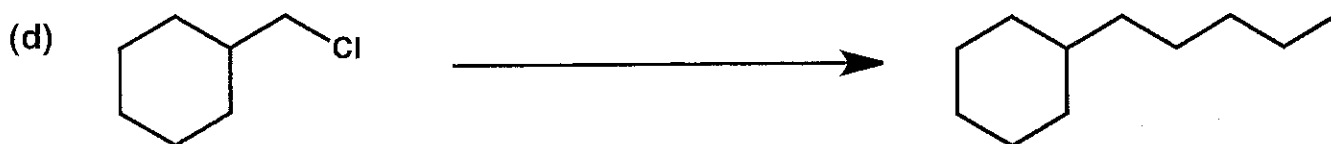
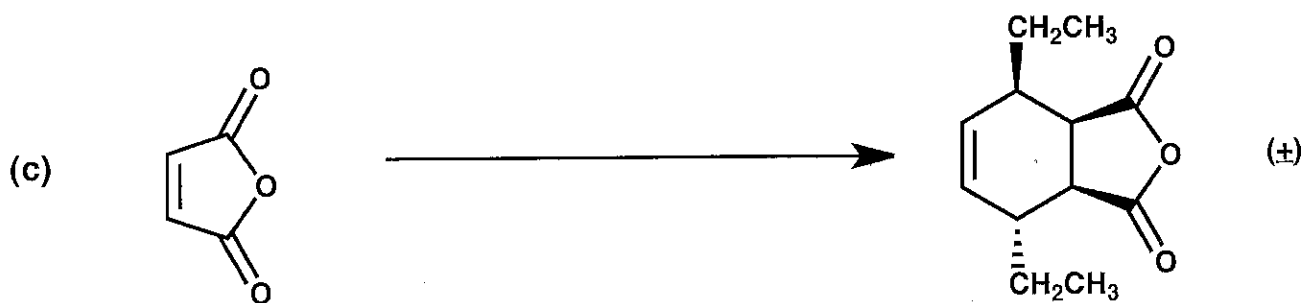
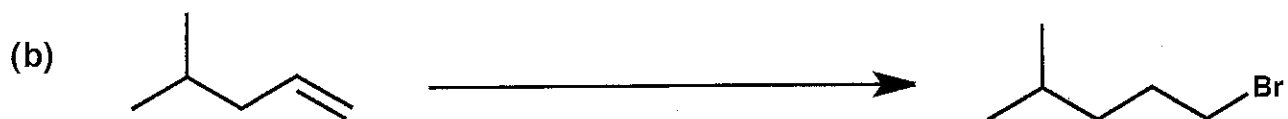
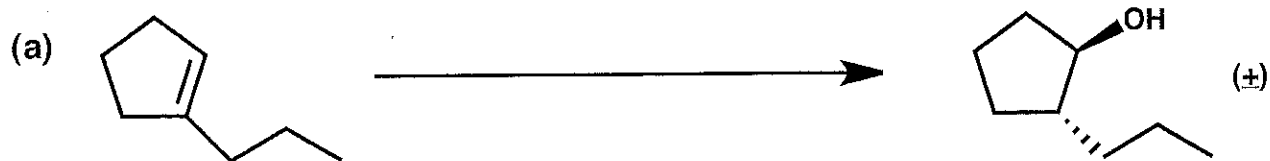
1. (cont.)



2. (8 points) Draw all of the other resonance structures for the carbocation shown below. Skeletal drawings (no H's) are acceptable, if they are correct.



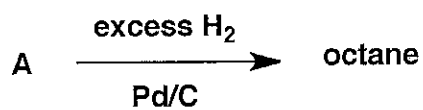
3. (23 points) Show the reagents required to convert the starting molecule to the indicated product. If necessary, be sure to differentiate clearly between distinct steps, by using "1)," "2)," etc. over the arrow.



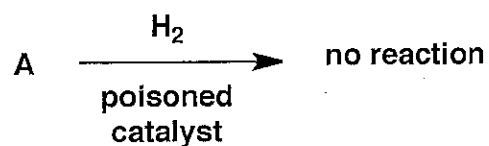
Name _____

4. (16 points) Propose one structure each for molecules A and B (there may be more than one correct answer).

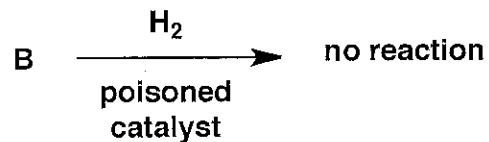
Molecule A has the formula C_8H_{10} and is not chiral.



A =

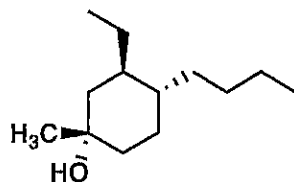


Molecule B has the formula C_8H_{10} and is not chiral.



B =

5. (30 points)



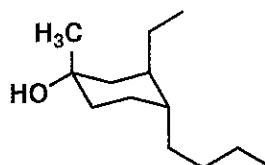
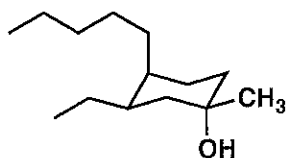
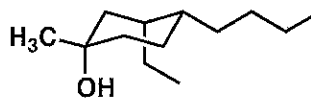
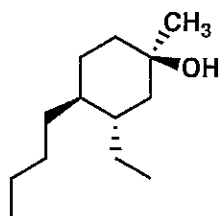
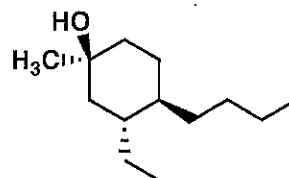
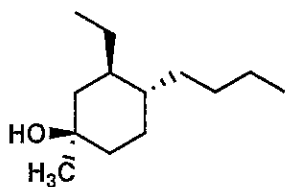
Among the structures drawn below the line, indicate isomeric relationships to the structure of molecule D, drawn above, by following the directions below. Molecule D is a single enantiomer. (Conformational differences are not relevant to this question.)

Put a **CIRCLE** around any structure that corresponds to D (i.e., a different drawing of the same molecule).

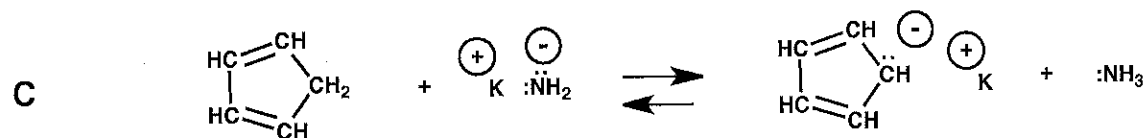
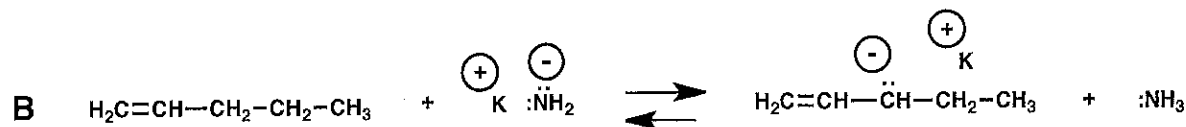
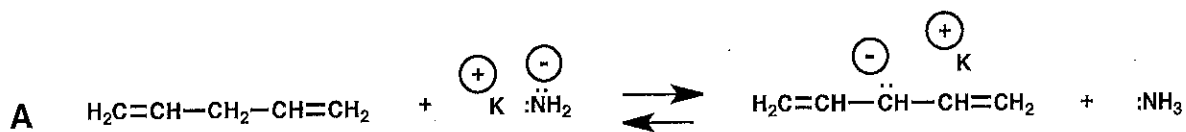
Put a **SQUARE** around any structure that corresponds to the **ENANTIOMER** of D.

Put a **TRIANGLE** around any structure that corresponds to a **DIASTEREOMER** of D.

Put an **X** across any structure that corresponds to a **CONSTITUTIONAL ISOMER** of D.

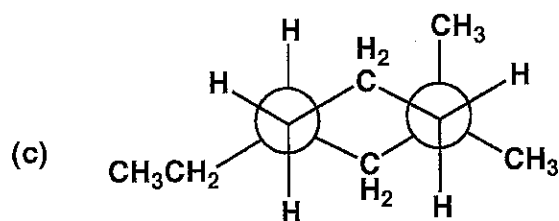
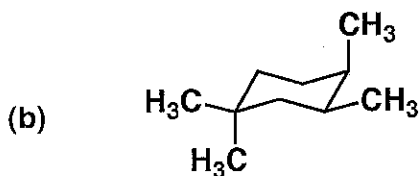
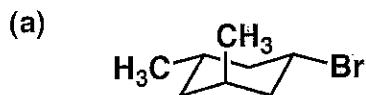


6. (5 points) For the set of equilibria shown below, indicate the order in propensity to lie to the right (most vs. intermediate vs. least), using the designations A-C.

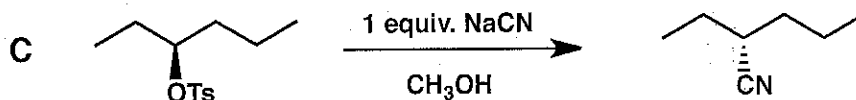
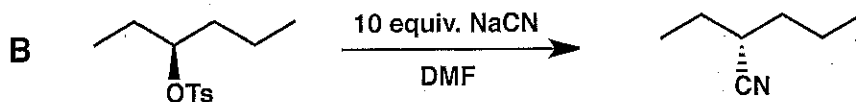
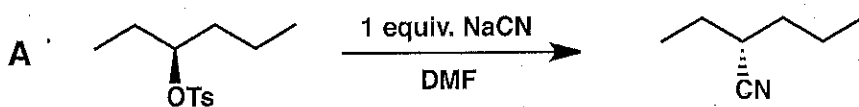


Most = _____ Intermediate = _____ Least = _____

7. (18 points) For each cyclohexane conformation shown below, draw the other possible conformation (using the same drawing style as the original image), and CIRCLE the one you expect to be most stable.

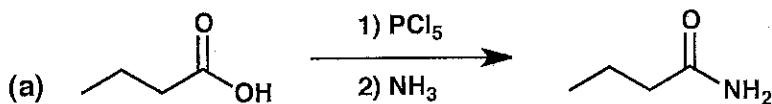


8. (5 points) For each set of reactions shown below, indicate the expected order of reaction rates (fastest vs. intermediate vs. slowest) using the designations A-C.



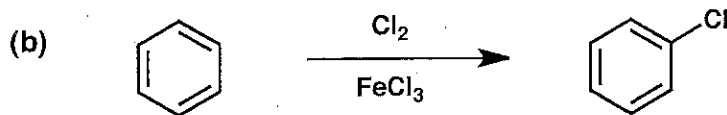
Fastest = _____ Intermediate = _____ Slowest = _____

9. (6 points) Using the 'simplified' rules we discussed in class for assigning oxidation states to carbon atoms within molecules, categorize each of the reactions below as "oxidation", "reduction" or "no redox change". These categorizations should be based on the organic molecules to the left and right of the arrow; do not be concerned with any reagents. Also, do not concern yourself with the mechanism of any reaction below, which will be covered in Chemistry 345.



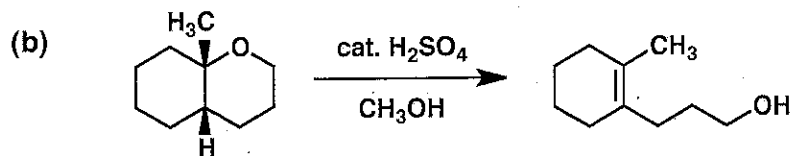
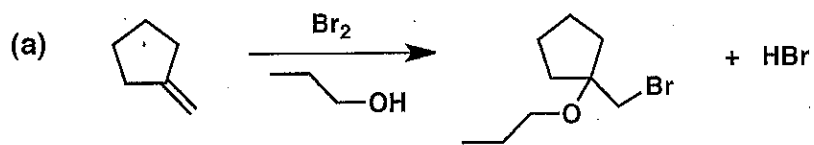
CIRCLE ONE

Oxidation
Reduction
No redox change



Oxidation
Reduction
No redox change

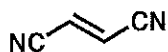
10. (20 points) Provide a mechanism (curved arrows) for each reaction shown below. Be sure to show intermediates.



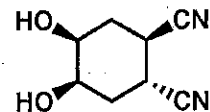
11. (30 points) Devise a synthetic route from the indicated starting material to the indicated target in each of the two cases below. Each route should be as short and as selective as possible. You may use any other organic molecules and any inorganic reagents in your synthetic plans. Show the expected product after each step in each synthetic route. (Do not provide mechanistic information.)

(a)

Starting material =



Target =

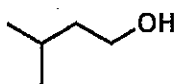


(±)

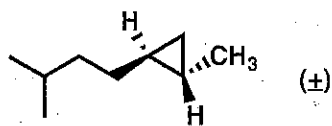
Name _____

11. (cont.)

Starting material =



Target =



<u>Problem #</u>	<u>Score</u>
1	/ 39
2	/ 8
3	/ 23
4	/ 16
5	/ 30
6	/ 5
7	/ 18
8	/ 5
9	/ 6
10	/ 20
11	/ 30

Total: / 200

