

Hour Exam #2  
Chemistry 343  
Professor Gellman  
2 November 2016

Last Name \_\_\_\_\_

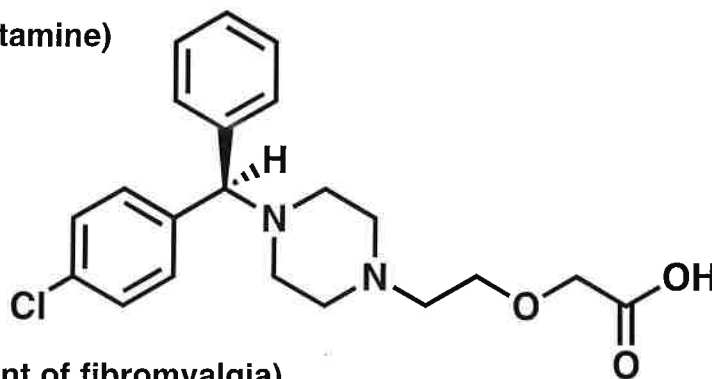
First Name \_\_\_\_\_

**General Instructions:**

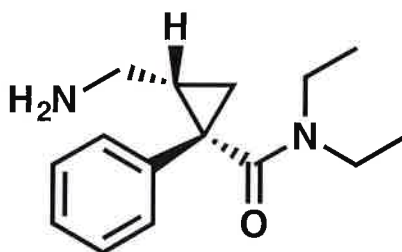
- (i) Use scratch paper at back of exam to work out answers; final answers must be recorded at the proper place on the exam itself for credit.
- (ii) Print your name on each page.
- (iii) Please keep your paper covered and your eyes on your own work. Misconduct will lead to failure in the course.

1. (13 points) Shown below are the structures of two drug molecules. In each case, CIRCLE each of the chiral centers, and indicate configuration (R vs. S) for each chiral center. Be sure to answer the question at the bottom.

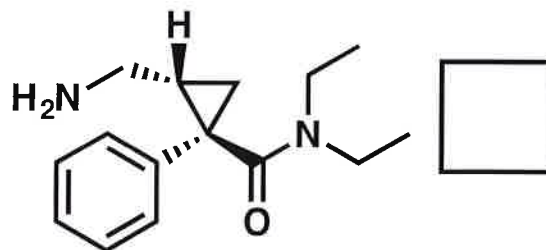
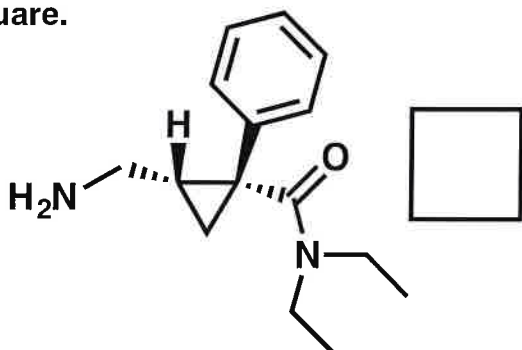
(a) Cetrizine (an antihistamine)



(b) Milnacipran (treatment of fibromyalgia)



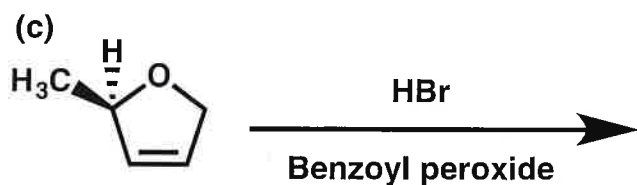
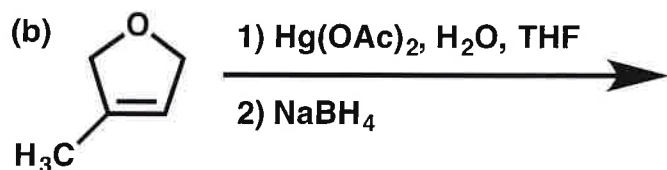
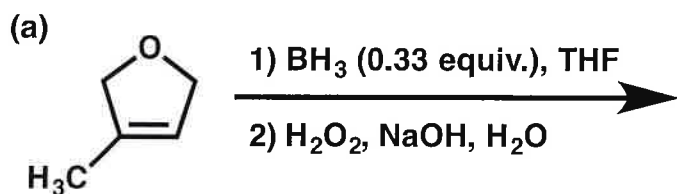
(c) For each structure below, one of the three statements about optical activity given is correct. In each case, write the numeral corresponding to the correct statement in the square.



- (1) The specific rotation will be identical to that of the molecule shown in part (b).
- (2) The specific rotation will have the same absolute value but the opposite sign relative to that of the molecule shown in part (b).
- (3) No prediction about the specific rotation can be made.

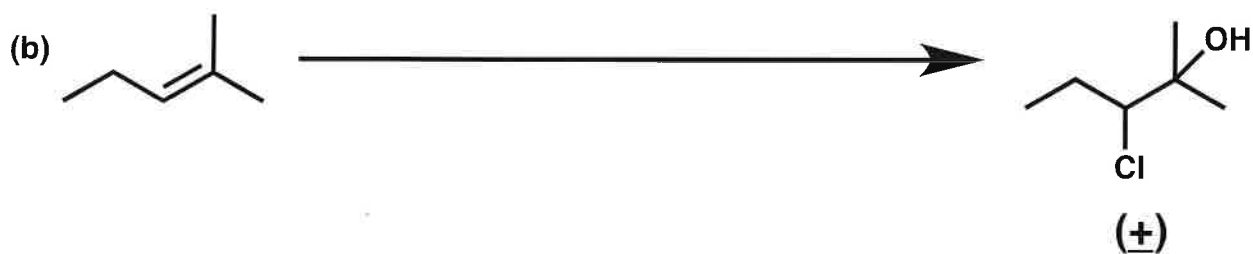
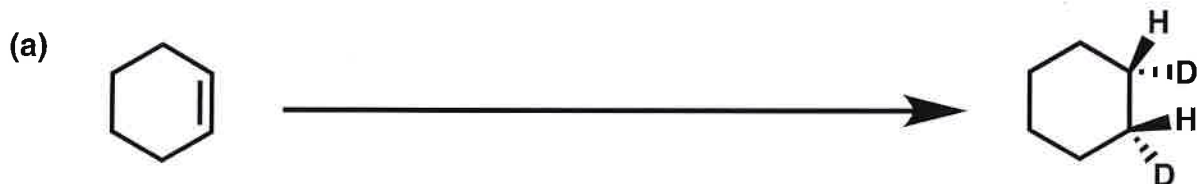
Name \_\_\_\_\_

2. (24 points) Show the major product(s) expected from each reaction below.



(single enantiomer)

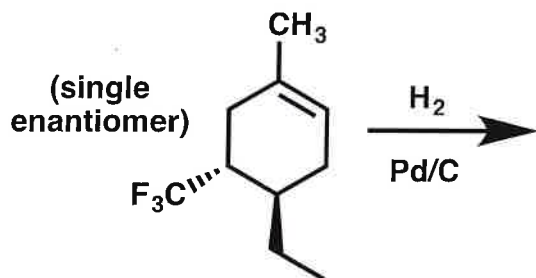
3. (12 points) Show the reagents required to convert the starting molecule to the indicated product. If necessary, differentiate between or among distinct steps by using "1)", "2)", etc.



Name \_\_\_\_\_

4. (22 points)

(a) Two products are formed in the reaction indicated below. Draw the structures of those products after the arrow.



(b) On the line below, indicate the relationship between the two product molecules. Be as specific as possible.

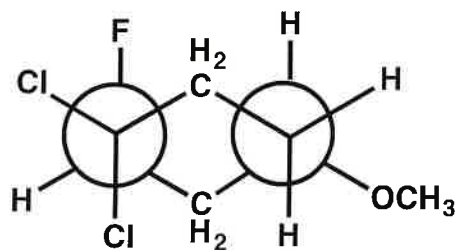
\_\_\_\_\_

(c) Draw both chair conformations of each of the product molecules you indicated in part (a). For each molecule, CIRCLE the conformation you expect to be more stable.

(d) Of the products generated in the reaction above, which molecule should be most stable (i.e., which should release least heat upon combustion)? Answer this question by redrawing below the appropriate molecule.

Name \_\_\_\_\_

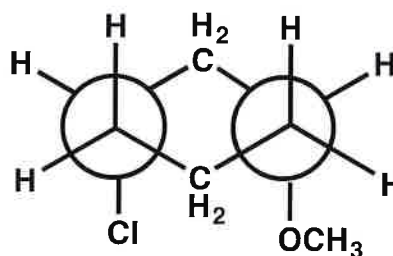
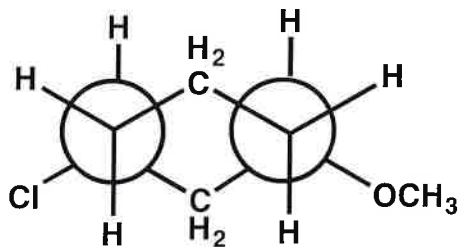
5. (10 points) Consider the Newman projection below.



(a) Provide a "hexagon" drawing for the molecule shown in the Newman projection above.

(b) Provide a "chair" drawing for the molecule shown in the Newman projection above, maintaining the conformation indicated by this Newman projection.

(c) Shown below are the Newman projections for the two chair forms of a substituted cyclohexane derivative. CIRCLE the Newman projection that corresponds to the more stable chair conformation.



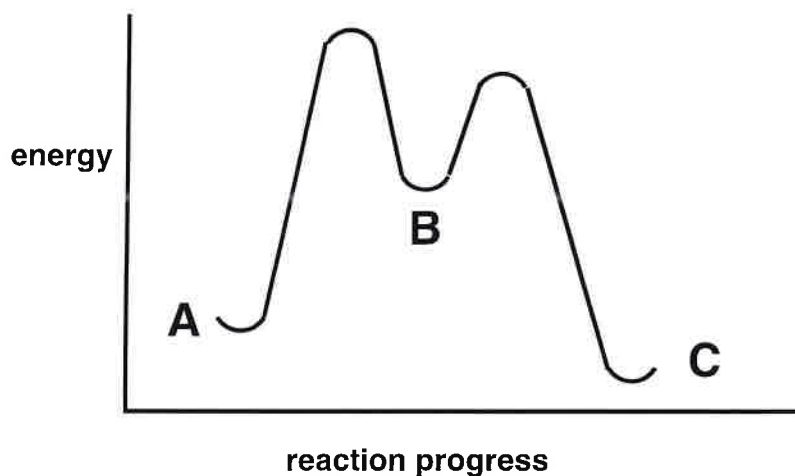
Name \_\_\_\_\_

6. (8 points) Provide a mechanism ("curved arrows") for the reaction shown below.

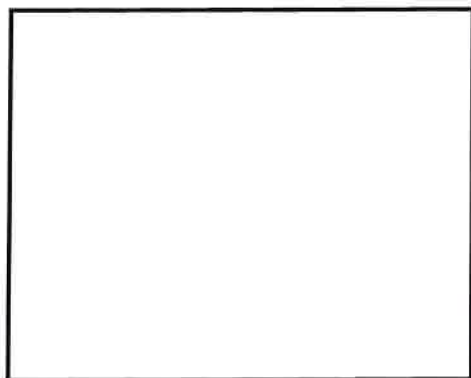


Name \_\_\_\_\_

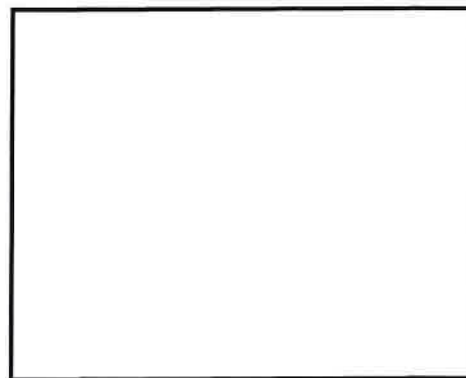
7. (11 points) Shown below are a reaction and the energy diagram for this reaction. (Note that there is only one step in this reaction; no follow-up treatment with  $(\text{CH}_3)_2\text{S}$  or  $\text{H}_2\text{O}_2$ .) Draw the structures for molecules A, B and C in the appropriate boxes below.



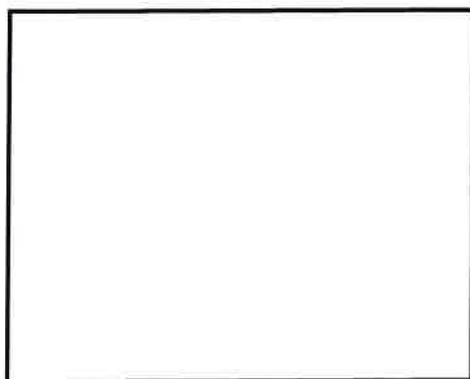
A =



B =



C =



Name \_\_\_\_\_

**Problem #****Score**

1 /13

2 /24

3 /12

4 /22

5 /10

6 / 8

7 /11

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**Total:****/100**

Periodic Table of the Elements

<i>UW-Madison</i>																						
VIII B																						
IB IIB																						
III A IV A VB VIB VII B VIII B																						
III A IV A VA VIA VII A VIII A																						
1	2																	10	18	36		
3	4																	9	17	35		
5	6	7	8															16	34	52	84	86
11	12																	15	33	51	83	85
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36					
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54					
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86					
87	88	89	104	105	106	107	108	109	110	111	112											

58	59	60	61	62	63	64	65	66	67	68	69	70	71
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
140.12	140.91	144.24	145	150.36	151.96	157.25	158.93	162.50	164.93	167.26	168.93	173.04	174.97
90	91	92	93	94	95	96	97	98	99	100	101	102	103
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
232.04	231.04	238.03	237	244	243	247	247	251	252	257	258	259	262

\* Lanthanides

\*\* Actinides



