Hour Exam #2
Chemistry 343
Professor Gellman
30 October 2013

Last Name _____

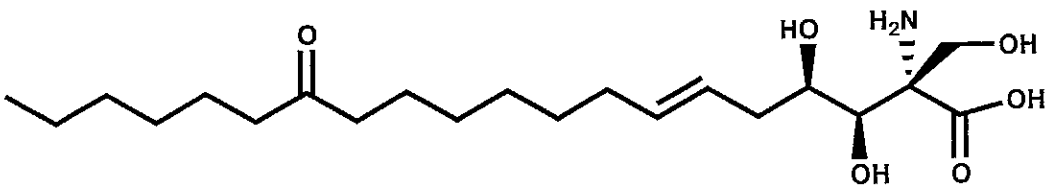
First Name _____

General Instructions:

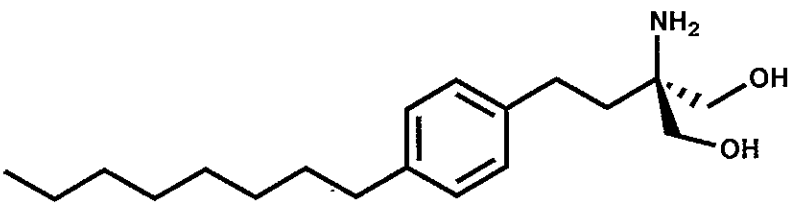
(i) Use scratch paper at back of exam to work out answers; final answers must be recorded at the proper place on the exam itself for credit.
(ii) Print your name on each page.
(iii) Please keep your paper covered and your eyes on your own work. Misconduct will lead to failure in the course.

1. (12 points) Shown below are two molecules that were discussed on the first day of class. The upper, Myriocin, is produced by a fungus, while the lower, Fingolimod, is a new drug for treatment of multiple sclerosis.

CIRCLE each sp^3 stereogenic center (chiral center) and assign the configuration (R or S) of each stereogenic center.



Myriocin

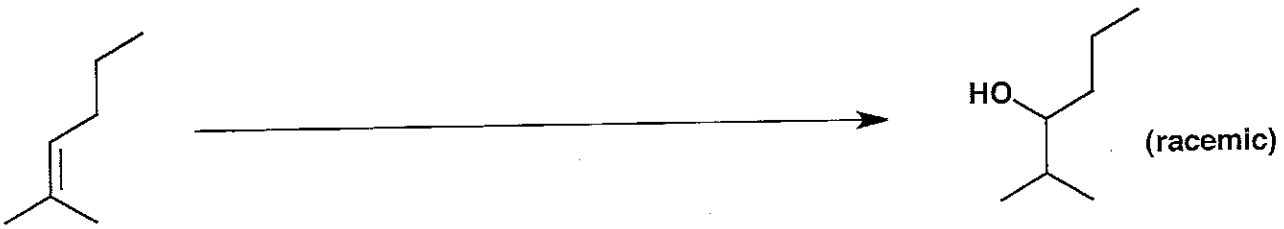


Fingolimod

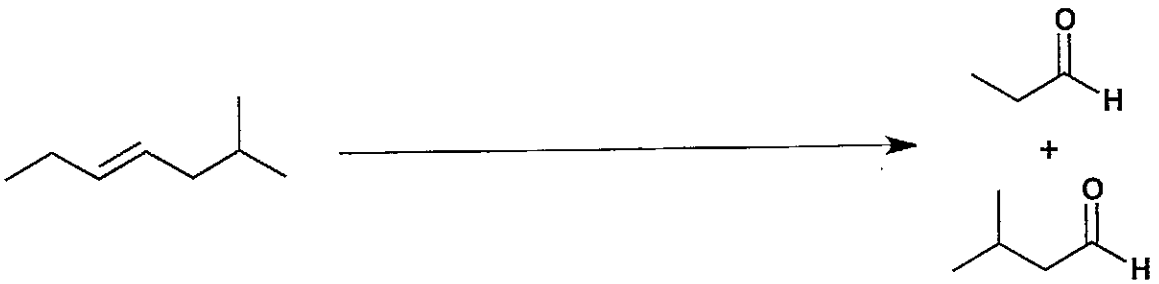
Name _____

2. (13 points) Show the reagents required to convert the starting molecule to the indicated product. If necessary, differentiate clearly between distinct steps by using "1)", "2)", etc. over or under the arrow.

(a)

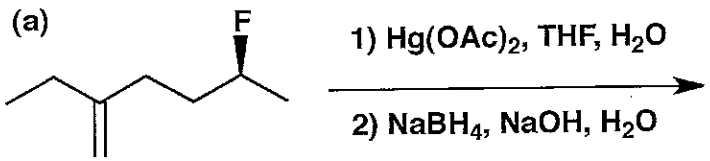


(b)



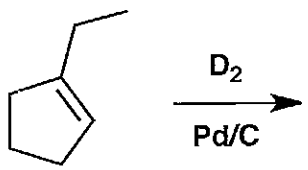
3. (12 points) Show the major product(s) expected from the reactions below.

(a)



(single enantiomer)

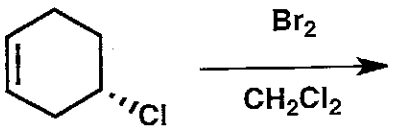
(b)



Name _____

4. (24 points)

(a) Show all expected products from the reaction below. Note that the starting material is a single enantiomer. Draw the expected products in the "regular hexagon" format (as the starting material is drawn), rather than in the chair form.



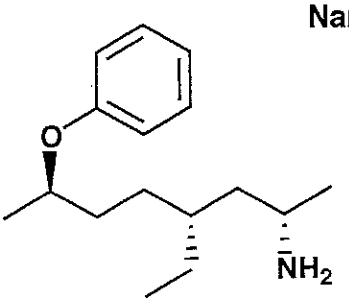
(b) For each product formed from the single enantiomer starting material, draw the conformational equilibrium between the two possible "chair" conformations.

(c) For each conformational equilibrium you drew above, put a SQUARE around the MOST STABLE chair conformation. In addition, put a CIRCLE around the equilibrium that you expect to be most strongly biased toward one of the two conformations.

In deciding how to place the squares and the circle, consider the following information.

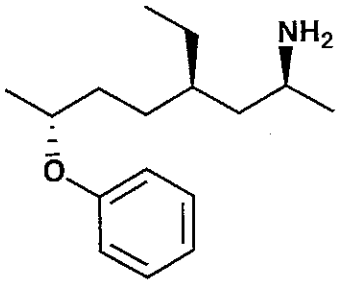
--> For chloro-cyclohexane and for bromo-cyclohexane, the conformation with equatorial halide is ~0.4 kcal/mol more stable than the conformation with axial halide.

5. (16 points) Consider molecule X.



X

For each of the structures shown below, indicate <u>on the line below the structure</u> the relationship to molecule X, choosing from the following possibilities: identical, enantiomer, diastereomer, constitutional isomer, non-isomer.



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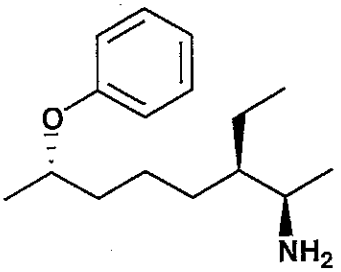

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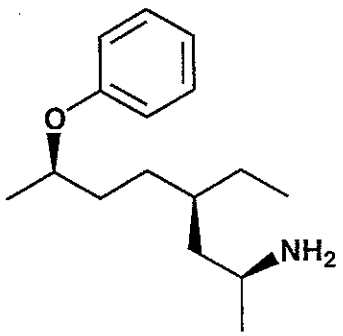

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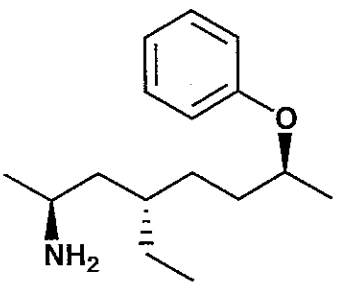

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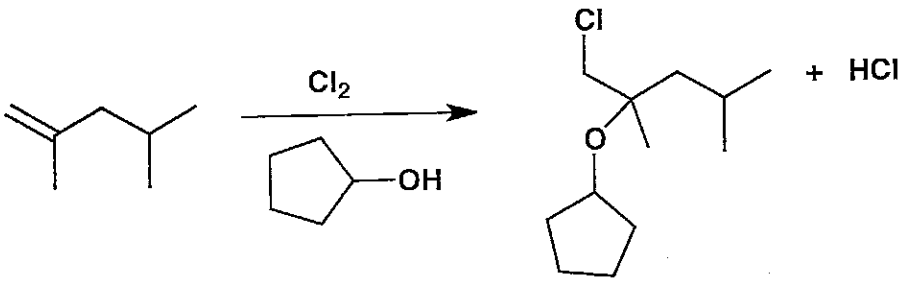
6. (13 points) Draw a mechanism (curved arrows) for the reaction shown below. Be sure to draw all intermediates, and to indicate any by-products that may not be shown in the equation.



7. (10 points) Draw two meso forms of difluorohexane ($C_6H_{12}F_2$).

Name _____ 00015

Problem #	Score
1	/ 12
2	/ 13
3	/ 12
4	/ 24
5	/ 16
6	/ 13
7	/ 10

Total: / 100

Periodic Table of the Elements

																	2 He 4.003
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.011	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.71	29 Cu 63.55	30 Zn 65.37	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc 98.91	44 Ru 101.07	45 Rh 102.91	46 Pd 106.4	47 Ag 107.87	48 Cd 112.40	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.60	53 I 126.90	54 Xe 131.30
55 Cs 132.91	56 Ba 137.34	57 La 138.91	72 Hf 178.49	73 Ta 180.95	74 W 183.85	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.09	79 Au 196.97	80 Hg 200.59	81 Tl 204.37	82 Pb 207.19	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226.03	89 Ac (227)	104 Unq* (261)	105 Unp* (262)	106 Unh* (263)	107 Uns* (262)	108 Uno* (265)	109 Una* (266)									

Lanthanides	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.35	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97
Actinides	90 Th 232.04	91 Pa (231)	92 U 238.03	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (249)	98 Cf (249)	99 Es (254)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)

*Symbol (and name) provisional.

Numbers in parentheses: available radioactive isotope of longest half-life.