

Seat No. _____

LAST NAME _____

FIRST NAME _____

There are 7 pages to this exam. Check to make sure you have a complete exam.

PLEASE ALSO PRINT YOUR NAME ON THE TOP OF
THE **BACK** OF THE LAST PAGE OF THE EXAM

CHEMISTRY 331

EXAM III

Spring 2007 (3/9/07)

I. (22 points) _____

II. (24 points) _____

III. (8 points) _____

IV. (17 points) _____

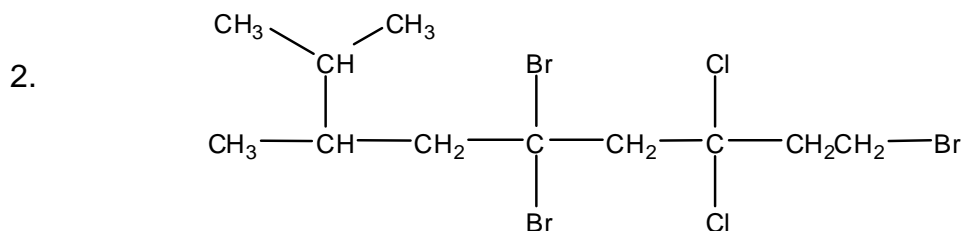
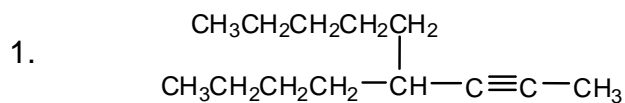
V. (16 points) _____

VI. (13 points) _____

TOTAL (100 points) _____

I. (22 pts)

A. (6 pts) Give a correct name for each of the following compounds.

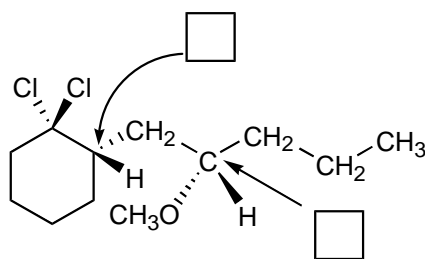
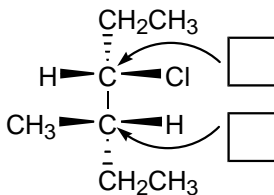
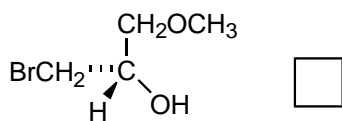


B. (6 pts) Give a correct structure for each of the following names.

1. 4-allyl-1,1-dibromocyclohexane

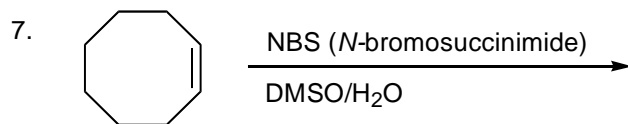
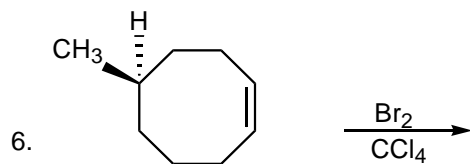
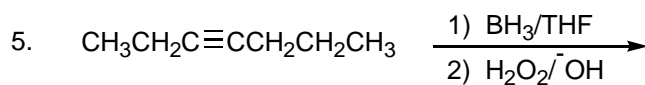
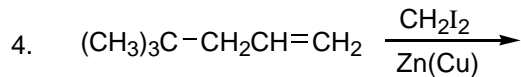
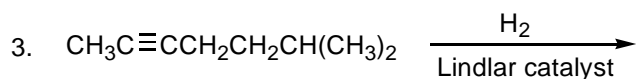
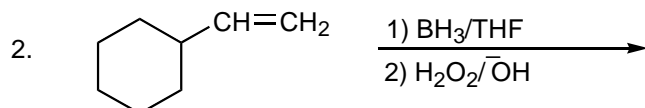
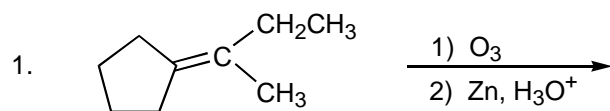
2. *E*-8-fluoro-7,9-dimethyldeca-5-en-1-yne

C. (10 pts) Assign R or S to the following stereogenic (chiral) centers.

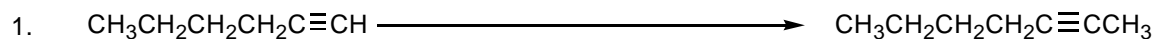


II. (24 pts)

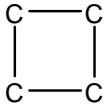
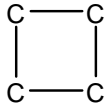
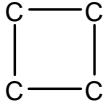
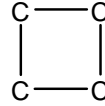
A. (21 points) Complete the following equations giving all organic products. Stereochemistry must be clearly indicated in reactions which are stereoselective.



B. (3 points) Give the reagents required to carry out the following conversion.



- III. (8 pts) complete the structures below to show all of the stereoisomers of 1,2-dichlorocyclobutane, $C_4H_6Cl_2$ (there are no more than four correct stereoisomers and there may be fewer; use wedges and dotted lines as needed). **Be sure to show all hydrogens.** **Cross out any boxes that are not used.** Points will be deducted for duplicate or incorrect structures.

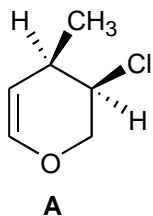
	
	

Periodic Table of the Elements

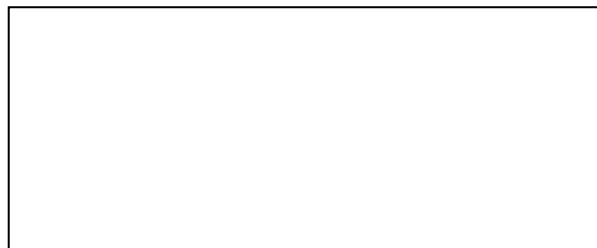
1A																	8A	
1	2A											3A	4A	5A	6A	7A	18	
H 1.01	2 He 4.00											13	14	15	16	17	2	
3	4											5	6	7	8	9	10	
Li 6.94	Be 9.01											B 10.8	C 12.0	N 14.0	O 16.0	F 19.0	Ne 20.2	
11	12	3B	4B	5B	6B	7B	8B			1B	2B	13	14	15	16	17	18	
Na 23.0	Mg 24.3	3	4	5	6	7	8	9	10	11	12	Al 27.0	Si 28.1	P 31.0	S 32.1	Cl 35.4	Ar 39.9	
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
K 39.1	Ca 40.1	Sc 45.0	Ti 47.9	V 50.9	Cr 52.0	Mn 54.9	Fe 55.8	Co 58.9	Ni 58.7	Cu 63.5	Zn 65.4	Ga 69.7	Ge 72.6	As 74.9	Se 79.0	Br 79.9	Kr 83.8	
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
Rb 85.5	Sr 87.6	Y 88.9	Zr 91.2	Nb 92.9	Mo 95.9	Tc (98)	Ru 101	Rh 103	Pd 106	Ag 108	Cd 112	In 115	Sn 119	Sb 122	Te 128	I 127	Xe 131	
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	
Cs 133	Ba 137	La 139	Hf 178	Ta 181	W 184	Re 186	Os 190	Ir 192	Pt 195	Au 197	Hg 201	Tl 204	Pb 207	Bi 209	Po (209)	At (210)	Rn (222)	
87	88	89	104	105	106	107	108	109										
Fr (223)	Ra 226	Ac 227	Rf (261)	Ha (262)	Unh (263)	Uns (262)	Uno (265)	Une (266)										

IV. (17 pts) Complete the following.

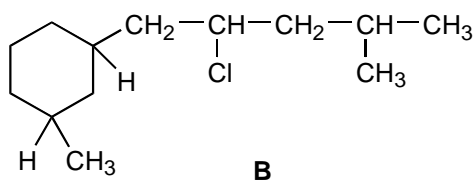
A. In the box provided, draw the enantiomer of **A**.



B. In the box provided, draw a diastereomer of **A**.



C. Circle the stereogenic (chiral) centers of **B**.



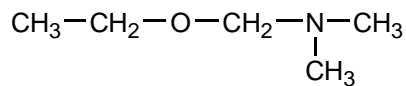
D. (2 pts) How many stereoisomers have the constitution of structure **B**? _____

E. Indicate whether the following statements are True or False by circling **T** or **F**.

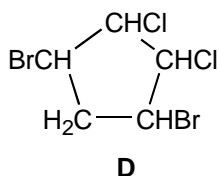
T **F** 1. The resolution of racemic mixtures often involves the formation of diastereomers.

T **F** 2. Chiral compounds from natural sources are rarely single enantiomers.

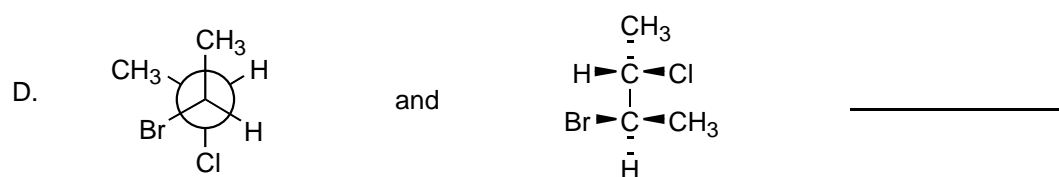
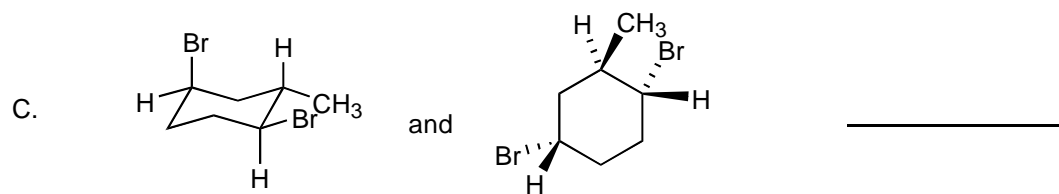
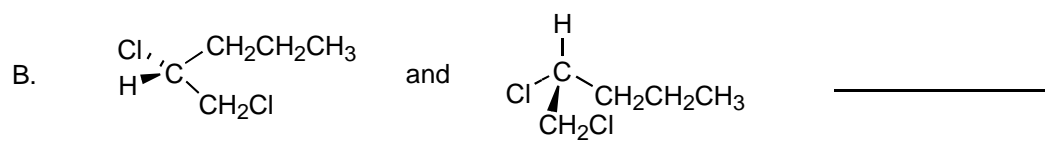
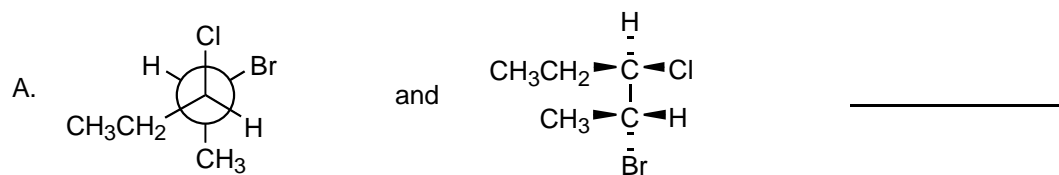
T **F** 3. Compound **C** (below) has two prochiral centers.



F. In the box provided, draw a meso stereoisomer that has the constitution of structure **D**.

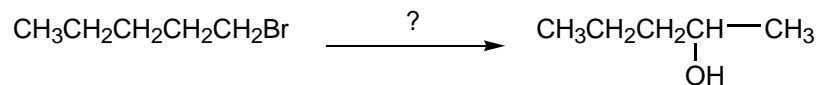


V. (16 pts) Label each pair of structures as I (identical), E (enantiomers), D (diastereomers) or C (constitutional isomers – not stereoisomers).



VI. (13 pts) Beginning with the starting material indicated, show how to achieve each of the following syntheses by showing all the reactions that are needed. (For each reaction, give the starting material, conditions over the arrow, and the products). You may use any inorganic compound or organic compound with one or two carbons.

A. (6 pts)



B. (7 pts)

