

Seat No. _____

LAST NAME _____

Section A _____

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

Fall 2006 (10/24/06)

I. (22 points) _____

II. (24 points) _____

III. (8 points) _____

IV. (17 points) _____

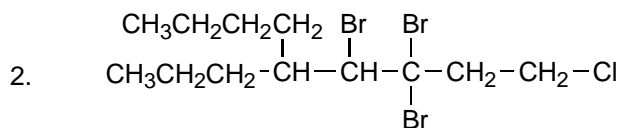
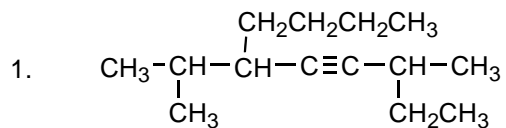
V. (16 points) _____

VI. (13 points) _____

TOTAL (100 points) _____

I. (22 pts)

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

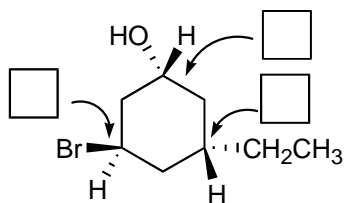
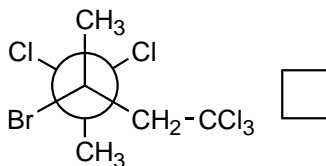
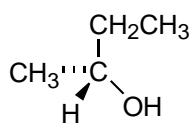


B. (6 pts) Give a correct structure for each of the following names.

1. 1-bromo-5-ethyl-4-iodohept-4-en-2-yne

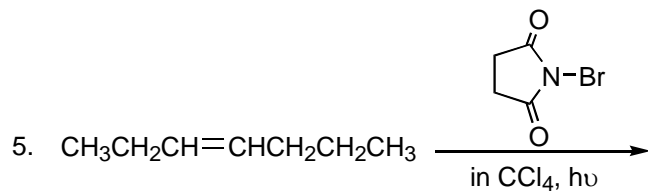
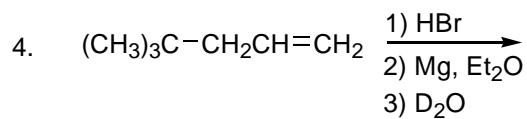
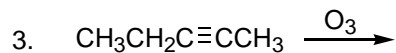
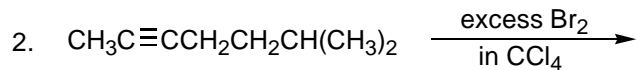
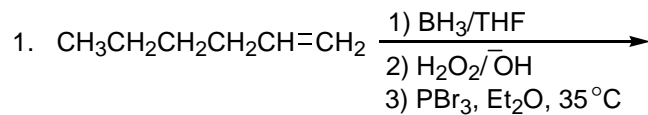
2. *meso*-1,1,6,6-tetrabromo-3,4-divinylcyclooctane

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

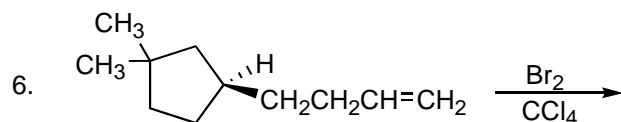


II. (24 pts)

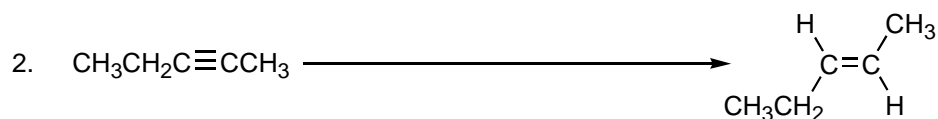
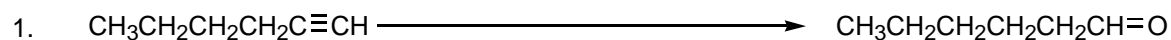
A. (18 points) Complete the following equations giving all organic products. Stereochemistry must be clearly indicated in reactions which are stereoselective.



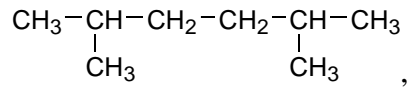
(It is not necessary to show cis-trans isomers)



B. (6 points) Give the reagents required to carry out the following conversions.



III. (8 pts) If Cl_2 is used as the chlorinating agent in the light-induced chlorination of



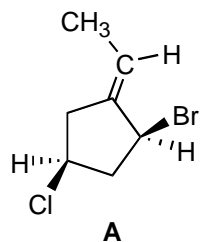
the relative reactivities (per hydrogen) for 1° , 2° , and 3° are 1 to 3.5 to 5 at 25°C . What will the relative proportions of monochloro products (constitutional isomers only) in the reaction mixture be? (Answers may be expressed in fractions). SHOW YOUR WORK. List the reaction products and the fraction of each formed.

Periodic Table of the Elements

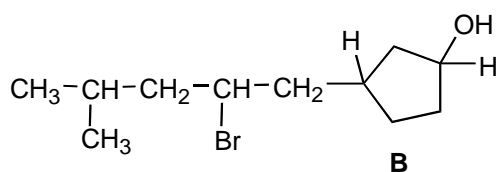
1A												3A		4A	5A	6A	7A	8A													
1	2A											13	14	15	16	17	18														
1 H 1.01																		2 He 4.00													
3 Li 6.94	4 Be 9.01											5 B 10.8	6 C 12.0	7 N 14.0	8 O 16.0	9 F 19.0	10 Ne 20.2														
11 Na 23.0	12 Mg 24.3	3B	4B	5B	6B	7B	8B			1B	2B	13 Al 27.0	14 Si 28.1	15 P 31.0	16 S 32.1	17 Cl 35.4	18 Ar 39.9														
19 K 39.1	20 Ca 40.1	21 Sc 45.0	22 Ti 47.9	23 V 50.9	24 Cr 52.0	25 Mn 54.9	26 Fe 55.8	27 Co 58.9	28 Ni 58.7	29 Cu 63.5	30 Zn 65.4	31 Ga 69.7	32 Ge 72.6	33 As 74.9	34 Se 79.0	35 Br 79.9	36 Kr 83.8														
37 Rb 85.5	38 Sr 87.6	39 Y 88.9	40 Zr 91.2	41 Nb 92.9	42 Mo 95.9	43 Tc (98)	44 Ru 101	45 Rh 103	46 Pd 106	47 Ag 108	48 Cd 112	49 In 115	50 Sn 119	51 Sb 122	52 Te 128	53 I 127	54 Xe 131														
55 Cs 133	56 Ba 137	57 La 139	58 Ce 140	59 Pr 141	60 Nd 144	61 Pm 145	62 Sm 150	63 Eu 152	64 Gd 157	65 Tb 159	66 Dy 163	67 Ho 165	68 Er 167	69 Tm 169	70 Yb 173	71 Lu 175	72 Hf 178	73 Ta 181	74 W 184	75 Re 186	76 Os 190	77 Ir 192	78 Pt 195	79 Au 197	80 Hg 201	81 Tl 204	82 Pb 207	83 Bi 209	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226	89 Ac 227	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (262)	108 Hs (265)	109 Mt (266)										110 Ds (271)	111 Rg (272)	112 Cn (285)	113 Nh (286)	114 Fl (289)	115 Mc (290)	116 Lv (293)	117 Ts (294)	118 Og (294)					

IV. (17 pts) Complete the following.

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

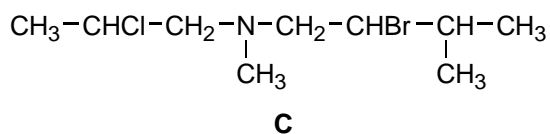


B. Circle the stereogenic (chiral) centers of **B**.

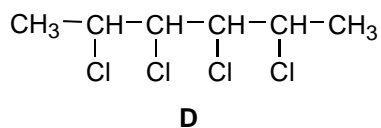


C. (2 pts) How many stereoisomers have the constitution of structure **B**? _____

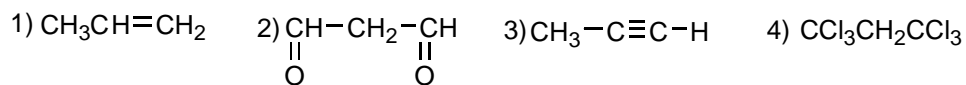
D. The maximum number of stereoisomers (stable at room temperature) for compound **C** is _____.



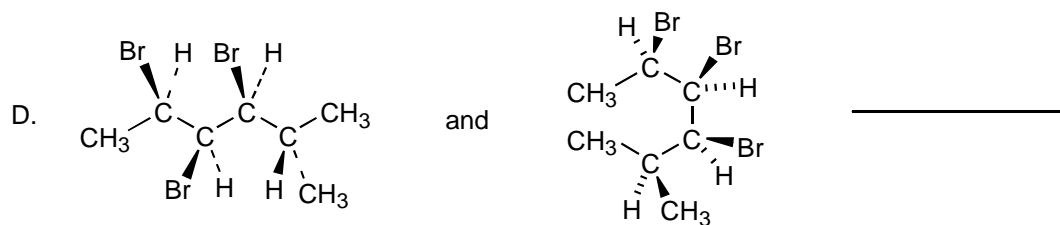
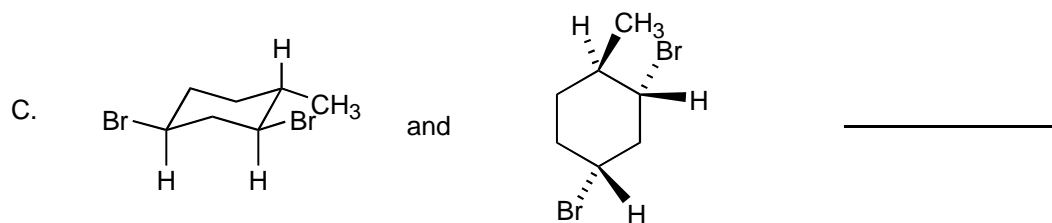
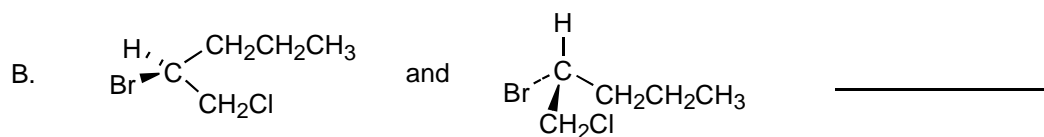
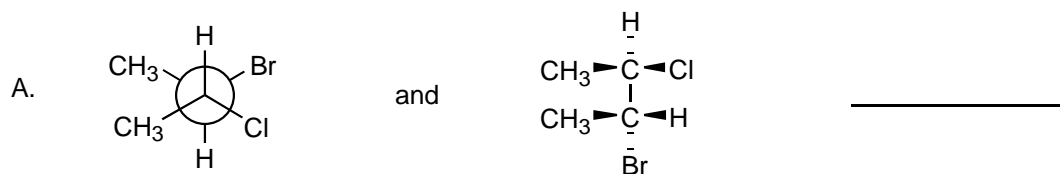
E. In the box provided, draw a meso stereoisomer that has the constitution of structure **D**.



F. Which compound has the highest oxidation level?

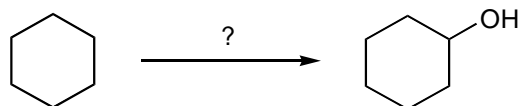


V. (16 pts) Label each pair of structures as I (identical), E (enantiomers), D (diastereomers) or C (constitutional isomers – not stereoisomers).



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)

