Chemistry 275
Exam #2
October 14, 2015

Name: Key

ID#: _____

Clearly print your name in the space provided.

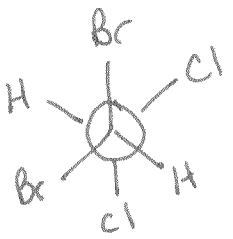
Clearly print your student ID number in the space provided.

Maintain appropriate security over your exam.

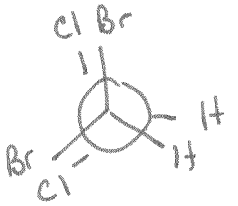
## PERIODIC TABLE OF THE ELEMENTS

| 1A | 2A | 3B | 4B | 5B | 6B | 7B | 8B | 8B | 8B | 1B | 2B | 3A | 4A | 5A | 6A | 7A | 8A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 **H** 1.01 | | | | | | | | | | | | | | | | | 2 **He** 4.00 |
| 3 **Li** 6.94 | 4 **Be** 9.01 | | | | | | | | | | | 5 **B** 10.81 | 6 **C** 12.01 | 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** 32.07 | 17 **Cl** 35.45 | 18 **Ar** 39.95 |
| 19 **K** 39.10 | 20 **Ca** 40.08 | 21 **Sc** 44.96 | 22 **Ti** 47.88 | 23 **V** 50.94 | 24 **Cr** 52.00 | 25 **Mn** 54.94 | 26 **Fe** 55.85 | 27 **Co** 58.93 | 28 **Ni** 58.69 | 29 **Cu** 63.55 | 30 **Zn** 65.39 | 31 **Ga** 69.72 | 32 **Ge** 72.61 | 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) | 44 **Ru** 101.07 | 45 **Rh** 102.91 | 46 **Pd** 106.42 | 47 **Ag** 107.87 | 48 **Cd** 112.41 | 49 **In** 114.82 | 50 **Sn** 118.71 | 51 **Sb** 121.76 | 52 **Te** 127.60 | 53 **I** 126.90 | 54 **Xe** 131.3 |
| 55 **Cs** 132.91 | 56 **Ba** 137.33 | 57 **La** 138.91 | 72 **Hf** 178.49 | 73 **Ta** 180.95 | 74 **W** 183.85 | 75 **Re** 186.21 | 76 **Os** 190.2 | 77 **Ir** 192.22 | 78 **Pt** 195.08 | 79 **Au** 196.97 | 80 **Hg** 200.59 | 81 **Tl** 204.38 | 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 | 105 | 106 | 107 | 108 | 109 | | | | | | | | | |

1. Draw the Newman projections of the lowest and highest energy states of 1,1-dibromo-2,2-dichloroethane looking down the carbon-carbon bond. (10 pts)

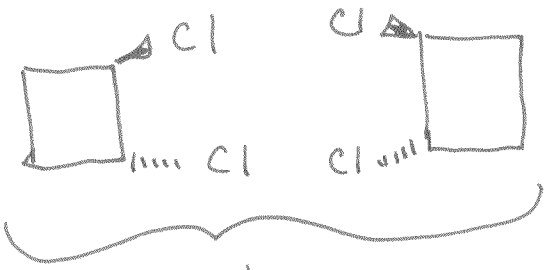



lowest

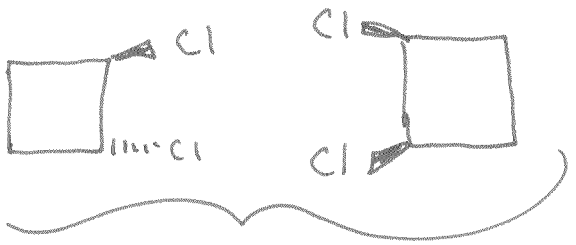



Highest

2. Using 1,2-dichlorocyclobutane draw a set of enantiomers, a set of diastereomers and compound that would be meso. Clearly label all compounds drawn. (16 pts)



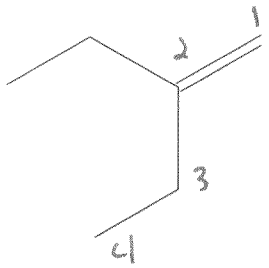

enantiomers



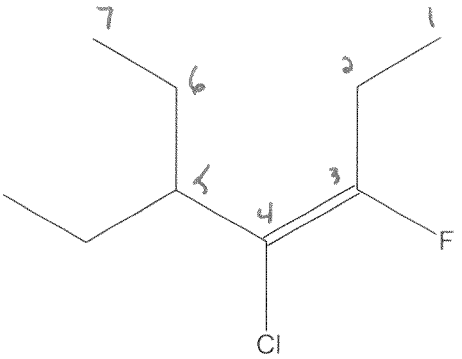

diastereomers

meso

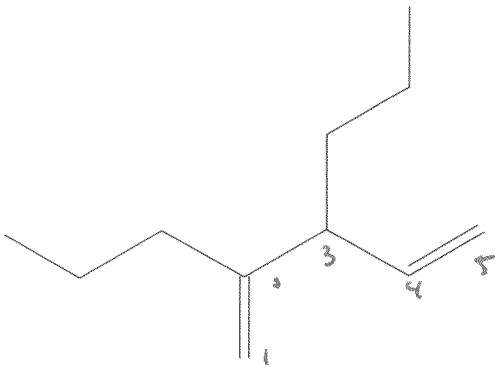
3. Name the following compounds. Use the E-Z or the cis/trans system when appropriate. (24 pts)



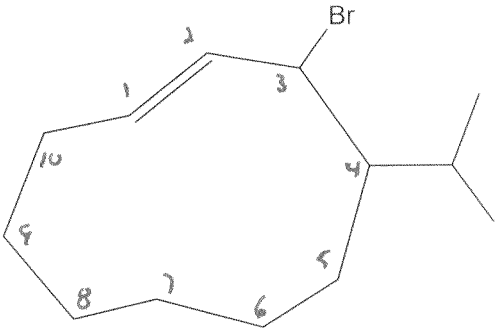
2-ethyl-1-butene



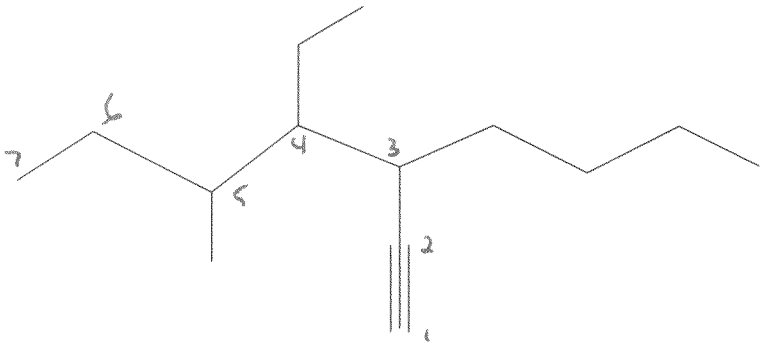

Z-4-chloro-5-ethyl-3-fluoro-3-heptene



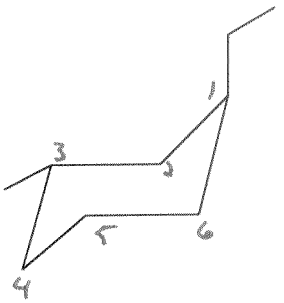
2,3-dipropyl-1,4-pentadiene




trans-3-bromo-4-isopropyl cyclodecene



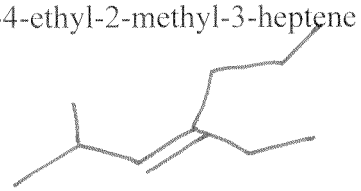
3-butyl-4-ethyl-5-methyl-1-hexyne



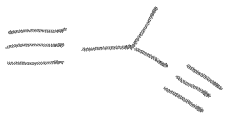
trans-1-ethyl-3-methyl cyclohexane

4. Draw, using the line-angle formula, the following compounds. Show three-dimensionality when appropriate. (20 pts)

a. Z-4-ethyl-2-methyl-3-heptene



b. 3-methyl-1,4-pentadiyne

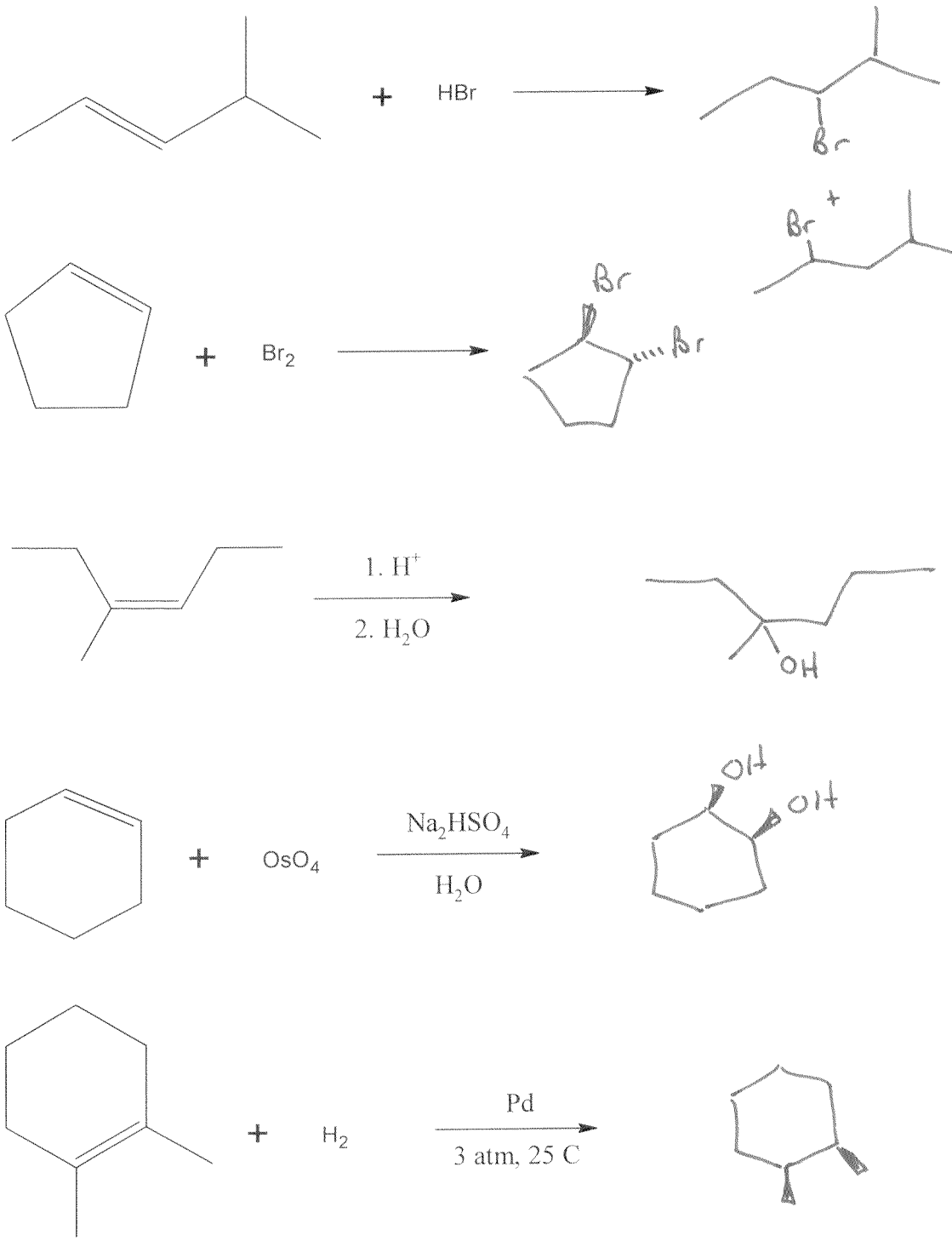


c. Z-4,7-dimethyl-5-decene

d. trans-1,3-dipropyl-cyclobutane

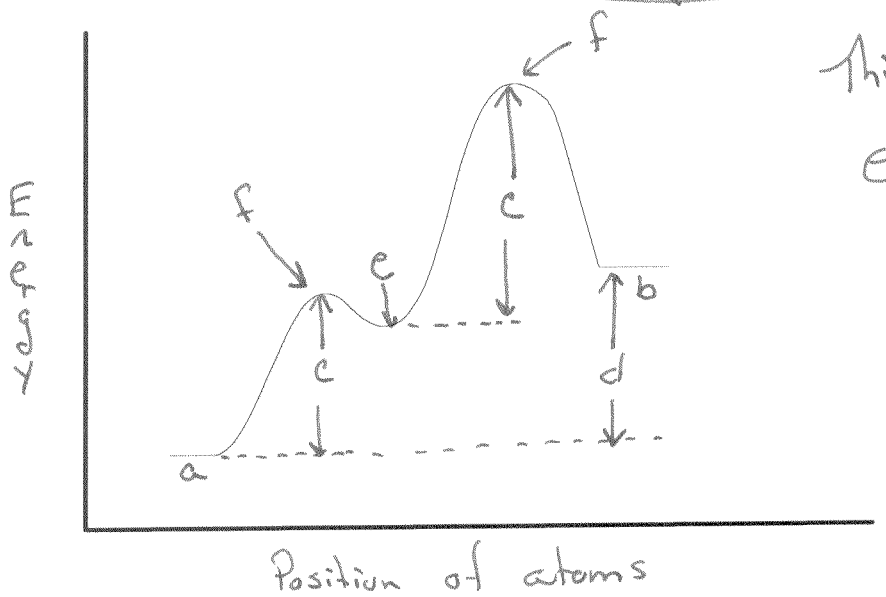
e. 1,2,3-pentatriene

5. Draw the structure of the product(s) of the following reactions. Show three dimensionality when appropriate. (25 pts)



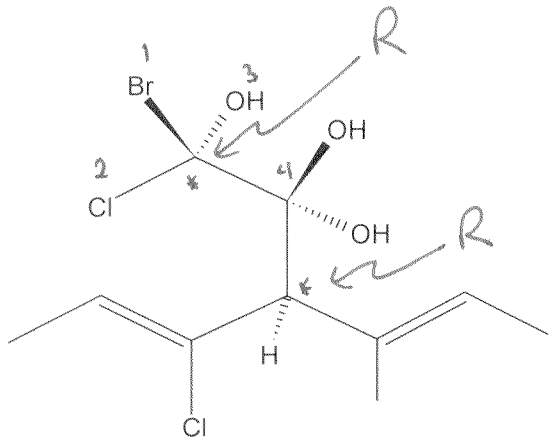
6. For the energy diagram below label the following. (16 pts)

a) Reactants
b) Products
c) Activation energies
d) Heat of Reaction
e) Intermediate
f) Transition states
g) Label values of both axis
h) Is this reaction endothermic or ~~exothermic~~?




This reaction is endothermic

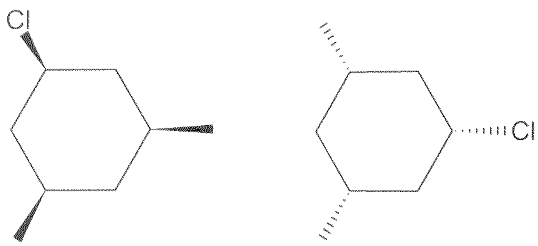
7. Identify the stereocenters in the following molecule and determine if each stereocenter is R or S. ( 15 pts)



8. Identify whether each of the following pairs of compounds are enantiomers, diastereomers or the same compound. (24 pts)

a)

enantiomers

b) 

Same

c)

Same

d)
diastereomers