Sultan Qaboos University
College of Science, Department of Chemistry

Chem3321/Chem3322
Introduction to Organic Chemistry/Organic Chemistry I

Spring 2009

Test 2

30 April, 2009

Test Duration: 90 minutes

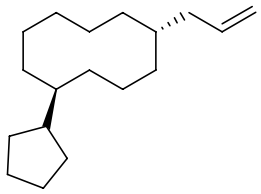
Name: _____ ID: _____

Question	Earned Mark	Maximum Mark
1		9
2		32
3		14
4		12
5		11
6		22
Total		100

Question 1 (9 marks)

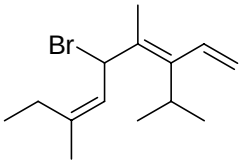
Name the following compounds according to IUPAC rules.

a.



Name: _____

b.



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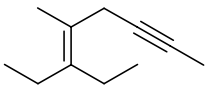
c.



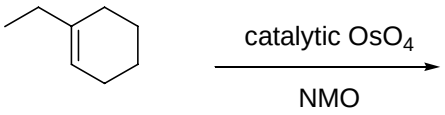
Name: _____

Question 2 (32 marks)

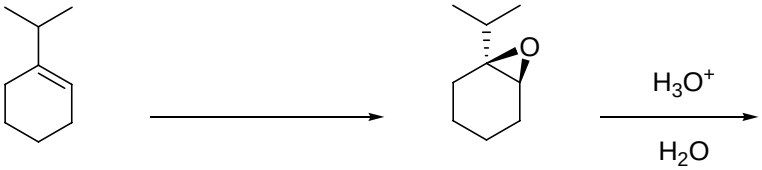
Complete the following reactions by writing possible reactant(s), reagent(s) or product(s). If you think a certain reaction will not take place under the given conditions, write No Reaction.

a.

b.



c.



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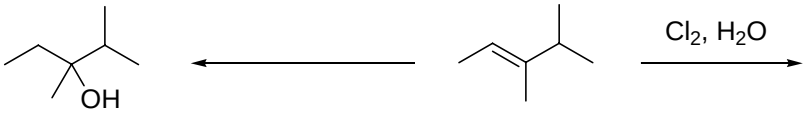
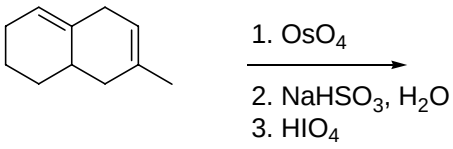
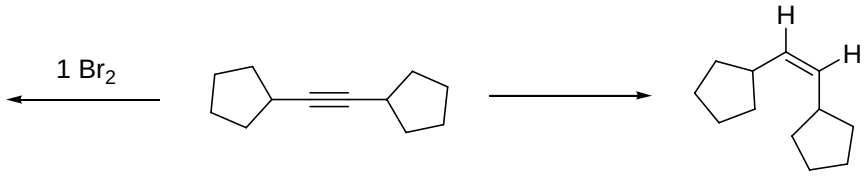


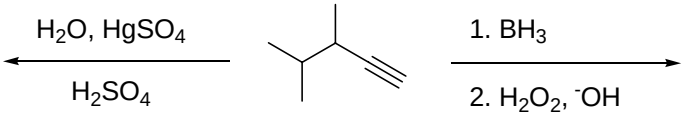
e.



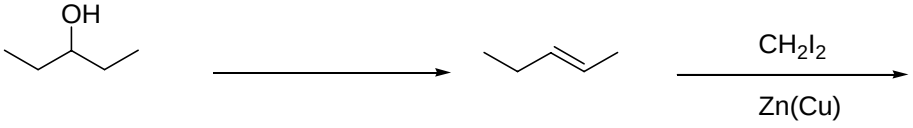
f.



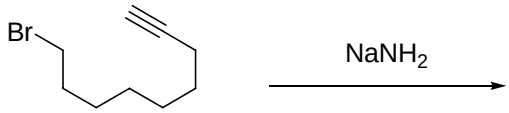
g.



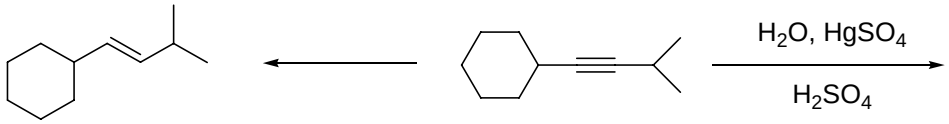
h.



i.



j.



Question 3 (14 marks)

Consider trans-1-*t*-butyl-3-methylcylcohexane. Answer the following questions:

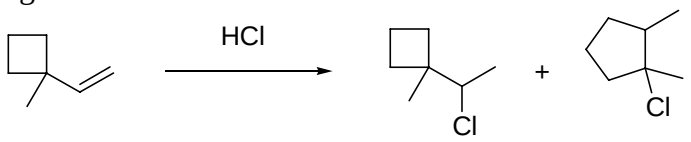
a. Draw two chair conformations of this compound.

b. Assuming that each diaxial CH_3-H costs 3.8 kJ/mol and that each diaxial *t*-butyl-H costs 11.4 kJ/mol, calculate the cost of energy of each chair.

c. Now, which of them is more stable and by how much? Briefly, explain the difference in stability.

Question 4 (12 marks)

Consider the following reaction:



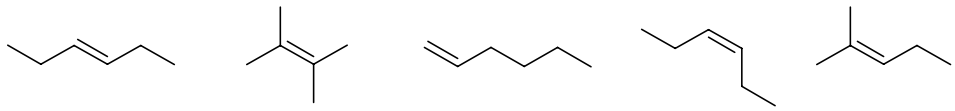
a. In this reaction, what is the nucleophile and what is the electrophile?

b. Propose a stepwise mechanism for the reaction using curved arrows.

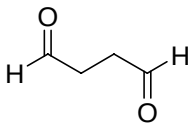
c. Two products are obtained in this reaction. Why? Provide an explanation.

Question 5 (11 marks)

a. Rank the following alkenes in order of increasing stability beginning with the least stable. Explain you answer briefly.



b. A hydrocarbon has a formula of C_8H_{12} and reacts with 2 equivalents of H_2 in the presence of Pd/C as a catalyst. Upon ozonolysis with O_3 followed by Zn, H^+ treatment, the following dialdehyde is produced as the only product:

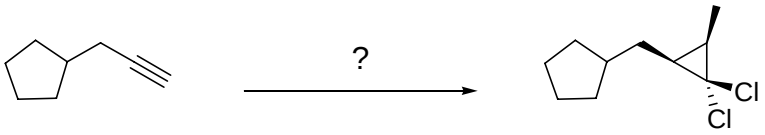


Propose a structure for the hydrocarbon.

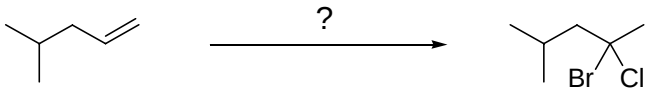
Question 6 (22 marks)

Show how you would carry out the following transformations. More than one step is required in each case. Clearly outline all steps with reactants, reagents and intermediate products.

a.



b.



End of Test 2