

Seat No. \_\_\_\_\_

Name \_\_\_\_\_  
(Please print your name and **CIRCLE** your last name)

**CHEMISTRY 331A**

**FINAL EXAM**

Tuesday, December 16, 2008

- I. (24 points) \_\_\_\_\_
- II. (12 points) \_\_\_\_\_
- III. (12 points) \_\_\_\_\_
- IV. (14 points) \_\_\_\_\_
- V. (45 points) \_\_\_\_\_
- VI. (30 points) \_\_\_\_\_
- VII. ( 5 points) \_\_\_\_\_
- VIII. ( 6 points) \_\_\_\_\_
- IX. ( 2 points) \_\_\_\_\_

\_\_\_\_\_

TOTAL (150 points) \_\_\_\_\_

I. (24 pts) Using structures and/or words briefly explain:

(A) Why acetic acid is more acidic than ethanol?

(B) Why  $\text{CH}_4$  should be more stable as a tetrahedron than planar?

(C) Why water is soluble in methanol but not in hexane?

(D) Why carbon dioxide has no dipole moment?

(E) Why 1,3-pentadiene is more stable than 1,4-pentadiene?

(F) Why geckos don't fall of the ceiling?

(G) Why the eclipsed conformation of ethane is the least stable?

(H) Why cis-1,3-dichlorocyclohexane is more stable than cis-1,2-dichlorocyclohexane?

~~(I) Why do dogs roll on dead squirrels?~~

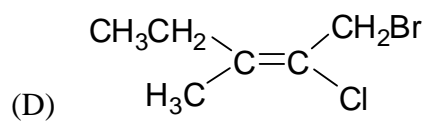
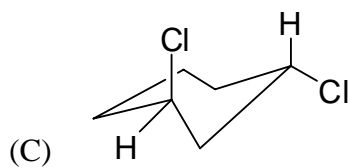
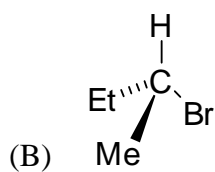
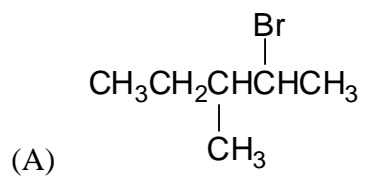
(J) Why cyclohexane is more stable than cyclobutane?

(K) Why rxn. of Br<sub>2</sub> and cyclopentene leads to the *trans* 1,2-dibromide?

(L) Why Barton uses single-headed arrows (fishhooks) when describing the mechanism of chlorination of ethane?

(M) Why S<sub>N</sub>1 rxns. give racemic products?

II. (12 pts) Provide proper, complete names for the following structures.



III. (12 pts.) Provide the structures that correspond to the following names.

(A) isopropyl bromide

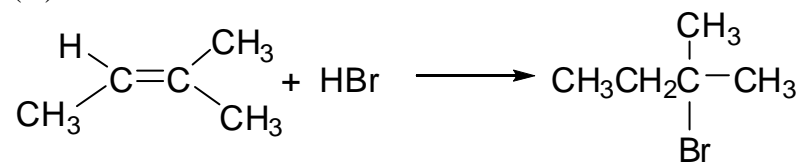
(B) (R)-2-chlorobutane

(C) (E)-3-methyl-1,3-pentadiene

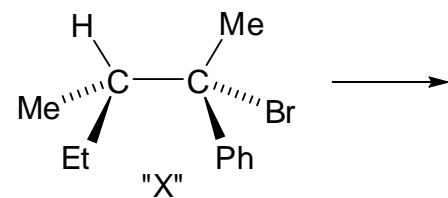
(D) *meso* conformer of 2,3-dibromobutane

IV. (14 pts.) Write stepwise mechanisms for the following transformations.

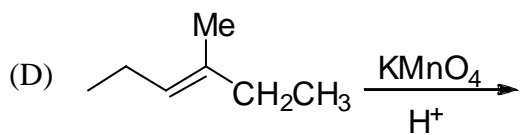
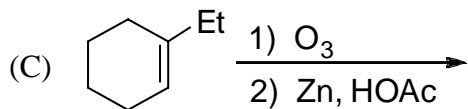
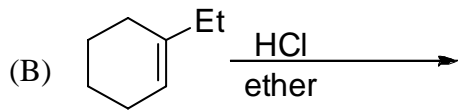
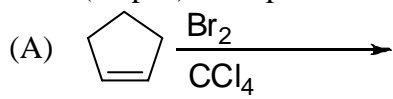
(A)

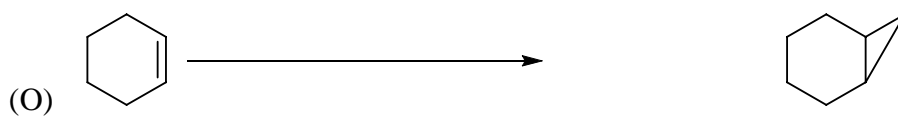
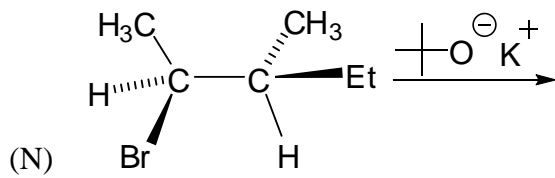
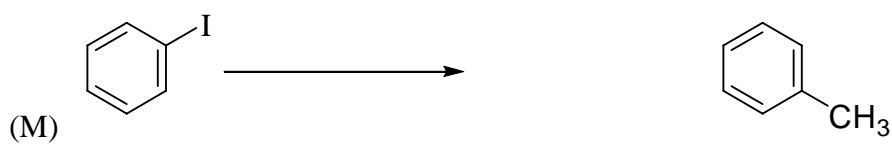
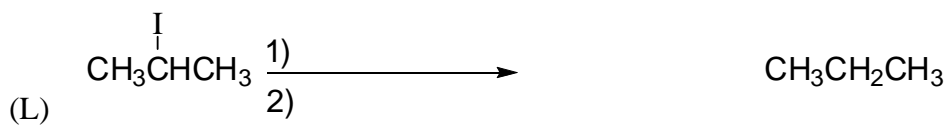
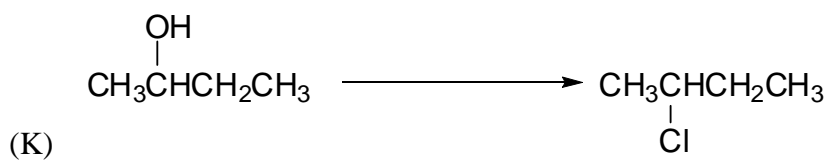
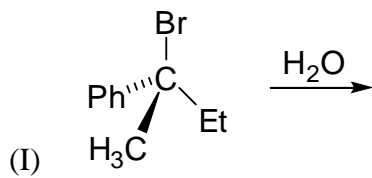


(B) The E2 elimination of HBr from "X" using KOH as base.

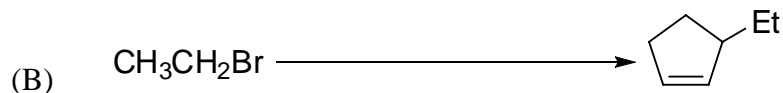
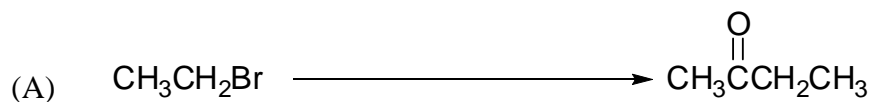


V. (45 pts.) Complete the following rxns. Show stereochemistry when important.



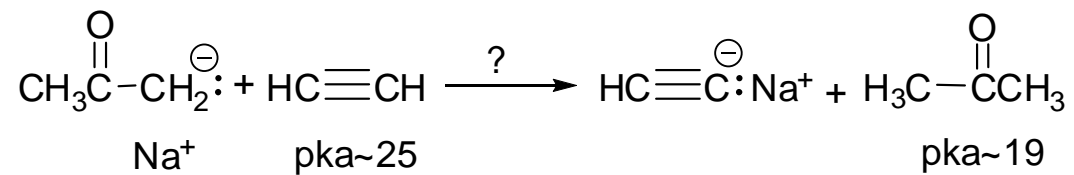


VI. (30 pts.) Show how you would perform the following 2 synthetic transformations. Assume the availability of all needed reagents.

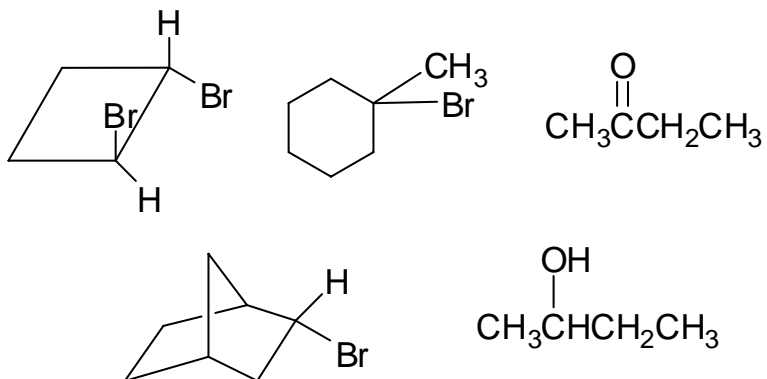


VII. (5 pts) Will the following reaction proceed in the direction shown?

YES  NO



VIII. (6 pts.) Circle the molecules expected to display optical activity.



IX. (2 pts.) Guess how many horses there are in this flask.

Answer: \_\_\_\_\_

