## CHEMISTRY 59-230

## FIRST TEST

## Time: 50 Min

## October 8, 1998

## NAME:

$\qquad$

ID \#:
LABORATORY DAY: $\qquad$ Afternoon $\qquad$ Evening $\qquad$

READ ALL QUESTIONS CAREFULLY AND ANSWER THE QUESTION ASKED!! Answer all questions on the test paper. An extra sheet has been attached for rough work which will not be marked. Only the FIRST answer to any question will be considered. Point values for each question are given. There are 7 questions and 4 pages in this test and the available points total 100.

1. Provide an acceptable IUPAC name for each of the following compounds. Be sure your answer indicates stereochemistry where this is appropriate. [5 points each]
(a)

(b)

(c)

2. Draw the structure, including stereochemistry where appropriate, which corresponds to the names given. Structures which show only the carbon and other non-hydrogen atoms are sufficient. [5 points each]
(a) 3-bromo-4-propyloct-1-ene
(b) 2,7,7-trimethyl-1,3,5-cycloheptatriene
(c) (3Z,7E) 7-methyl-1,3,7-nonatriene
3. (a) Draw the NEWMAN PROJECTION of cis 1-bromo-4-methylcyclohexane in the more stable chair conformation and label the substituents as being axial (a) or equatorial (e). [10 points]
(b) Draw the 3-D drawing (NOT the Newman projection) of the less stable configuration of 1-isopropyl-2-methylcyclohexane in its less stable chair conformation and label the substituents as being axial (a) or equatorial (e). [10 points]
(c) Determine which of the chains $\mathbf{A}$ or $\mathbf{B}$ shown below has the highest priority. Using the usual notation, show how you arrived at your decision. [10 points]

(d) Briefly and concisely, explain, using appropriate diagrams, why an equatorial substituent is preferred over an axial one in chair form cyclohexane. [5 points]
4. (a) from the following list, circle those substances which can be classified as nucleophiles. [6 points]

$$
\begin{array}{lllllll}
\mathrm{Br}_{2} & \mathrm{H}_{3} \mathrm{O}^{+} & \mathrm{NH}_{3} & \mathrm{Br}^{-} & \mathrm{BH}_{3} & \mathrm{OH}^{-} & \mathrm{NH}_{4}^{+}
\end{array}
$$

(b) Use the correct "curly arrow notation" to show how each of the following processes occur. Make sure you indicate what charges are on the products of each process. [5 points]


5. Draw an energy axis and the reaction energy profile for a reaction between A and B which proceeds in two steps and whose rate depends only on the concentration of B. Indicate which step involves A and which involves B. [5 points]
6. Circle the structures below which can be stabilized by resonance. For those that you choose, draw one more resonance structure and show, using curly arrows, how the electrons move to make it. Make sure you shown any charges that develop in the structures. [10 points]

## $\mathrm{CH}_{3} \mathrm{CH}=\mathrm{CHCH}_{2} \mathrm{CH}_{2} \mathrm{CH}=\mathrm{CH}_{2}$

$\mathrm{CH}_{3} \mathrm{CH}=\mathrm{CHCH}=\mathrm{CHCH}_{2} \mathrm{CH}_{3}$

$\mathrm{CH}_{3} \mathrm{CH}=\mathrm{CHCH}_{2} \mathrm{CH}=\mathrm{O}$

7. Choose the word from the following list (positional isomer, configuration, conformation) that correctly describes the relationship between the following materials. [3 points each]
(a) a chair form cyclohexane with an axial isopropyl group on C5, an axial chlorine atom on C3 and an equatorial bromine atom on C1

AND
a chair form cyclohexane with an equatorial isopropyl group on C 5 , an axial chlorine atom on C 3 and an axial bromine atom on C1
(b) a cyclohexene with two substituents that are described as being "trans" and another with two substituents that are described as being "cis"


