CHEMISTRY 59-135/137

FIRST TEST

**Time 50 Min**   **February 8, 1993**
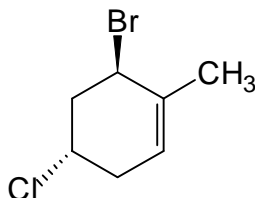
NAME: _____

ID #:   _____

READ ALL QUESTIONS CAREFULLY AND ANSWER THE QUESTION ASKED!! Answer all questions on the test paper. Extra sheets have been attached to 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 6 questions and 3 pages in this test and the available points total 100.

1.   Give an acceptable name for each of the following structures. If stereochemistry is important, make sure your name includes this [18 points]
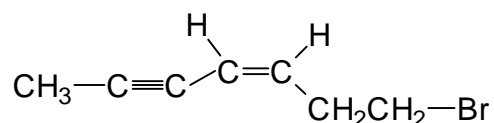(a)
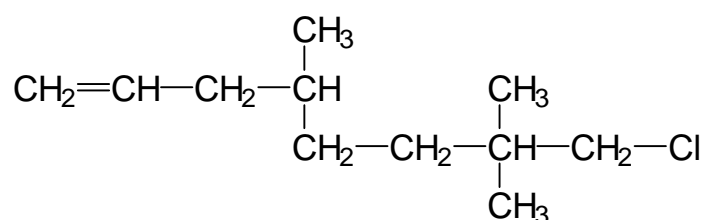
(b)

(c)

2.   Draw the structures which corresponds to the following IUPAC names. Drawings which show only the non-hydrogen atoms are sufficient. Make sure your drawings show all stereochemical features. [18 points]
(a) cis 3,4-dimethyl-1,3-cyclohexadiene

(b) E 5-bromo-3-chloro-2-hexene

(c)trans 3-isopropyl-1-methylcylclopentane

3.   (a) Draw the NEWMAN projection of the following situations.
        (i) The molecule 1-ethyl-3-methylcyclohexane in the more stable chair conformation of its less stable configuration. Label the substituents as being either axial [a] or equatorial [e]. [12 points]

(ii) The molecule 2-methylpentane viewed down the C2-C3 bond in the conformation which has the most synclinal interactions. [6 points]

(b) Draw the 3-D drawing (NOT the Newman Projection) of <u>trans</u> 1,4-dimethyl-cyclohexane in its more stable chair conformation and label the substituents as being axial or equatorial.[12 points]

4. Indicate whether the relationship between the following pairs of compounds is described by the word <u>conformation</u> or the word <u>configuration.</u> [10 points]

(a)

and

(b)

CH$_2$CH$_2$

and

Br

CH$_2$CH$_2$

Br
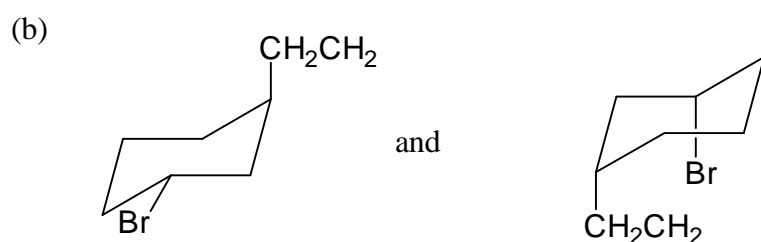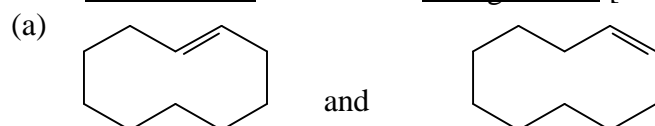
5. Draw the "curly arrows" which correctly show the movement of electrons in each of the following processes. Use dots to represent non-bonding electrons if these are involved. [12 points]

(a)

H
⊕
O—H   NH$_3$ ⟶   H   O   H—NH$_3$
H   H

(b)

—C—O—C—   H$^+$ ⟶   —C⊕   —C—OH
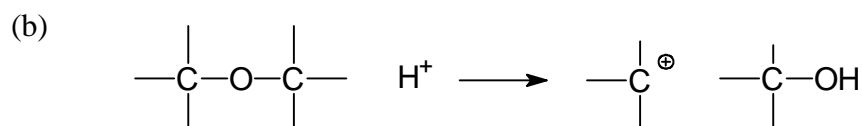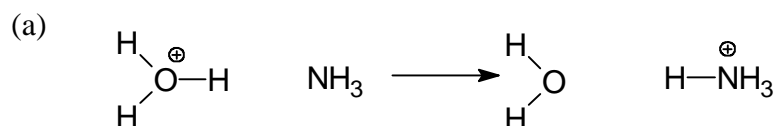
6. On the axes shown below, draw the energy diagram for the indicated situations. In each case, <u>A</u> takes part in the <u>FIRST STEP</u> of the reaction. Also show the form of the rate equation for each example. [12 points]

(a) A reaction between <u>A</u> and <u>B</u> which occurs in two steps , the second of which is slower than the first.

(b) <u>A</u> reaction which occurs in three steps, the second step has the highest activation energy and <u>B</u> is consumed in the third step.

a)   b)

G↑   G↑

rate α   rate α