# CHEMISTRY 59-230/232

## FIRST TEST

**Time 50 Min** **October 12, 2000**

**NAME:** _____

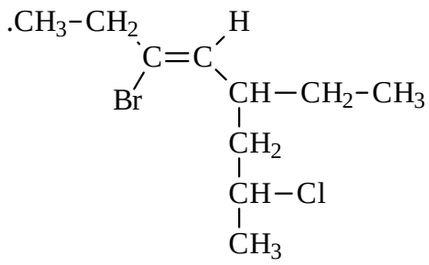
**ID #:** _____

**LABORATORY DAY:** _____

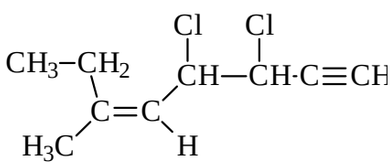
*READ ALL QUESTIONS CAREFULLY AND ANSWER THE QUESTION ASKED!! Answer all questions on the test paper. An extra sheet has been attached for rough work which <u>will not be marked</u>. Only the FIRST answer to any question will be considered. Point values for each question are given. There are 6 questions and 4 pages in this test and the available points total 100.*

1. Give an acceptable IUPAC name for each of the following structures. Make sure your name includes stereochemistry where this is required. [5 points each]

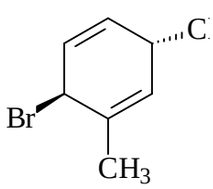
(a)



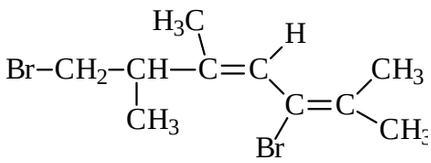
(b)



(c)



(d)



2. Draw structures which correspond to each of the following names. Drawings that show only carbon and other non-hydrogen atoms are acceptable. Make sure your drawings indicate stereochemistry where this is required. [5 points each]

(a) 4Z 5-bromo-2-methyl-2,4-heptadiene

(b) 2-chloro-3-isopropyloct-1-en-4-yne

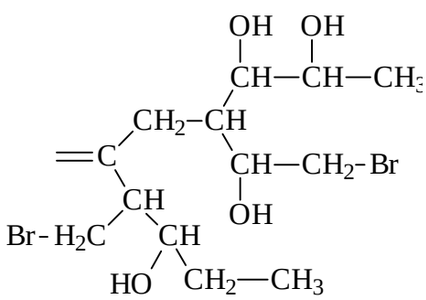
(c) *trans* 2,7-dimethyl-6-chlorocycloocta-1,4-diene

(d) *cis* 2,6-dichloro-5,5-dimethylocta-1,6-diene

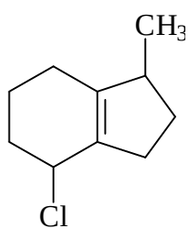
3. (a) Draw the <u>NEWMAN PROJECTION</u> of 1-bromo-3-methylcyclohexane in its less stable configuration and less stable chair conformation. Label the substituents and either axial (a) or equatorial (e). [10 points]

(b) Draw two structures where the stereochemical descriptors *trans* and E are NOT synonymous. [4 points]

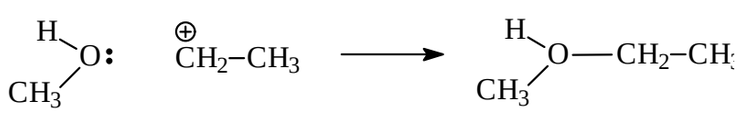
(c) In the following partial structure, indicate which of the chains has the higher priority and show how you arrived at your decision. [4 points]

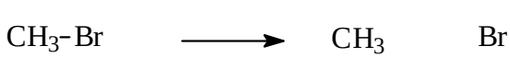


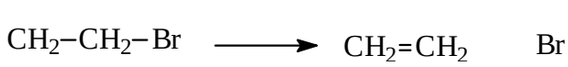

(d) Assign the correct stereochemical descriptor (E or Z) to the compound shown below. Show how you arrived at your answer. [4 points]



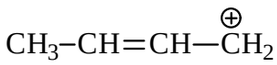

4. (a) Draw the "curly arrows" that describe each of the following transformations and place charges on the products where they are required. [3 points each]

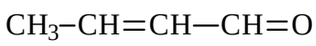


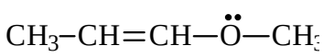



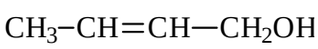



(b) For those structures shown below for which resonance is possible, draw as many resonance structures as possible. [9 points]









5. (a) On the axes below, draw the energy reaction coordinate profile for:

(i) A reaction between A and B which occurs in two steps, A takes part in the first step and B takes part in the second step, and whose rate depends on the concentrations of both A and B. [3 points]

(ii) a reaction between A and B which takes place in three steps and the reaction rate is controlled by the last step. [3 points]

(b) give the form of the rate equation for reaction (ii) [2 points]

(i)

(ii)

6.

6. Indicate whether each of the following statements is TRUE [T] or FALSE [F]. Note that for a statement to be true, <u>all parts</u> of the statement must be true!. [2 points each]

(a) cis and trans are words used to describe different configurations of a molecule [ ]

(b) $sp^2$ hybridized carbons are always bonded to four other atoms [ ]

(c) water is a stronger acid that alcohols [ ]

(d) the first transition state in any mechanism is always the rate determining step [ ]

(e) ammonia is an electrophile and bromide is a nucleophile [ ]

(f) geometric isomers always have the same melting and boiling points [ ]