

CHEMISTRY 59-230 (Section 02)

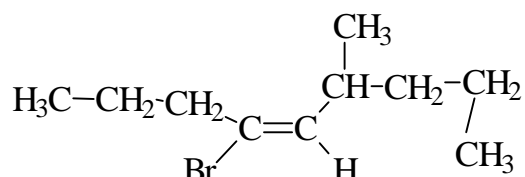
FIRST TEST

Time: 50 Min

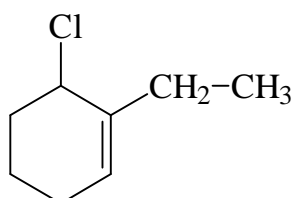
October 8, 1997

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]

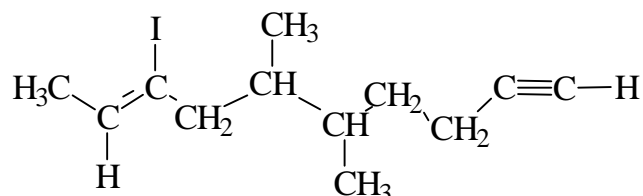
(a)



(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) 2-chloro-3,4,5-trimethylhexane

(b) *cis* 1,3,4 trimethylcycloheptene

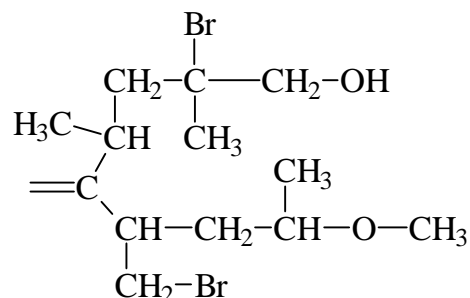
(c) (Z,E) 2-bromo-5-chloro-3,7-dimethylnona-2,6-diene

3. (a) Draw the Newman projection of *trans* 1-isopropyl-3-methylcyclohexane in its least stable chair conformation and label the bonds as being either axial (a) or equatorial (e). [7 points]

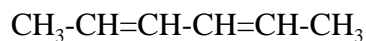
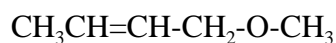
(b) Draw the Newman Projection of 1-chloro-2-methylbutane viewed down the C1-C2 bond in the conformation which has the most synclinal interactions. [6 points]

(c) Draw the 3-D structure (NOT the Newman Projection) of the more stable configuration of 1,4-dimethylcyclohexane in its least stable conformation and label the substituents as being axial (a) or equatorial (e). [7 points]

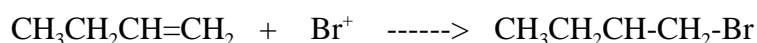
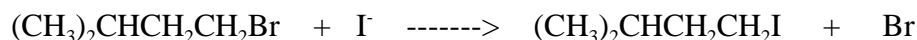
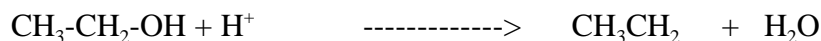
(d) Which of the chains in the part structure shown below has the higher priority? Show how you arrived at your conclusion. [4 points]



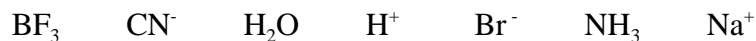
4. (a) Circle those structures in the list below which are capable of being stabilized by resonance. In each one you identify, draw one other valid resonance form. [6 points]



(b) In the equations shown below, use “curly arrows” to denote the movement of electrons which leads to the indicated product and show the charges (if any) on the atoms of the products. [9 points]



(c) Classify each of the following molecules or ions as being either an electrophile or a nucleophile. [7 points]



5. On the axes below, draw the energy profile for a reaction which has the following description. In each case, indicate all intermediates and also the reaction transition state. [4 points each]

- a two step reaction mechanism where the rate of reaction depends on the concentration of only one reactant.
- a three step reaction mechanism in which the rate depends on the concentrations of both reactants.
- a three step mechanism in which the second step is the slowest.



6. Choose the word from the following list (configurational isomer, conformations, positional isomer) which correctly describes the relationship between the following pairs of compounds. [4 points each]
- (a) (E) AND (Z) 2-butene
- (b) 1,3-dimethylcyclohexane which has two axial substituents AND 1,3-dimethylcyclohexane which has two equatorial substituents.
- (c) a cyclohexane which has an equatorial bromine atom on C1, an axial bromine on C2 and an axial methyl group on C4 AND a cyclohexane which has an equatorial bromine atom on C1, an equatorial bromine on C2 and an equatorial methyl group on C4.