

## CHEMISTRY 59-135/137

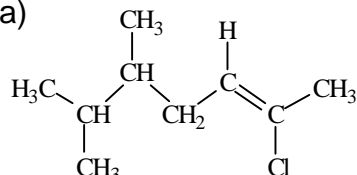
## FIRST TEST

Time 50 Min

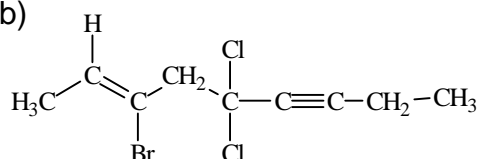
February 15, 1995

1. Give an acceptable name for each of the following structures. If stereochemistry is important, make sure your name includes this. [20 points]

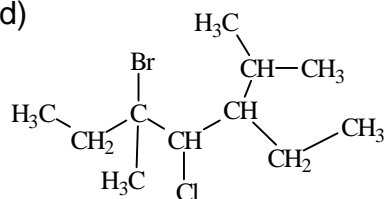
a)



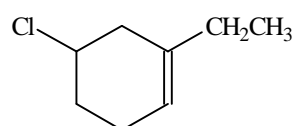
b)



d)



d)



2. Draw the structure, including stereochemistry where required, which corresponds to each of the following IUPAC names. Structures which show only the carbon and other non-hydrogen atoms are sufficient. [15 points]

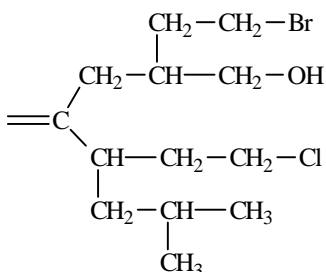
(a) (Z) 3,4-dichloro-6,6-dimethylhept-4-ene-1-yne

(b) *trans* 5-bromo-7-chloro-2-methyl-1,3-cycloheptadiene

(c) (Z) 2-bromo-4-bromomethyl-3-methyl-3-hexene

3. (a) Draw the chair drawing (NOT THE NEWMAN PROJECTION) of the less stable configuration of 1-bromo-4-methylcyclohexane in its more stable conformation. Label the substituents as being axial (a) or equatorial (e). [10 points]
- (b) Draw the NEWMAN PROJECTION of 2-bromopentane viewed down the C2-C3 axis in the conformation which has the main chain in a synclinal arrangement. [7 points]

(c) Indicate which of the substituents in the drawing below has the higher priority. [4 points]



4. (a) On the axes below, draw the energy profile for reactions with the following kinetic characteristics. In each case the reaction is  $A+B \rightarrow C$  and A is involved in the first step of the mechanism. [15 points]
- (i) A reaction which occurs in two steps whose rate is dependent on the concentrations of BOTH A and B.
- (ii) A reaction which has two intermediates, B is involved in the last step and the rate is dependent on the concentrations of BOTH A and B.
- (iii) A reaction which takes place in three steps, B is involved in the last step and the second step is the slowest one.

i)

(ii)

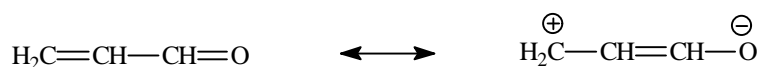
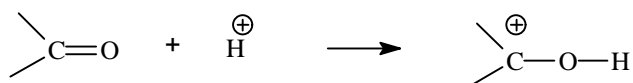
(iii)



(b) Write the form of the rate equation for part (iii) [4 points]

5. (a) Define the terms (+I) and (-I) as applied to substituents and give an example of each. [5 points]

(b) Using the appropriate notation system, show the movement of electrons in the starting material which leads to the indicated product. [10 points]

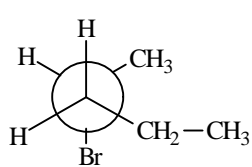


6. Pick the term from the following list (positional isomer, configurational isomer, conformational isomer, none of the above) which correctly describes the relationship between the following pairs of compounds. [10 points]

(a) cis and trans 1,3-dimethylcyclohexane.

(b) a cyclohexane which has a chlorine atom on carbons 1,2 and 4 which are on axial, axial and equatorial bonds respectively, and another cyclohexane which has a chlorine atom on carbons 1,2 and 4 which are axial, equatorial and axial bonds respectively.

(c)



and

