CHEMISTRY 59-135/137

First Test

Time 50 min

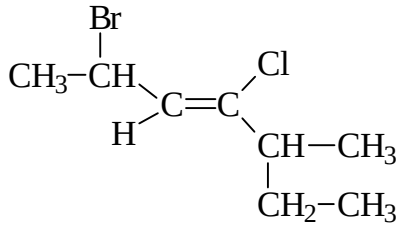
October 1992

NAME: _____

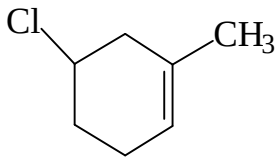
ID #: _____

1. Provide an acceptable IUPAC name, including the stereochemical designators (E, Z, or cis, trans) where required, for each of the following compounds. [15 points]

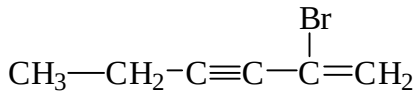
(a)



(b)



(c)



2. Draw the structure, including the stereochemistry of double bonds where appropriate, which corresponds to each of the following IUPAC names. Structures which show only the carbon skeleton and its substituents are sufficient. [15 points]

(a) cis 4-bromo-3-methylcyclohexene

(b) (Z) 4-chloro-3,5,6-trimethyl-3-octene

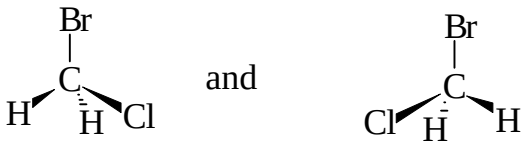
(c) 1,4-dimethyl-6-propylcyclohepta-1,4-diene

3.(a) Draw the Newman projection of the less stable configuration of 3-bromo-1-methylcyclohexane in its less stable chair conformation. Label the substituents as being (a) or (e). [10 points]

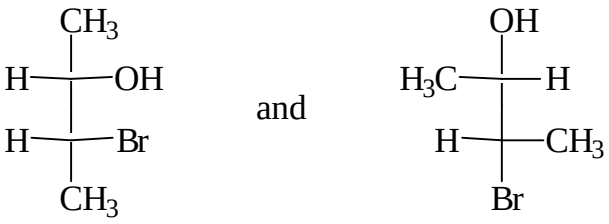
(b) Draw the chair (NOT the Newman) drawing of the less stable chair conformation of trans 1-ethyl-4-isopropylcyclohexane. Label the substituents as being (a) or (e). [10 points]

4.(a) Pick the word from the following list (diastereomer, enantiomer, identical, positional isomer) which correctly describes the relationship between the following pairs of compounds. [20 points]

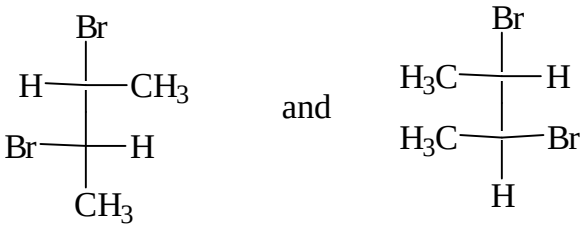
(i)



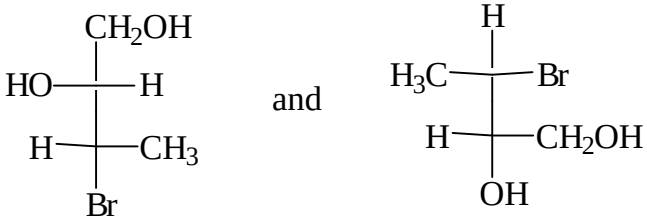
(ii)



(iii)



(iv)



(b) Indicate which, if any, of the pairs of compounds shown in part (a) would show optical activity if they were mixed in a 1:1 ratio [5 points].

(i) (ii) (iii) (iv)

(c) Indicate which, if any, of the eight molecules shown in part (a) is a meso form. [5 points]

(d) For the left drawing in part (a) (iv), assign the proper stereochemical designator (R or S) to each chiral centre. Show your answer on the drawing on the bottomn of page 4 [8 points]

5. Indicate whether each of the following statements is TRUE [T] of FALSE [F]. (Note that for a statement to be true, all parts of it must be true. [8 points]

(a) All three hybridization states of carbon form four bonds to 4 atoms [ ]

(b) The stereochemical designators cis and Z are alway synonymous [ ]

(c) The synclinal conformation of butane around the C2-C3 bond is more stable than the synperiplanar one. [ ]

(d) A Fischer projection represents a molecule in its most stable conformation. [ ]

(e) The mirror image of a molecule having the R absolute configuration is always S. [ ]

(f) A molecule having the S configuration always rotates light in the (-) direction. [ ]