First Test
Time 50 min
May 1992
NAME: $\qquad$
ID \#: $\qquad$

1. Give a structure which corresponds to the following IUPAC names. Make sure your drawing shows all required stereochemistry. Drawings which show only the carbon and other nonhydrogen atoms are satisfactory [12 points]
(a) trans 2,3-dichloro-6-methyl-3-octene
(b) 7-bromo-5,6,8-trimethylnon-7-en-1-yne
(c) trans 1-ethyl-3-isopropylcyclobutane
2. Give an acceptable IUPAC name (including stereochemical descriptors) for the following structures. [16 points]
(a)

(b)

(c)

(d)

3.(a) Draw the NEWMAN projection of the less stable configuration of 1-methyl-4isopropylcyclohexane in its less stable chair conformation. Label the substituents as being axial (a) or equatorial (e). [8 points]
(b) Draw the chair (NOT the Newman) drawing of the more stable chair conformation of trans 1-ethyl-2-isopropylcyclohexane. Label the substituents as being (a) or (e). [8 points]
(c) Draw the Newman projection of 2-methylpentane in its least stable staggered conformation around the C2-C3 bond. [4 points]
4.(a) Choose the term from the following list (diastereomer, enantiomer, identical, positional isomer) which correctly describes the relationship between the following pairs of compounds. [16 points]
(i)

(ii)

and

(iii)

and

(iv)

and

(b) Assign the proper stereochemical descriptor ( $\underline{\mathrm{R}}$ or $\underline{\mathrm{S}}$ ) to each of the chiral centres in the following structures. Indicate the priorities of the substituents. Also, provide the complete IUPAC name for the molecule shown in part (ii)
(i)

(ii)

(c) Draw the Fischer projection which correctly represents the molecule (2R,4R) 2-bromo-4methylhexane [5 points]
(d) Give the correct stereochemical designator ( $\bar{E}$ or $\underline{Z}$ ) for the following compounds. [4 points]
(i)

(ii)

(e) Indicate which of the molecules shown in question 4(b) would show optical activity when placed in a polarimeter. [5 points]
first one second one both neither (circle your answer)
3. Indicate whether each of the following statements is TRUE [T] or FALSE [F]. Note that for a statement to be true, all parts of it must be true. [2 points each]
(a) A Fisher projection represents a molecule in its most stable conformation
(b) The mirror image of a molecule having the $\underline{R}$ absolute configuration is always $\underline{S}$.
(c) A molecule having the $\underline{S}$ configuration always rotates light in the (-) direrction.
(d) Interconversions of configurations must involve making and breaking bonds.
(e) If one diastereomer of a molecule is optically active, then all diastereomers of the same molecule must be optically active.
4. [ 4 points] Two students were asked to draw a Fischer projection of (2R,3R) 2,3dichloropentane. One student drew the structure labelled I below and the other drew the structure labelled II.


I


II
[CIRCLE THE CORRECT RESPONSE TO EACH QUESTION BELOW]
(a) Which of these drawings is correct?
neither,
I
II
both
(b) How are $\underline{\mathbf{I}}$ and $\underline{I}$ related to one another? - as

| conformations | configurations |
| :--- | :--- |
| positional isomers | none of these |

