

Names of all students (please print) _____

Answer Key

CHEM 243 Organic Chemistry I

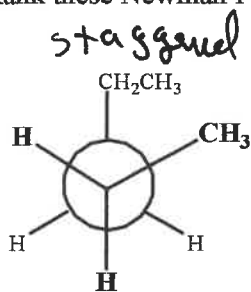
Points _____ (10 max)

Worksheet #8: September 27, 2021. Complete the following worksheet by collaborating with a group of 3-4 students. You can use a text book or your lecture video notes. You must work together, with the names of all students included on ONE sheet and turned in for a group grade.

Note: As we get into the "nuts and bolts" of organic chemistry, you should expect to see more questions where I will ask you to explain your reasoning.

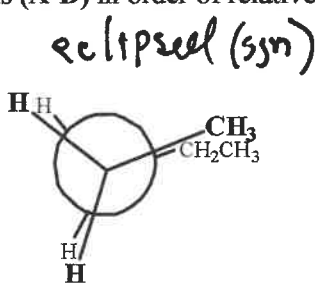
(1) Conformations and Newman Projections. Feel free to use the molecular models provided.

(a) Rank these Newman Projections (A-D) in order of relative stability (1 = least stable.... 4 = most stable).



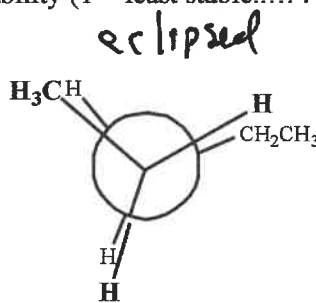
A

3



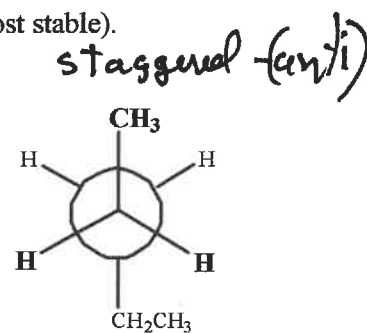
B

1



C

2



D

4

(b) Explain your reasoning in part (a).

The two least stable alkane conformers must be the two eclipsed conformers due to e^- repulsion of sigma bonds. The syn-eclipsed is least stable due to steric hindrance of alkyl substituents. The staggered conformers are the more stable with anti being the most stable.

(c) Which Newman Projection is "syn-eclipsed"? Circle one: A B C D

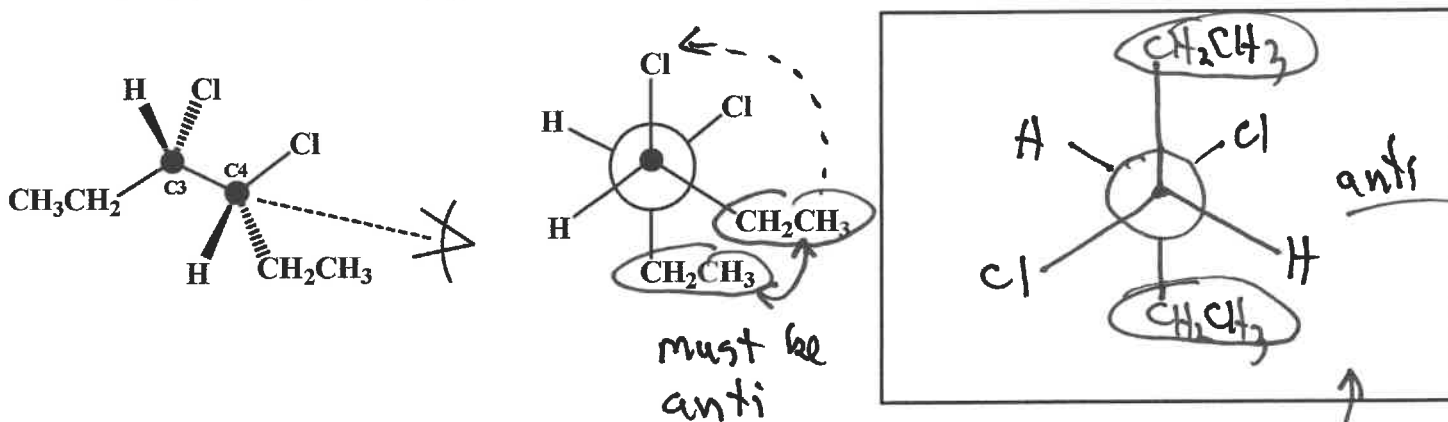
(d) Which Newman Projection is "anti-staggered"? Circle one: A B C D

(e) In the space at the right, draw the **zig-zag line structure** for this alkane, and **give it an IUPAC name**. Note: All Newman Projections drawn above are for the same compound.



pentane

(2) Conformations and Newman Projections. Consider the zig-zag structure drawn below, the view looking at the C4-C3 bond, and the corresponding Newman Projection. Feel free to use molecular models.



(a) Is this Newman Projection the most stable conformer? If not, draw the most stable conformer in the box.

(No)

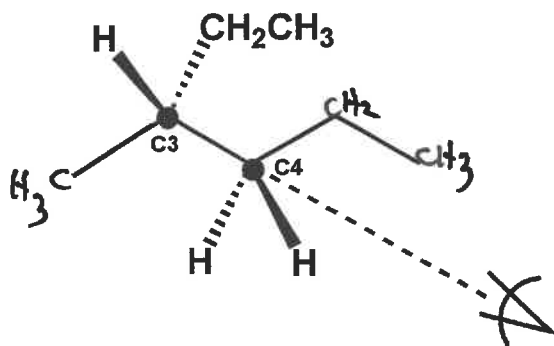
(b) Write the IUPAC name for the compound in 2(a) above:

parent = 6C = hexane

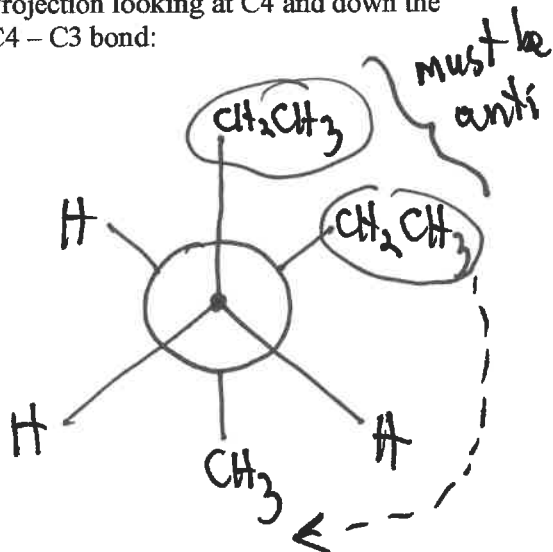
3,4-dichloro

3,4-dichloro hexane

(3) Alkane Conformations. Consider the molecule from video CH 4-4 drawn below, and the view looking at the C4-C3 bond. Feel free to use the molecular models provided.



(a) Based on the structure above, draw a Newman Projection looking at C4 and down the C4 - C3 bond:



(b) Now, rotate your Newman Projection to make the more stable conformer (largest groups anti to each other):

