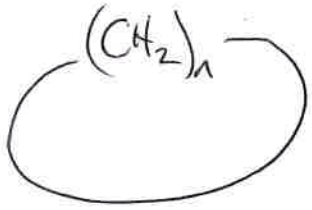
Course Chem 343 Lecturer Coltman
Day Monday Date 10/19/15
Notes Taken By Nolan Blythe Total # of Pages 4

Submit a *Single-sided Copy* to the Undergraduate Office
NO NOT STAPLE - ONLY WRITE NOTES INSIDE THE SQUARE BELOW

Chapter 7 Molecules that contain rings + stereochemistry of organic reactions

Rec Problems: 1, 4, 5, 7-13, 15, 17, 20, 25-38, 40-73

Cyclic alkanes

general: 

Thus

△ cyclopropane

□ cyclobutane

etc.

Consider thermodynamic data (ΔH°_f)

Benchmark: (CH_2) unit in linear alkane

$CH_3(CH_2)_nCH_3 \Rightarrow -5.0$ kcal/mol per CH_2

	ΔH°_f increment per CH_2 (kcal/mol)
△	+4.2
□	+1.7
⬠	-3.7
⬡	-5.0
27's	-3.5 to -4.6

What is "wrong" w/ the small rings?

→ Internal strain (non-ideal bonding relationships)

Angle strain + torsional strain

Course Chem 343 Lecturer Coellner

Day Monday Date 10/19/15

Notes Taken By NB Total # of Pages 4

Submit a *Single-sided Copy* to the Undergraduate Office

NO NOT STAPLE - ONLY WRITE NOTES INSIDE THE SQUARE BELOW

Closer Look at angle strain Recall:

sp^3 carbon 

tetrahedral

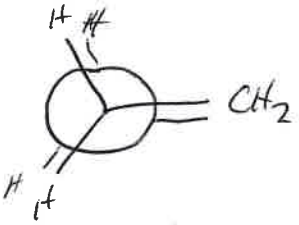
Contrast

– strong deviation from sp^3 carbon

Torsional strain

(Recall staggered vs. eclipsed about C-C bond.)

Consider △ Newman projection

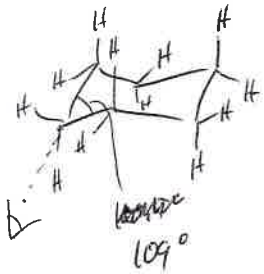


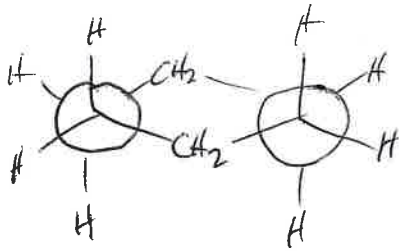
Locked into eclipsed form!

Now consider cyclohexane. Why strain free?

– six-membered ring can adopt a conf. w/ no angle strain + no torsional strain

"Chair" conformation





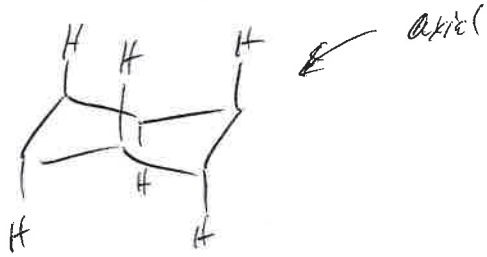
Course Chem 343 Lecturer Coellman
Day Monday Date 10/19/15
Notes Taken By AB Total # of Pages 4

Submit a *Single-sided Copy* to the Undergraduate Office
NO NOT STAPLE - ONLY WRITE NOTES INSIDE THE SQUARE BELOW

Rules of "chair" cyclohexane drawing

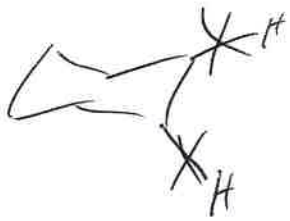
3 sets of parallel lines

Each carbon has 2 H's (or other substituent) One set of H's, one per C project ⊥ to mean plane ("axial")



Other set is roughly in the mean ring plane ("Equatorial")

Avoid nonsense!!!



Note! All axial positions are equivalent to each other

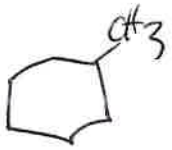
All equatorial - - - - -

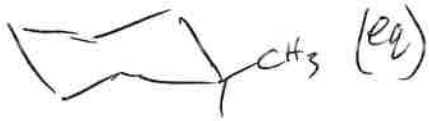
Course Chem 343 Lecturer Coffman
Day Monday Date 10/19/15
Notes Taken By NB Total # of Pages 4

Submit a *Single-sided Copy* to the Undergraduate Office
NO NOT STAPLE - ONLY WRITE NOTES INSIDE THE SQUARE BELOW

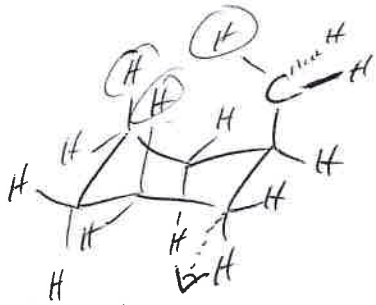
* An axial position is different than an equatorial

W/ Substituents





Eq. Methyl is More Stable than axial Methyl by about 1.8 kcal/mol

Origin of difference —  "1,3-diaxial interactions" (Steric repulsion)

1,3 interactions are gauche interactions!