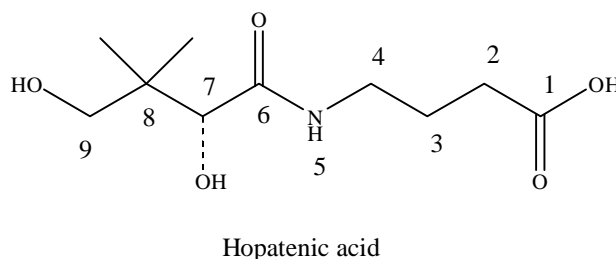
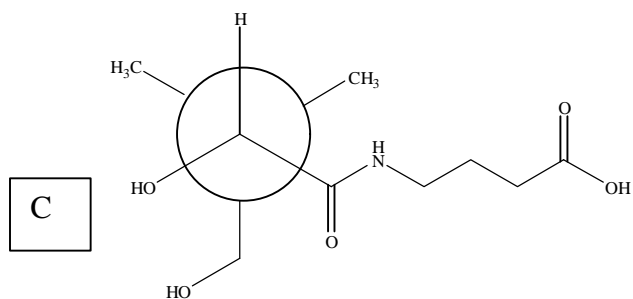
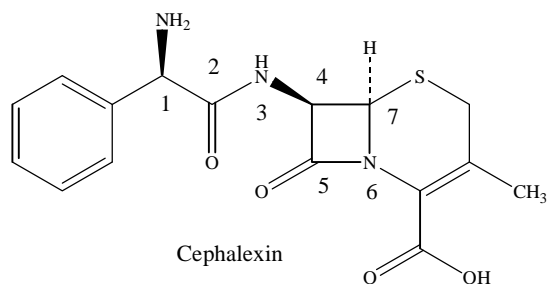


1. The Newman Projection below represents:



- the most stable conformation of the C₈-C₉ bond of hopateric acid.
- the least stable conformation of the C₆-C₇ bond of hopateric acid
- a staggered conformation of the C₇-C₈ bond of hopateric acid that is not the most stable.
- the most stable conformation of the C₇-C₈ bond of hopateric acid.
- none of these

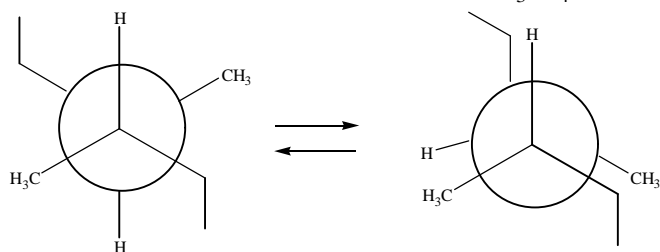
2. The configurations of the chiral carbons of cephalixin, an antibiotic are:



- 1R, 4R, 7R
- 1R, 4S, 7S
- 1S, 4R, 7S
- 1R, 4S, 7R
- 1S, 4S, 7S

Credit for all answers

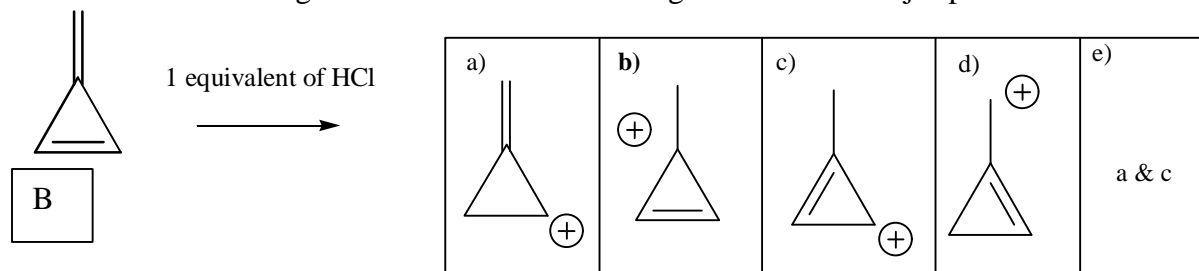
3. The ratio of the two conformations of C₃-C₄ bond of 3,4-dimethylhexane at 25°C is:



- 81(A):1(B)
- 1(A):81(B)
- 0.002 (A):1 (B)
- 1(A):0.002(B)
- 1(A):1(B)

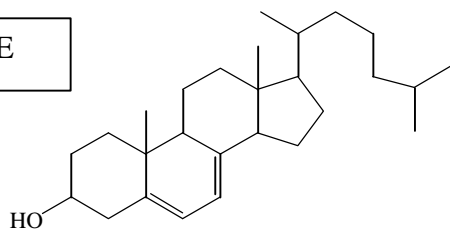
D

4. Which of the following reaction intermediates will give rise to the major product of the reaction given below?



5. Which of the following statements are true as they relate 5,7-cholestadien-3 β -ol ?

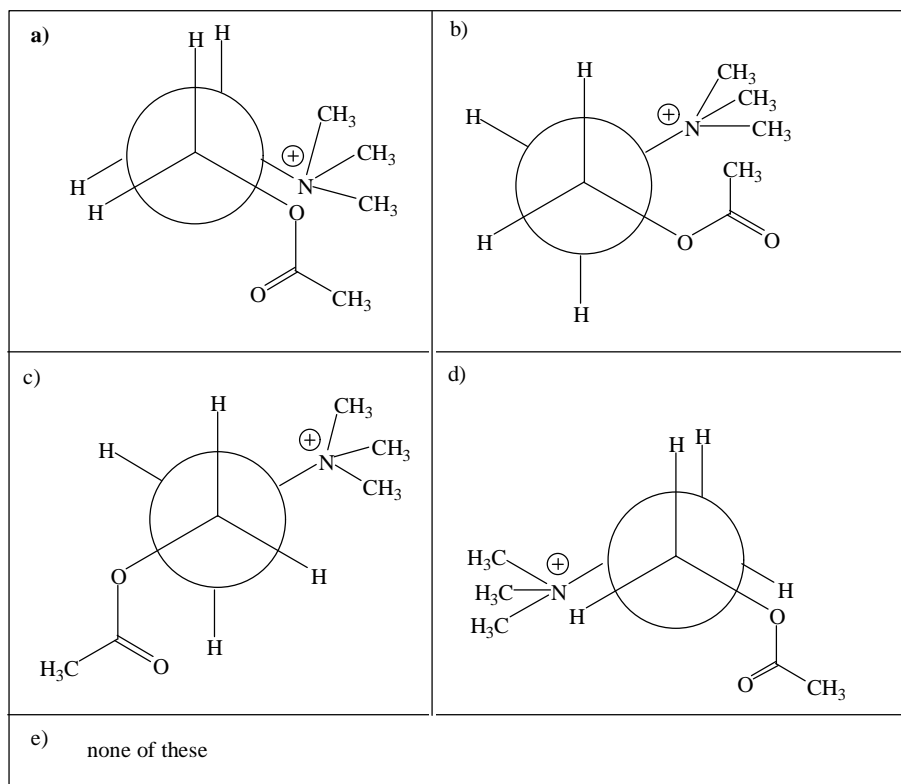
E



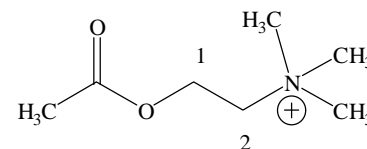
5,7-cholestadien-3 β -ol

- a) 5,7-Cholestadien-3 β -ol will give a mixture of enantiomers upon reaction with Br₂.
- b) 5,7-Cholestadien-3 β -ol will react with AgNO₃ in ethanol
- c) 5,7-Cholestadien-3 β -ol will react with NaI in acetone
- d) a & b
- e) none of these**

6. Acetylcholine, a cholinergic neurotransmitter is only active when it adopts the least stable conformation about the C₁-C₂ bond. Which of the Newman projections depict the active form of acetylcholine?

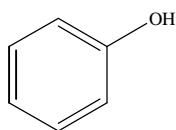


A

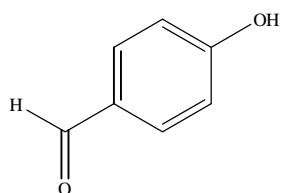


7. The pK_a of phenol is 9.2. Predict which of the following pK_a values given below is most consistent for the pK_a of para-hydroxybenzaldehyde.

B



Phenol

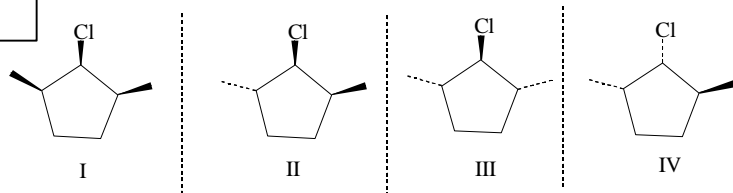


para-Hydroxybenzaldehyde

- a) 10.4
- b) 8.6**
- c) 9.2
- d) 4.8
- e) There is not enough information to answer the question.

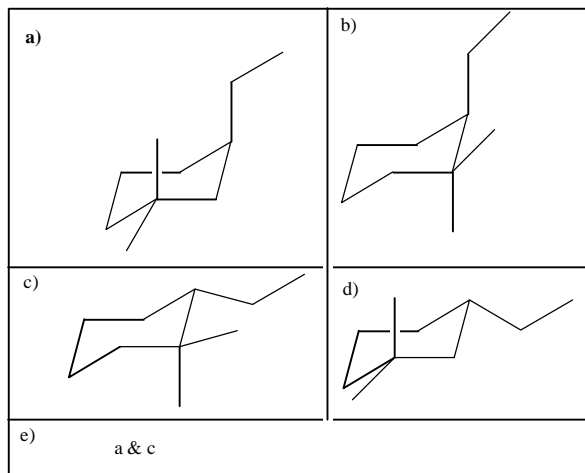
8. Which of the following statements is true regarding the set of compounds given below?

D



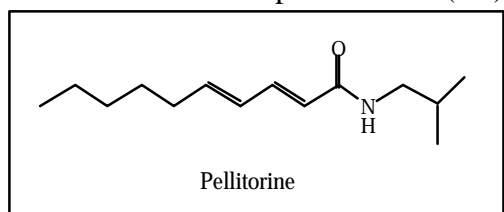
- a) I and II are enantiomers
- b) I and III is the same meso compound.
- c) II and IV are enantiomers
- d) I and IV are diastereomers**
- e) b & d

9. The LEAST stable chair conformation of 1-ethyl-3,3-dimethylcyclohexane is:

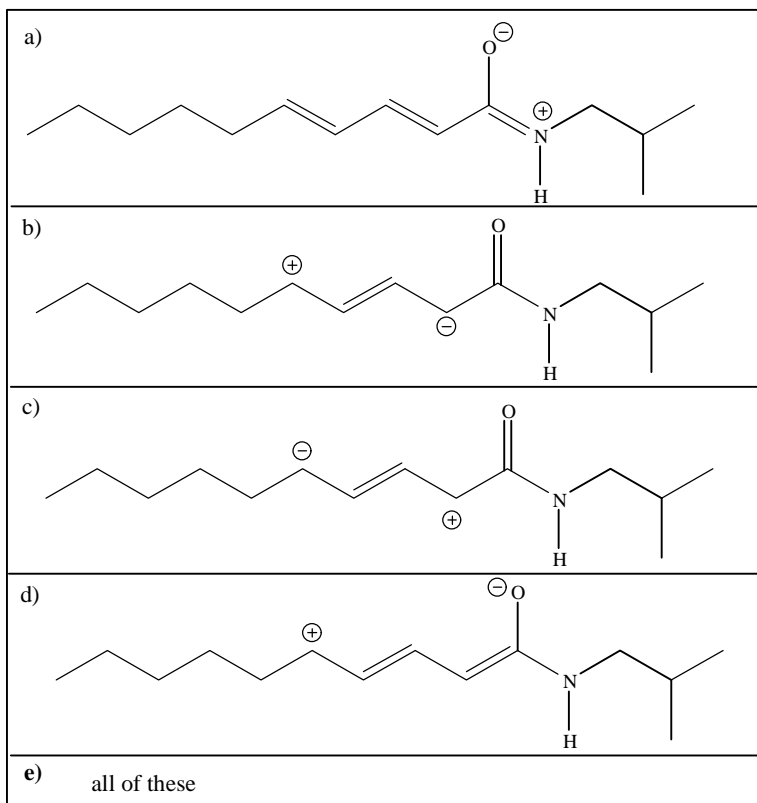


A

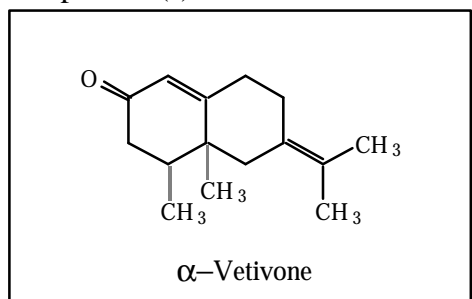
10. A resonance form of pellitorine is (are):



E

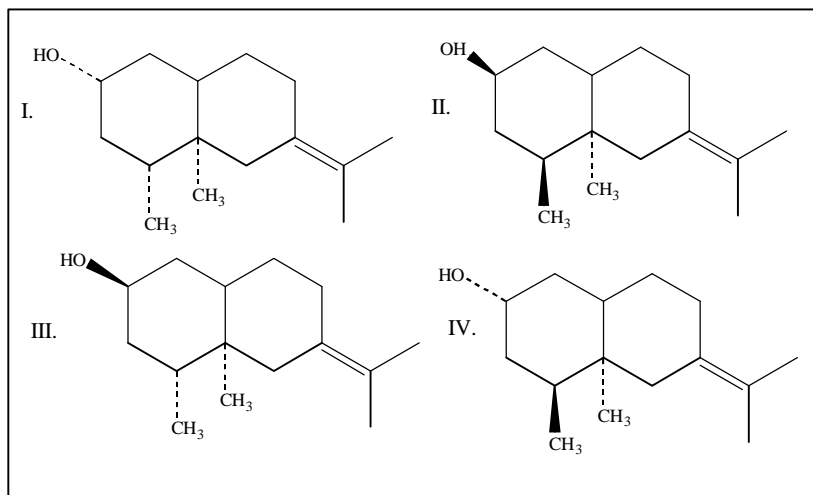


11. The product(s) of the reaction of α -vetivone with NaBH_4 , CH_3OH is (are):



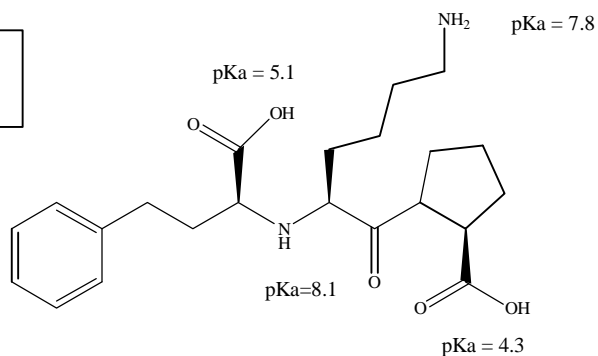
D

- a) I only
b) II only
c) I & II
d) I & III
e) I, II, III, IV



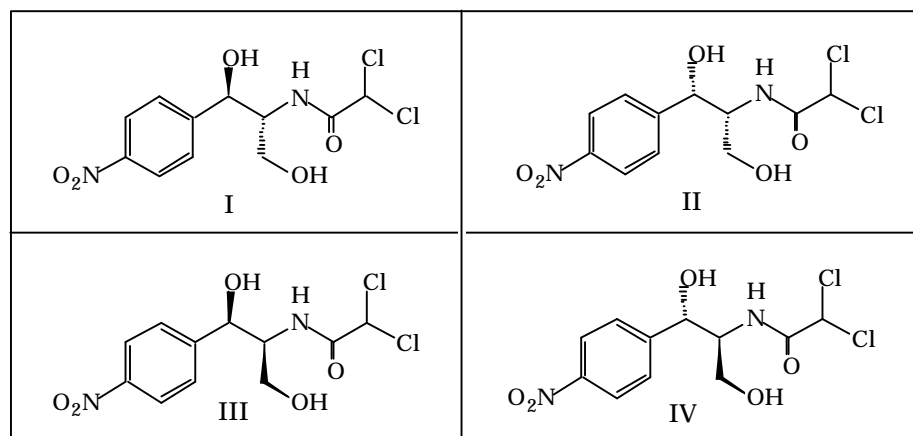
12. Which of the functional groups in lisinopril, an antihypertensive, will be mostly ionized at a pH of 7.4?

D



- a) both amines
b) ketone
c) both carboxylic acids
d) a & c
e) a, b & c

13. Which of the following compounds will have the same boiling point?

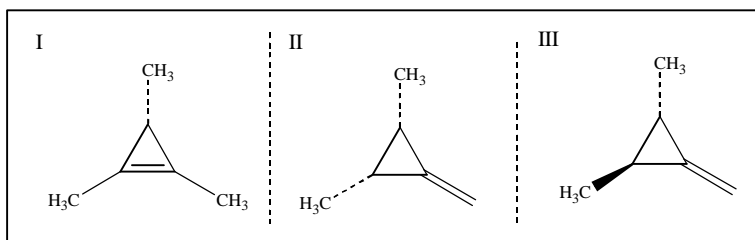


- a) I and II
b) I and IV
c) II and III
d) a & c
e) b & c

E

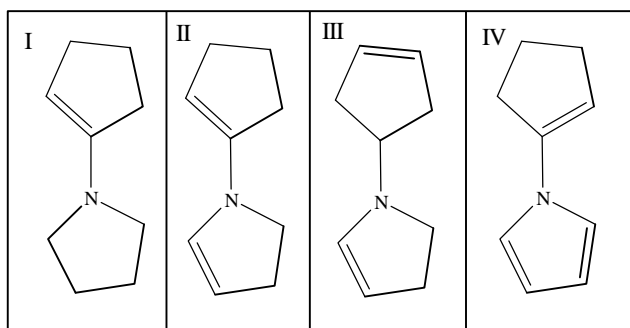
14. Which of the following statement(s) is (are) true as they relate to the compounds given below?

A



- a) II has more torsional strain energy than III
 b) III has more steric strain energy than II
 c) The angle strain of II and III is the same and greater than the angle strain in I
 d) a & c
 e) a, b & c

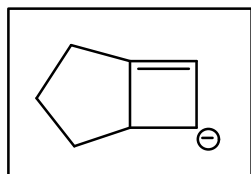
15. Rank the order of pKa values for each of the compounds below.



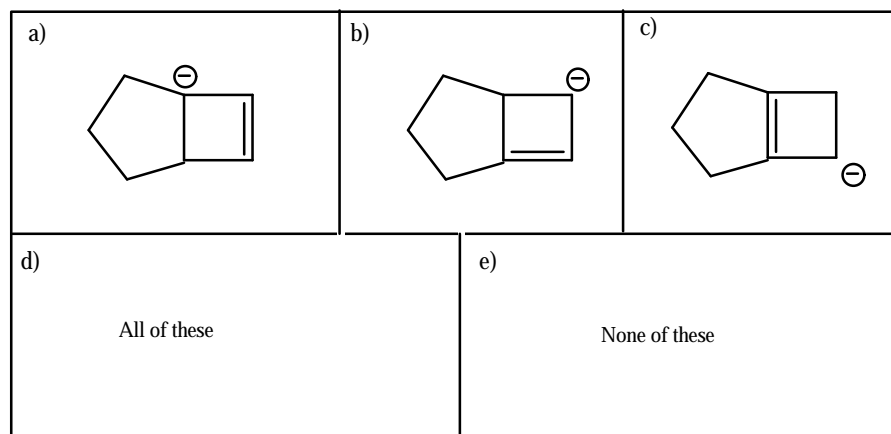
D

- a) IV > II > I = III
 b) I > III > II > IV
 c) IV > II > III > I
 d) I = III > II > IV
 e) All have the same pKa

16. A resonance form of the allylic carbanion shown below is:



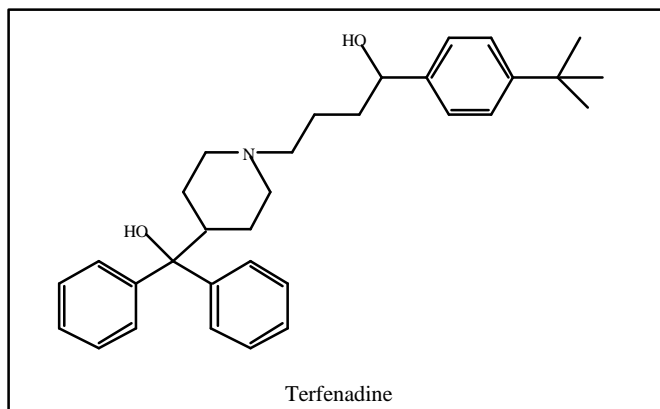
A



17. Terfenadine, an H^1 -antagonist

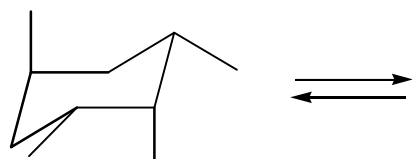
- a) is better absorbed at pH 6 than pH 10
- b) is better absorbed at pH 10 than pH 6
- c) is mostly ionized at pH 10
- d) a & c
- e) b & c

B



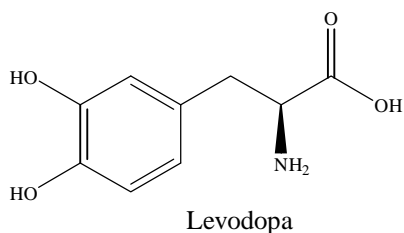
18. The energy of a *conformer* of the compound below is:

B

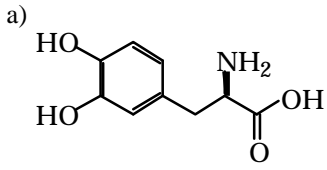
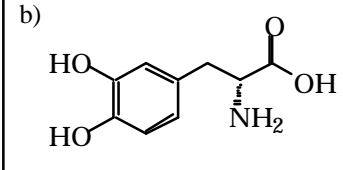
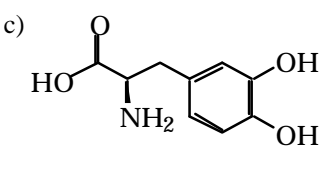


- a) 4.5 kcal
- b) 6.4 kcal**
- c) 4.6 kcal
- d) 4.7 kcal
- e) none of these

19. The levorotatory enantiomer of levodopa is given below. Which of the following structures is the dextrorotatory isomer of levodopa?

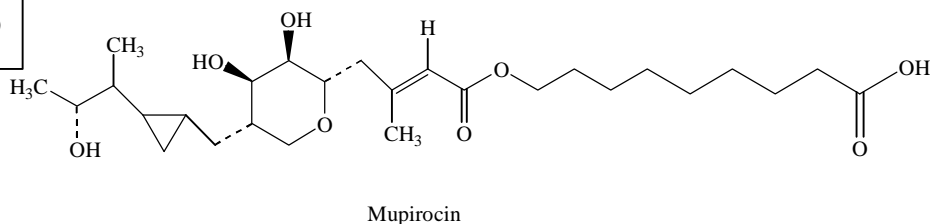


D

a) 	b) 
c) 	d) All of these
	e) None of these

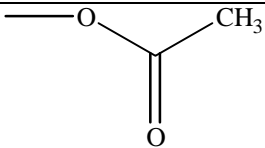
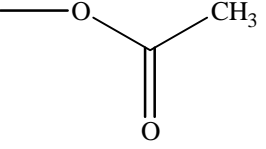
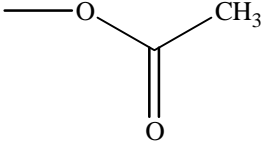
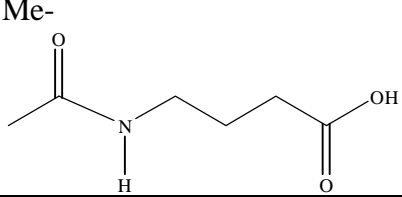
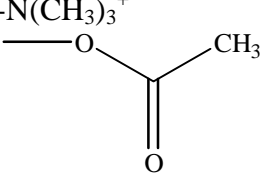
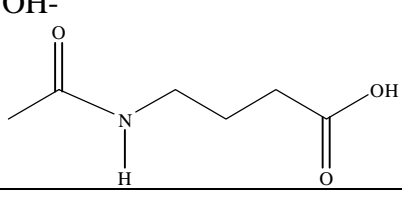
20. The pK_a of mupirocin is 4.7. The percent ionization of mupirocin at $pH = 3.9$ is:

D



- a) 47%
- b) 53%
- c) 86%
- d) 13%
- e) 99%

Useful Information

Steric Strain Energies		Torsional Strain Energies	
Me-Me	0.9kcal	H-H	1.0kcal
Me-OH	0.5kcal	H-Me	1.4kcal
Me-CH ₂ OH	1.2kcal	H-Ethyl	1.6kcal
HO-OH	0.4kcal	Me-Me	2.6kcal
HO- CH ₂ OH	1.1kcal	Me-Ethyl	2.8kcal
HOCH ₂ -CH ₂ OH	1.5kcal	Me-OH	2.2kcal
Me-Ethyl	1.0kcal	Ethyl-Ethyl	3.0kcal
-N(CH ₃) ₃ ⁺ -Me	2.1kcal	HO-OH	1.8kcal
HO--N(CH ₃) ₃ ⁺	1.9kcal	H-N(CH ₃) ₃ ⁺	2.1kcal
	3.2kcal	HO-Ethyl	2.4kcal
	2.8kcal		3.2kcal
	3.1kcal		4.5kcal
	2.6kcal	---	---
		---	---

1,3-Diaxial Interactions	
H-Me	0.9kcal
H-Ethyl	1.1kcal
Me-Me	2.8kcal
Me-Ethyl	3.0kcal
Ethyl-Ethyl	3.4kcal

$$\Delta G^\circ = E_p - E_r$$

$$\Delta G^\circ = -RT \ln K_{eq}$$

$$R = 0.002 \text{ kcal/Kmol}$$