Question 1

Which best describes the relationship between the following two structures?

![trans-1,3-diethylcyclohexane](image)

A structural isomers  
B different structures and not isomers  
C stereoisomers  
D the same thing

Question 2

What is the energy difference between the two chair conformations of the following molecule?

<table>
<thead>
<tr>
<th></th>
<th>Energy kcal/mol</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.5</td>
</tr>
<tr>
<td>B</td>
<td>3.7</td>
</tr>
<tr>
<td>C</td>
<td>0.55</td>
</tr>
<tr>
<td>D</td>
<td>3.15</td>
</tr>
</tbody>
</table>

![Energy Differences](image)

<table>
<thead>
<tr>
<th>ECLIPSING Interactions</th>
<th>Energy kcal/mol</th>
<th>GAUCHE Interactions</th>
<th>Energy kcal/mol</th>
</tr>
</thead>
<tbody>
<tr>
<td>H / H</td>
<td>~1.0</td>
<td>Me / Me</td>
<td>~0.9</td>
</tr>
<tr>
<td>H / Me</td>
<td>~1.4</td>
<td>Et / Me</td>
<td>~0.95</td>
</tr>
<tr>
<td>Me / Me</td>
<td>~2.6</td>
<td>i-Pr / Me</td>
<td>~1.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t-Bu / Me</td>
<td>~2.7</td>
</tr>
</tbody>
</table>
Question 3
MC23h

which of the provided compounds has this IR spectrum?

A  B  C  D

Question 4
MC 23d

Determine how many reasonable molecular formulas correspond to the mass spectrum below. Assume that only carbon, hydrogen and possibly oxygen atoms are present. For the purpose of this question you should assume that all reasonable molecular formulae will have hydrogens and will not have more carbon atoms than hydrogen atoms or more oxygens than hydrogens.

A  1 formula  C  3 formulas
B  2 formulas  D  4 formulas
**Question 5**

**MC23i**

Use minor resonance contributors to determine which compound from the following has the LOWEST frequency for the C=O stretching vibration.

Hint: the way to think about this question is to remember why the amide C=O has a low vibration frequency, and remember that the explanation for that was also on the basis of minor resonance contributors.

![Chemical structures](image)

**Question 6**

**MCir3**

which of the provided compounds has this IR spectrum?

![IR spectrum](image)

![Chemical structures](image)
Question 7
MC23a

which of the provided compounds has this IR spectrum?

[Graph of IR spectrum]

A \( \text{OH} \)
B \( \text{OH} \)
C \( \text{NH}_2 \) \( \text{CO} \)
D \( \text{OH} \)

Question 8
MC23f

Identify the structure with the following IR spectrum

[Graph of IR spectrum]

A \( \text{NH}_2 \)
B \( \text{OH} \)
C \( \text{CO} \) \( \text{NH}_2 \)
D \( \text{CO} \) \( \text{OH} \)
QUESTION 9
There are NO INCORRECT answers to this question, ALL answers to this question will be considered correct for grading purposes
What overall final grade do you expect to earn in this class?
A
B
C
D

QUESTION 10
There are NO INCORRECT answers to this question, ALL answers to this question will be considered correct for grading purposes
How hard did you work on organic chemistry this week (not including watching/attending lectures)
A Very Hard
B Hard
C Somewhat Hard
D Not very Hard this week