Criteria	Excellent	Good	Fair	Unacceptable
Grammar, spelling and clarity	[2pt] No obvious spelling or grammatical errors	[1 pt] Spelling errors exist but are not distracting; no grammatical errors	[0.5 pt] Obvious spelling errors and grammatical errors	[0 pt] Spelling and grammatical errors are distracting
Overall appearance	[2 pt] Title page is properly formatted; figures are informative and appropriate	[1 pt] Title page not properly formatted; figures are included without proper notation	[0.5 pt] Title page is not properly formatted; figures are limited or not shown	[0 pt] No title page; no figures
(**Q#1**) **Ethane**: Accuracy of Conformation Analysis	[2 pts] Correct assignment and/or representation showing eclipsed conformation	[1 pt] Incorrect name but a correct picture showing eclipsed conformation	[0.5 pt] No mention of eclipsed conformation and the representation is incorrect	[0 pt] No answer
(**Q#2**) **Ethane**: Accuracy of Strain Interactions	[2 pts] A steric argument is given for the two eclipsing hydrogens	[1 pt] The eclipsing hydrogens are mentioned, but there is no rational argument for the type of interaction	[0.5 pt] The eclipsing hydrogens are not mentioned, and the type of strain is unclear or not addressed	[0 pt] No answer
(**Q#3**) **Butane**: Accuracy of Conformation Analysis	[2 pts] Conformation series is correct	[1 pt] All (4) of the conformers are listed, but in the incorrect series	[0.5 pt] One or more of the conformers are not included	[0 pt] No answer
(**Q#4**) **Butane**: Accuracy of Dihedral Angle Analysis	[2 pts] Local and global energy minima and maxima dihedral angles are listed correctly	[1 pt] Local and global energy minima and maxima dihedral angles are listed, but are incorrect	[0.5 pt] Only global energy minima and maxima are listed	[0 pt] No answer
(**Q#5**) **Butane**: Accuracy of Energy Barriers and Analysis	[3 pts] All energy minima barriers (3) are listed and a valid explanation is given	[2 pts] One or more of the energy minima barriers are not included, a valid explanation is given	[1 pt] One or more of the energy minima barriers are not included, an invalid explanation is given	[0 pt] No answer
(**Q#6**) **Butane**: Accuracy of Strain Interactions	[2 pts] A steric argument is given for the two eclipsing methyl groups*	[1 pt] The eclipsing methyl groups* are mentioned, but there is no rational argument for the type of interaction	[0.5 pt] The eclipsing methyl groups* are not mentioned, and the type of strain is unclear or not addressed	[0 pt] No answer **Note: Students may not use the term "methyl" look for carbon-hydrogen interaction in that case*
(**Q#7**) **Butane**: Accuracy of Strain Interactions	[2 pts] Bond strain, or a description of bond strain is included	[1 pt] Incorrect description of bond strain included	[0.5 pt] No description or mention of bond strain is included	[0 pt] No answer

Criteria	**Excellent**	**Good**	**Fair**	**Unacceptable**
(**Q#8**) **Cyclopropane**: Accuracy of heat of formation	[2 pts] A correct value for heat of formation is given with the appropriate sign	[1 pt] A correct value for heat of formation is given with the incorrect sign	[0.5 pt] An incorrect value for heat of formation is given with the appropriate sign	[0 pt] No answer
(**Q#9**) **Cycloalkanes**: Accuracy of reactivity Series	[2 pts] The correct cycloalkane is given for the most reactive and the reason is valid	[1 pt] The correct cycloalkane is given for the most reactive but the reason is invalid	[0.5 pt] The correct cycloalkane is not given for the most reactive	[0 pt] No answer
(**Q#10**) **Cycloalkanes**: Accuracy of heat of formation series	[3 pts] Calc. values provided are correct and analysis provided is correct	[2 pts] Calc. values provided are correct; interpretations are mostly correct	[1 pt] Calc. values provided are incorrect; interpretations are mostly correct	[0 pt] No answer
(**Q#11**) **Cyclohexane**: Accuracy of Axial-Equatorial Interactions	[2 pts] Calc. values provided are correct and analysis provided is correct	[1 pt] Calc. values provided are correct; interpretations are mostly correct	[0.5 pt] Calc. values provided are incorrect; interpretations are mostly correct	[0 pt] No answer
(**Q#12**) **Cyclohexane**: Accuracy of Conformational Stability for Axial-Equatorial Interactions	[2pts] A reasonable argument is given for axial-axial interaction including a detailed argument	[1 pt] A reasonable argument is given for axial-axial interaction but lacks detail	[1 pt] No reasonable argument is given for axial-axial interaction	[0 pt] No answer or an incorrect assessment (i.e., axial interaction is not mentioned at all)