### Question 1
**Question:** Which of the following Newman projections represents 2,4-dimethylpentane?

- A) 3
- B) 1
- C) 2
- D) 4

**Answer:** B

### Question 2
**Question:** Which of the following Newman projections represents the most stable conformation of butane?

- A) 3
- B) 4
- C) 1
- D) 2

**Answer:** A

### Question 3
**Question:** Which of the following contribute to the energy of conformations of butane?

1. torsional strain;
2. steric strain;
3. ring strain;

- A) only 2
- B) only 1 and 2
- C) 1, 2 and 3
- D) only 1

**Answer:** B

### Question 4
**Question:** Which of the following cycloalkanes has the least ring strain per carbon atom?

- A) cyclopropane
- B) cyclopentane
- C) cycloheptane
- D) cyclohexane

**Answer:** D

### Question 5
**Question:** Which one of the following structures represents a different compound from the other three?

- A) 4
- B) 1
- C) 2
- D) 3

**Answer:** D

### Question 6
**Question:** Which isomer of trans-n,m-dimethylcyclohexane and cis-x,y-dimethylcyclohexane are more stable?

- A) n,m = 1,3- and x,y = 1,4-
- B) n,m = 1,3- and x,y = 1,4-
- C) n,m = 1,2- and x,y = 1,3-
- D) n,m = 1,4- and x,y = 1,2-

**Answer:** C

### Question 7
**Question:** Which of the following structures represents trans-1,2-dimethylcyclohexane?

- A) 2
- B) 3
- C) 4
- D) 1

**Answer:** A
8. Which of the following compounds can adopt a chair conformation in which there are no axial methyl groups?

A) \textit{trans}-1,2-dimethylcyclohexane;  \quad B) \textit{cis}-1,2-dimethylcyclohexane;
C) \textit{cis}-1,3-dimethylcyclohexane;  \quad D) 1,1-dimethylcyclohexane

\textbf{A}

9. Which of the following statements is \textit{not} true regarding the conformational cyclohexanes?

A) Conformations of substituted cyclohexanes are stabilized by 1,3-diaxial steric interactions;
B) Ring inversion of substituted cyclohexanes swaps the equatorial and axial positions of the substituents;
C) The relative amount of two conformations of substituted cyclohexanes can be determined from the difference in strain energy;
D) The chair conformation of cyclohexane is more stable than the boat conformation.

\textbf{A}

10. What is the main cause for the difference in energy between the two chair conformations of \textit{cis}-1,3-dimethylcyclohexane?

A) torsion strain;  \quad B) angle strain;  \quad C) 1,3-diaxial interactions;  \quad D) ring strain

\textbf{C}

11. Which of the following is the most stable conformation of \textit{trans}-1-isopropyl-3-methylcyclohexane?

A) 2;  \quad B) 3;  \quad C) 1;  \quad D) 4

\textbf{D}

12. Which of the following is the most stable conformation of \textit{cis}-1-tert-butyl-4-methylcyclohexane?

A) 3;  \quad B) 4;  \quad C) 1;  \quad D) 2

\textbf{C}

13. Draw the most stable conformation of a \textit{1-tert}-butyl-3-fluorocyclohexane isomer using A) skeletal formula, and B) conformational representation (indicate a/e in the conformational representation).

\text{Skeletal (0/1 pts):} \quad \text{Conformational (0/2 pts):}

\text{cis-} \quad \text{=}

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