

Chapter 4:

1. How are isomers which differ only in their atomic arrangement in three-dimensional space designated?

- a. Constitutional isomers.
- b. Stereoisomers.
- c. Positional isomers.
- d. Cis isomers.

Answer: B

2. Why is ring strain greatest in cyclopropane and cyclobutane, out of all the cycloalkanes?

- a. It isn't; it is greatest in cyclobutane and cyclopentane.
- b. Because the bond angles in these two cycloalkanes are much larger than that which is the optimal angle for sp^3 carbon.
- c. The angles in these two cycloalkanes exist but are energetically unstable and unfavorable.
- d. The bonds in these two cycloalkanes are less than the preferred 109.5° degree angle of sp^3 carbon.

Answer: D

3. Why is cyclohexane the most strain-free of the cycloalkanes?

- a. Because the bond angles within the ring are very close to the optimum angles for sp^3 hybridization.
- b. Because the ring size is correct.
- c. Because the right number of carbon atoms have equatorial and axial C-H bonds.
- d. Because there is little steric hindrance between C-H bonds.

Answer: A

4. What is the most stable configuration of cyclohexane?

- a. Boat.
- b. Chair.
- c. Twist boat.
- d. Skew boat.

Answer: B

5. What are the most stable, substituted cyclohexanes?

- a. Axially substituted.
- b. 1,3 - disubstituted.
- c. Equatorially substituted.
- d. 1,3 - diaxially substituted.

Answer: C

6. What contributes to ring strain in cycloalkanes larger than cyclohexane?
- a. Molecular equilibrations.
 - b. Bond angle distortion exclusively.
 - c. Partial eclipsing of hydrogens, bond angle distortions, and transannular steric repulsions.
 - d. All anti-configurations.

Answer: C

7. In polycyclic cycloalkanes, when two atoms are shared by both rings, what term denotes this molecular arrangement?
- a. Multi-cyclic.
 - b. Shared.
 - c. Adjacent.
 - d. Fused.

Answer: D

8. How are natural products produced?
- a. By animals.
 - b. Originally, at least, by living organisms.
 - c. Synthetically from natural materials.
 - d. By plants, molds, and fungi.

Answer: B

9. What do hormones do?
- a. Regulate biochemical activity.
 - b. Accelerate chemical reactions.
 - c. Alter natural product syntheses.
 - d. Regulate disease.

Answer: A

10. What type of molecule is cholesterol?
- a. A terpene.
 - b. A bridgehead carbon cycloalkane.
 - c. A hydrocarbon.
 - d. A steroid.

Answer: D