Stereochemistry – Multiple Choice Questions (40 Questions)

Q1. Isomers are compounds that have:
A) Different molecular formulas
B) The same molecular formula
C) Different functional groups
D) The same structure

Q2. Constitutional isomers differ in:
A) Spatial arrangement
B) Optical activity
C) Atom connectivity
D) Chirality

Q3. Stereoisomers have the same:
A) Molecular weight
B) Functional groups
C) Connectivity of atoms
D) Physical properties

Q4. Enantiomers are best described as:
A) Identical molecules
B) Superposable mirror images
C) Non-superposable mirror images
D) Not stereoisomers

Q5. Diastereomers are stereoisomers that are:
A) Mirror images
B) Identical
C) Not mirror images
D) Always optically active

Q6. Cis–trans isomers are classified as:
A) Enantiomers
B) Diastereomers
C) Constitutional isomers
D) Conformers

Q7. A chiral molecule is one that:
A) Has a plane of symmetry
B) Is superposable on its mirror image
C) Is not superposable on its mirror image
D) Contains a double bond

Q8. Enantiomers can exist only in molecules that are:
A) Aromatic
B) Saturated
C) Chiral
D) Cyclic

Q9. A carbon atom bonded to four different groups is called:
A) Planar carbon
B) Trigonal carbon
C) Chiral center
D) Alkene carbon

Q10. A molecule with one chiral center is always:
A) Achiral
B) Chiral
C) Meso
D) Racemic

Q11. A tetrahedral stereogenic center usually results in a molecule that is:
A) Achiral
B) Chiral
C) Planar
D) Linear

Q12. Trigonal stereogenic centers are generally:
A) Chiral
B) Achiral
C) Optically active
D) Asymmetric

Q13. Which drug illustrates the biological importance of chirality?
A) Aspirin
B) Thalidomide
C) Paracetamol
D) Caffeine

Q14. A molecule will be achiral if it possesses:
A) A chiral carbon
B) Optical activity
C) A plane of symmetry
D) Enantiomers

Q15. The R/S system is used to:
A) Name alkenes
B) Assign molecular formula
C) Distinguish enantiomers
D) Identify functional groups

Q16. In assigning priorities, higher priority is given to the atom with:
A) Higher mass
B) Higher atomic number
C) More bonds
D) Larger size

Q17. The lowest priority group in most chiral centers is:
A) –OH
B) –CH■
C) –H
D) –Cl

Q18. A clockwise sequence of priorities corresponds to:
A) S configuration
B) R configuration
C) Cis form
D) Trans form

Q19. A counter-clockwise sequence of priorities corresponds to:
A) R configuration
B) S configuration

C) Meso form
D) Racemic form

Q20. Double bonds are treated in priority rules as if atoms were:
A) Ignored
B) Single
C) Duplicated
D) Removed

Q21. Enantiomers have identical:
A) Optical rotation
B) Chemical structure and physical properties
C) Interaction with chiral reagents
D) Direction of light rotation

Q22. Enantiomers differ in:
A) Melting point
B) Boiling point
C) Optical activity
D) Molecular formula

Q23. Optical activity refers to the ability of a compound to:
A) Absorb UV light
B) Emit light
C) Rotate plane-polarized light
D) Reflect light

Q24. Plane-polarized light is produced using a:
A) Spectrometer
B) Polarimeter
C) Polaroid filter
D) UV lamp

Q25. The instrument used to measure optical rotation is called a:
A) Calorimeter
B) Polarimeter
C) Spectrophotometer
D) Refractometer

Q26. Specific rotation is independent of:
A) Concentration
B) Temperature
C) Wavelength
D) Length of sample cell

Q27. Two enantiomers have specific rotations that are:
A) Identical and positive
B) Identical and negative
C) Equal in magnitude but opposite in sign
D) Zero

Q28. A racemic mixture contains:
A) Only one enantiomer
B) Unequal amounts of enantiomers
C) Equal amounts of enantiomers
D) Only diastereomers

Q29. A racemic mixture shows optical rotation that is:
A) Positive
B) Negative
C) Zero
D) Variable

Q30. Diastereomers usually have:
A) Identical physical properties
B) Identical chemical properties
C) Different physical and chemical properties
D) No stereocenters

Q31. The maximum number of stereoisomers for a molecule with n chiral centers is:
A) n^2
B) 2n
C) n + 1
D) 2■

Q32. A meso compound is:
A) Chiral and optically active
B) Achiral despite having chiral centers
C) Always an enantiomer
D) Always optically active

Q33. A meso compound shows optical rotation that is:
A) Positive
B) Negative
C) Zero
D) Variable

Q34. Enantiomers must have:
A) A plane of symmetry
B) At least one chiral center
C) Different molecular formulas
D) Different connectivity

Q35. Fischer projections are commonly used to represent:
A) Conformational isomers
B) Stereochemistry of chiral molecules
C) Reaction mechanisms
D) Bond angles

Q36. In Fischer projections, horizontal bonds project:
A) Away from the viewer
B) Toward the viewer
C) In the plane of paper
D) Randomly

Q37. A molecule with two chiral centers may have fewer than four stereoisomers due to:
A) High molecular weight
B) Optical inactivity
C) Meso form
D) Double bonds

Q38. Cis-1,3-dimethylcyclohexane is:
A) Chiral
B) A meso compound
C) An enantiomer

D) Optically active

Q39. Trans-1,3-dimethylcyclohexane exists as:
A) One achiral compound
B) A racemic mixture
C) A pair of enantiomers
D) A meso form

Q40. Chiral molecules that do not contain a chiral center are:
A) Impossible
B) Very common
C) Known and exist
D) Always meso

Answer Key

1.B 2.C 3.C 4.C 5.C 6.B 7.C 8.C 9.C 10.B
11.B 12.B 13.B 14.C 15.C 16.B 17.C 18.B 19.B 20.C
21.B 22.C 23.C 24.C 25.B 26.A 27.C 28.C 29.C 30.C
31.D 32.B 33.C 34.B 35.B 36.B 37.C 38.B 39.C 40.C