

CHAPTER

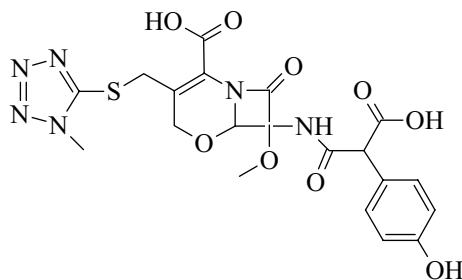
2

Isomerism

Question Bank

LEVEL 1

1. How many stereocenters does latamoxef (an oxacephem antibiotic) have?



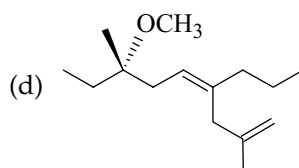
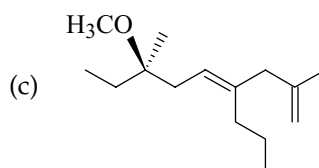
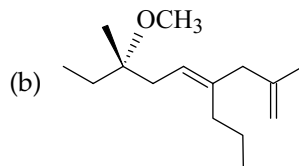
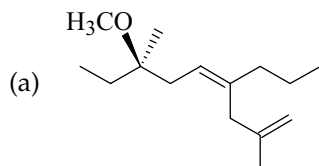
(a) 2

(b) 3

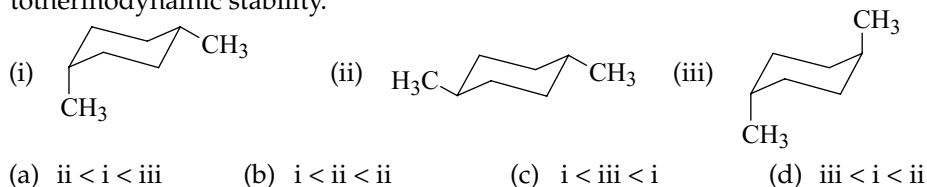
(c) 4

(d) 5

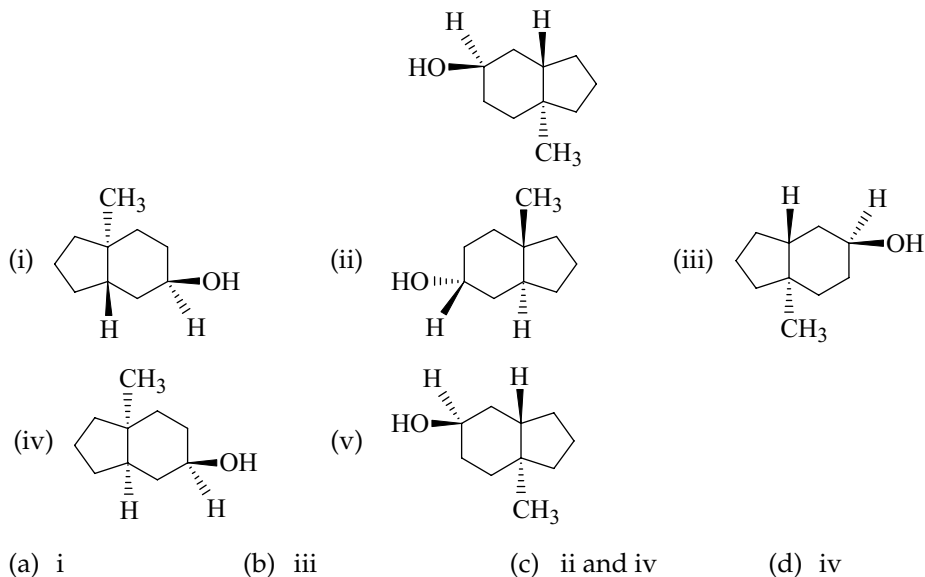
2. Which molecule is (R, Z)-7-methoxy-2,7-dimethyl-4-propylnona-1,4-diene?



3. Choose the correct order that has the following compounds correctly arranged with respect to thermodynamic stability.



4. Which of the structures below is a diastereomer of A?



5. The total number of structural isomers of $C_4H_{11}N$ would be



6. Which of the following pair is the chain isomer?



7. How many geminal dichloride with different formula are possible for $C_3H_6Cl_2$?
- (a) only one (b) two (c) three (d) four

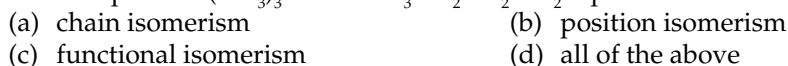
8. What is the relation between 3-ethylpentane and 3-methylhexane?



9. How many isomers are possible for methyl anthracene?



10. The compounds $(CH_3)_3N$ and $CH_3CH_2CH_2NH_2$ represent



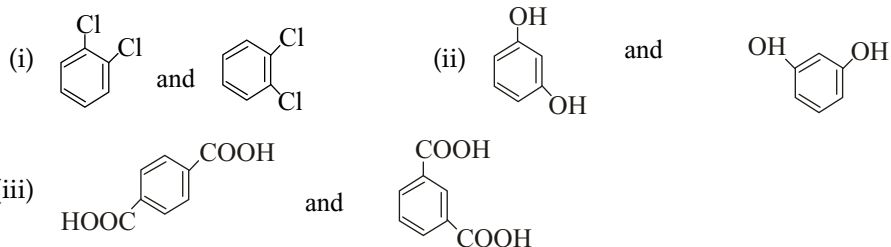
11. An isomer of ethanol is

- (a) methanol (b) acetone
(c) diethyl ether (d) dimethyl ether

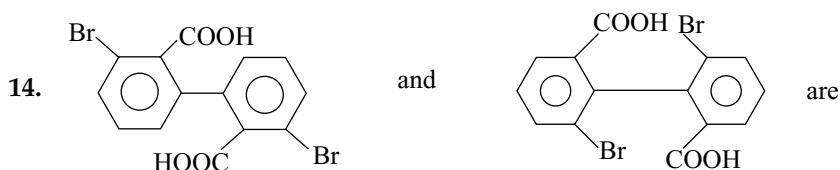
12. The number of primary, secondary and tertiary amines possible with the molecular formula C_3H_9N respectively

- (a) 1, 2, 2 (b) 1, 2, 1 (c) 2, 1, 1 (d) 3, 0, 1

13. Examine the relation between the following pairs of compounds

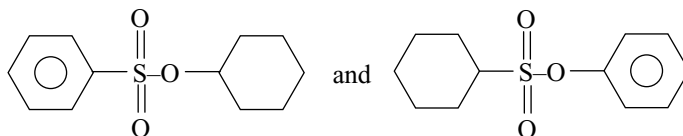


- (a) All i, ii, iii are identical
(b) All i, ii, iii are isomers
(c) i, ii are identical, iii is isomer
(d) i is identical and ii, iii are isomers

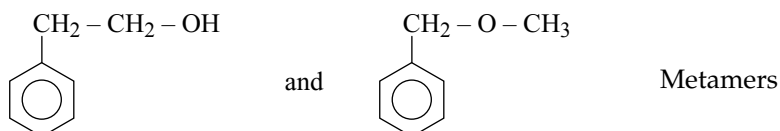
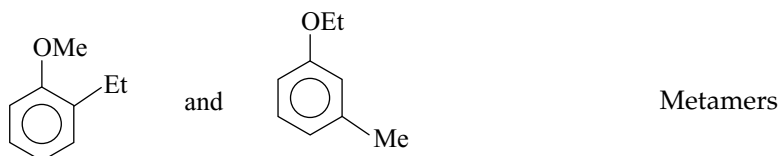
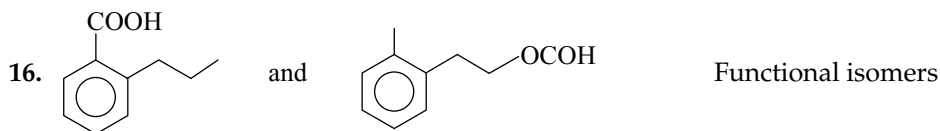


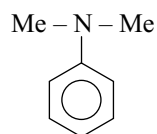
- (a) Positional (b) Chain (c) Geometrical (d) Functional

15. Given compound shows which type of isomerism?

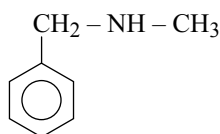


- (a) Chain isomerism (b) Positional isomerism
(c) Metamerism (d) Functional group isomerism





and



Functional isomers

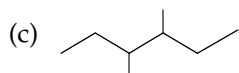
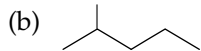
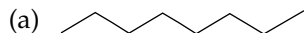
(a) TFFT

(b) FTTF

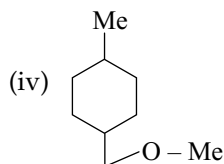
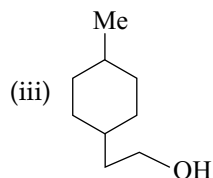
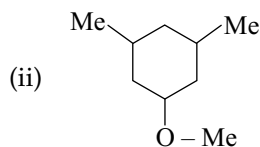
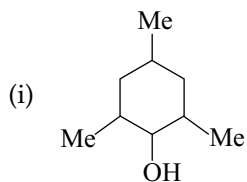
(c) TTFT

(d) TFFT

17. Which compound is not the isomer of 3-ethyl-2-methylpentane?



18. Which of the following is not the correct relationship?



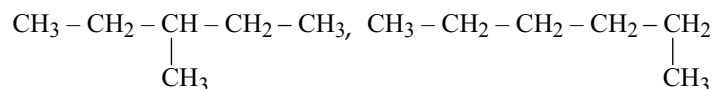
(a) ii and iv are metamers

(b) i and ii are functional isomers

(c) i and iii are chain isomers

(d) i and iv are positional isomers

19. What is the correct relationship between the following compounds?



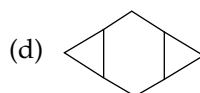
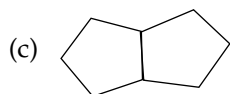
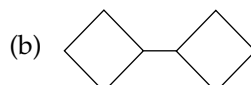
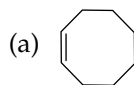
(a) Chain isomers

(b) Position isomers

(c) Functional isomers

(d) Identical

20. Which one of the compound is not isomer of others?



21. $\text{CH}_3 - \text{CH}_2 - \text{NH} - \text{CHO}$; $\text{CH}_3 - \text{CH} - \text{CHO}$

i

ii

Which type of isomerism is observed between i and ii?

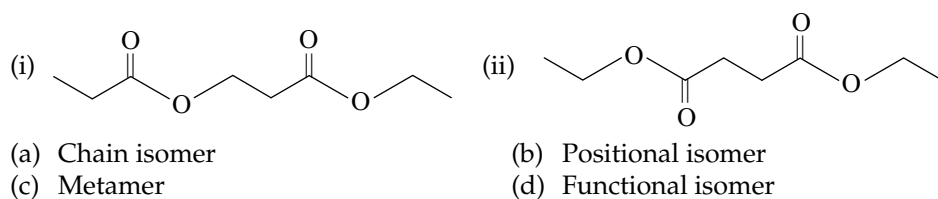
(a) Chain isomers

(b) Position isomers

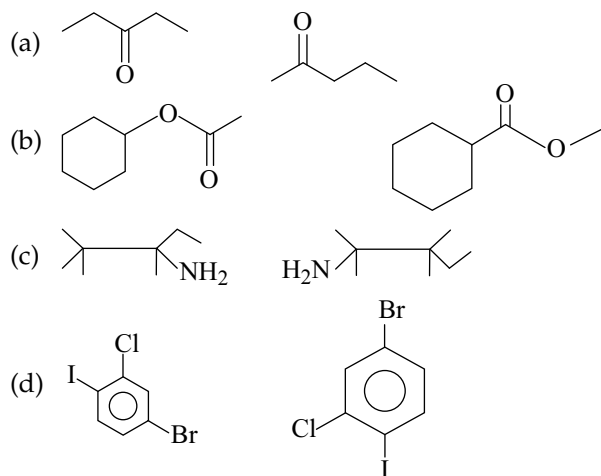
(c) Functional isomers

(d) Metamers

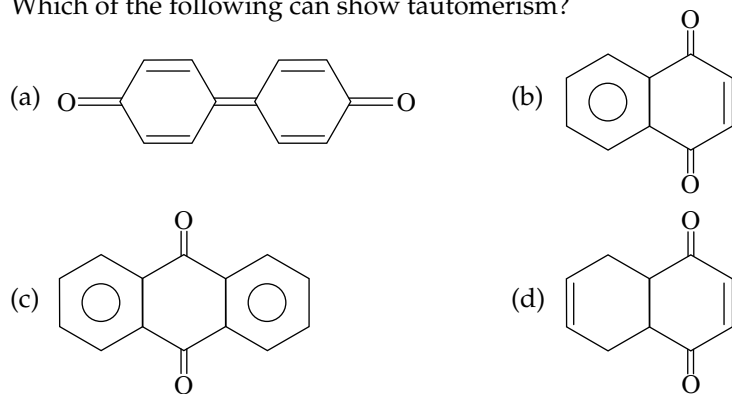
22. The correct relationship among the following pairs of given compounds is



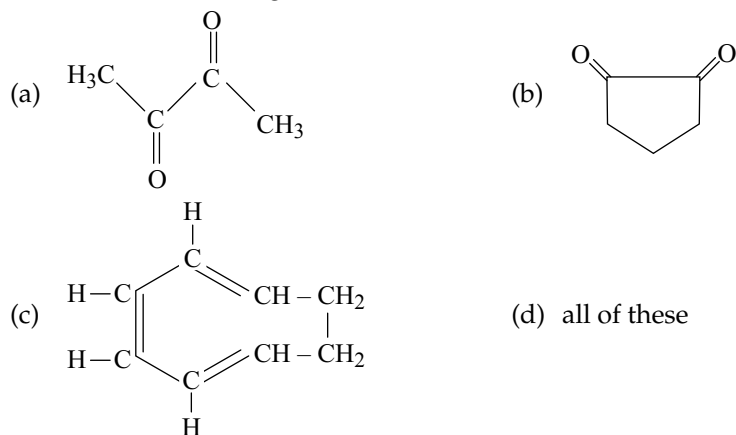
23. Which of the following is a pair of metamers?



24. Which of the following can show tautomerism?



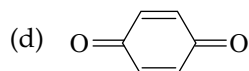
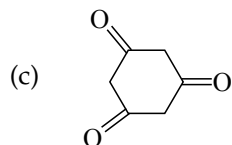
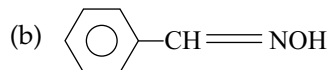
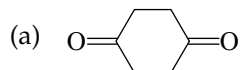
25. Which of the following can show tautomerism?



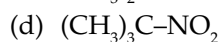
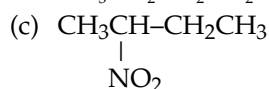
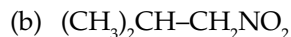
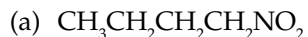
26. Which of the following can show tautomerism?

- (a) $(\text{CH}_3)_3\text{CNO}$ (b) $(\text{CH}_3)_2\text{NH}$ (c) R_3CNO_2 (d) RCH_2NO_2

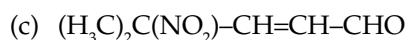
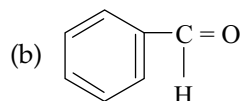
27. Which will not show tautomerism?



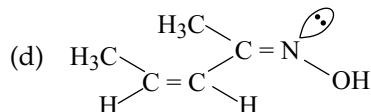
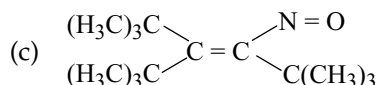
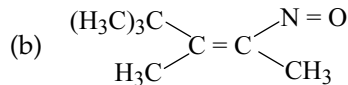
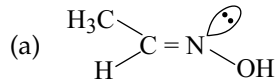
28. Which will not show tautomerism?



29. Which of the following compound show tautomerism?



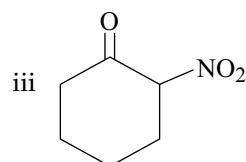
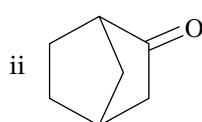
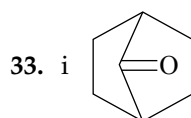
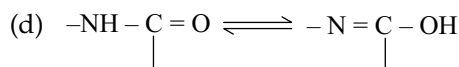
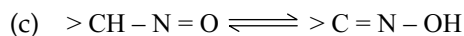
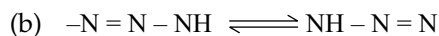
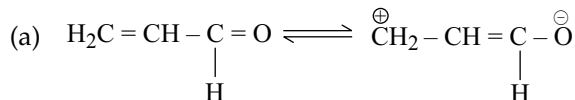
30. Which of the following will not show tautomerism?



31. Tautomerism will be exhibited by



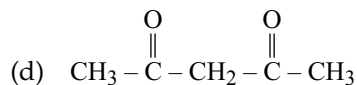
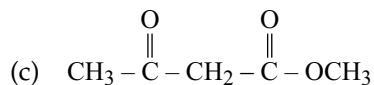
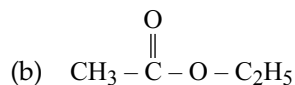
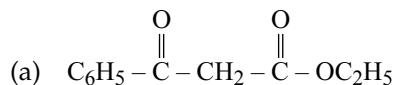
32. Which of the following is not an example of tautomeric equilibrium?



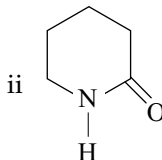
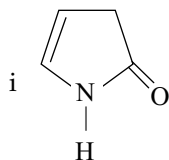
Among these compounds, which of following is the correct order of % enol content?

- (a) i > ii > iii (b) iii > ii > i (c) ii > iii > i (d) i > iii > ii

34. Which of the following will have highest percentage of enol content?



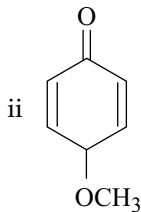
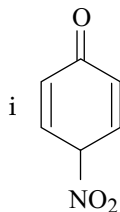
35. Which of the following compounds have less enol content?



- (a) i
(c) Both (a) and (b)

- (b) ii
(d) None of these

36. Which of the following compounds have higher enol content?



- (a) i
(c) i = ii

- (b) ii
(d) None of these

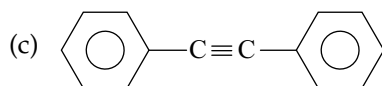
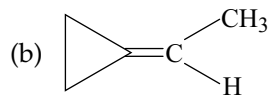
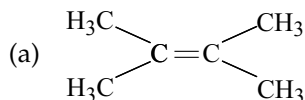
37. Geometrical isomers differ in

- (a) position of functional group (b) spatial arrangement of atoms
(c) position of atoms (d) length of carbon chain

38. Stereoisomers have different

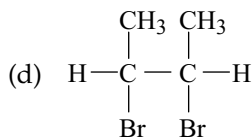
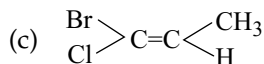
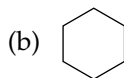
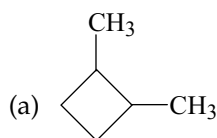
- (a) Molecular formula (b) Structural formula
(c) Configuration (d) Molecular mass

39. Which of the following compounds has restricted rotation?

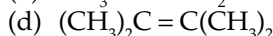
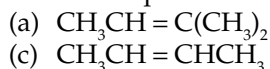


- (d) All of these

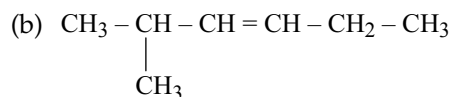
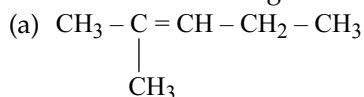
40. Which of the following compounds does not have restricted rotation?



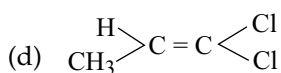
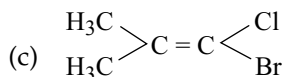
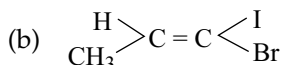
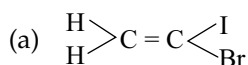
41. Which compound can show geometrical isomerism?



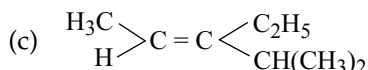
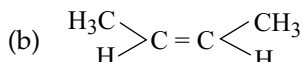
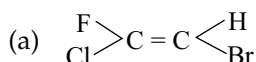
42. Which of the following will not show cis-trans isomerism?



43. Geometrical isomerism is shown by

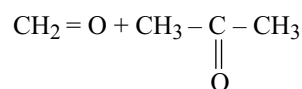
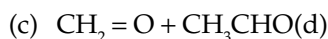
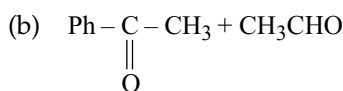
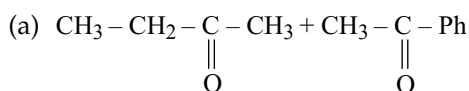
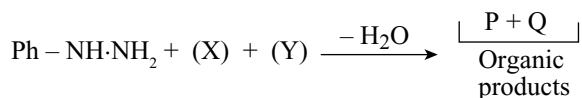


44. The "E"-isomer is

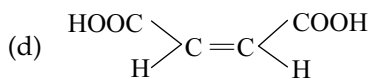
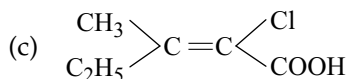
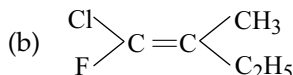
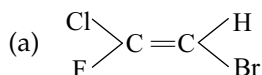


(d) none of the above

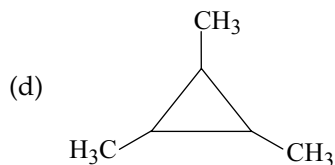
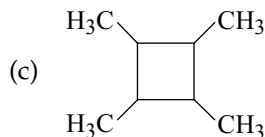
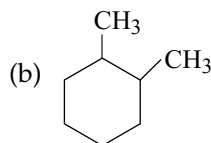
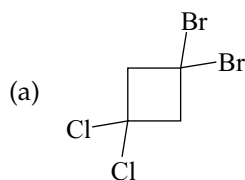
45. The compounds X and Y shown in the below reaction can be



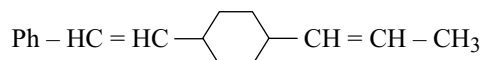
46. The "Z"-isomer is



47. Which of the following compounds cannot show geometrical isomerism?



48. The total number of geometrical isomers possible in following compound is



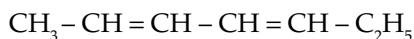
- (a) 2 (b) 1 (c) 6 (d) 8

49. The total number of geometrical isomers possible in following compound is



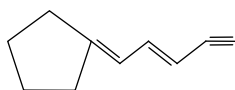
- (a) 4 (b) 6 (c) 3 (d) 2

50. The number of geometrical isomers in the following compound is



- (a) 4 (b) 3 (c) 2 (d) 5

51. The number of cis-trans isomer possible for the following compound is

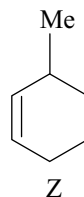
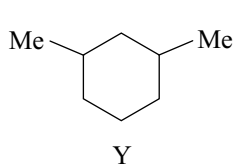
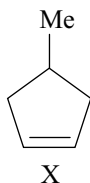


- (a) 2 (b) 4 (c) 6 (d) 8

52. What characteristic is the best common to both cis-2-butene and trans-2-butene?

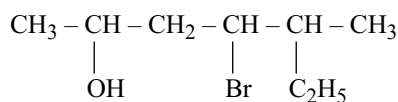
- (a) B.P. (b) Dipole moment
(c) Heat of hydrogenation (d) Product of hydrogenation

53. Number of chiral carbon atoms in the compound x, y and z respectively would be



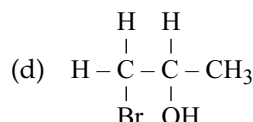
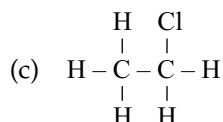
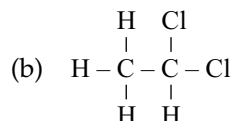
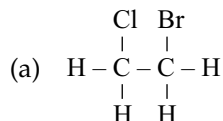
- (a) 0, 2, 1 (b) 1, 0, 1 (c) 1, 2, 1 (d) 1, 2, 0

54. Number of chiral carbon present in the following compound is



- (a) 2 (b) 3 (c) 4 (d) 5

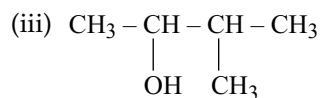
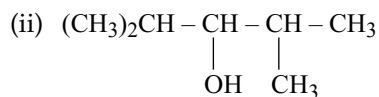
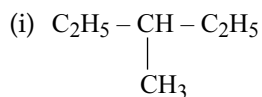
55. Which of the following have asymmetric carbon atom?



56. Meso-tartaric acid and d-tartaric acid are

- (a) positional isomers (b) enantiomers
(c) diastereomers (d) racemic mixture

57. observe the following structures (i) to (iii)



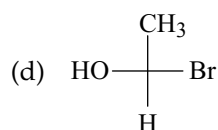
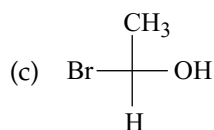
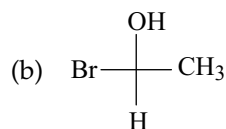
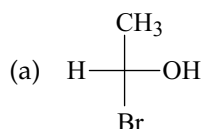
Correct statement is

- (a) All three are chiral compounds
(b) i and ii are chiral
(c) Only ii is chiral
(d) Only iii is chiral

58. The number of optically active compounds in the isomers of $\text{C}_4\text{H}_9\text{Br}$ is

- (a) 1 (b) 2 (c) 3 (d) 4

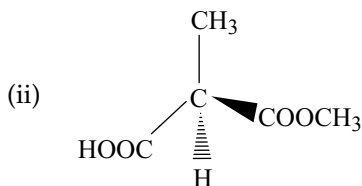
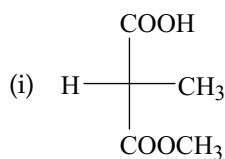
59. Which of the following compound has "S" configuration?



60. The number of optically active isomers observed in 2,3-dichlorobutane is

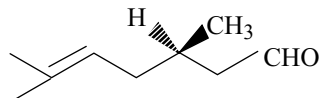
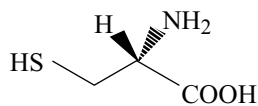
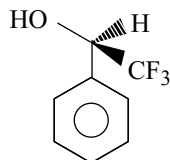
- (a) 0 (b) 2 (c) 3 (d) 4

61. The correct configuration assigned for compound (i) and (ii) respectively is



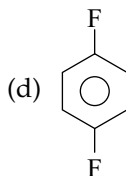
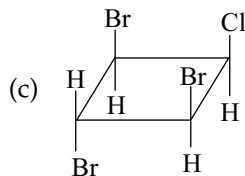
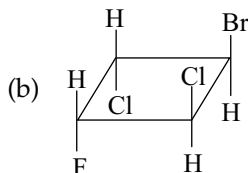
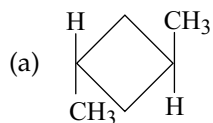
- (a) R, R (b) S, S (c) S, R (d) R, S

62. The R/S configurations of these compounds are respectively



- (a) R, R, R (b) R, S, R (c) R, S, S (d) S, S, S

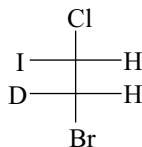
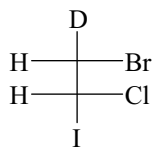
63. Which of the following compound has plane of symmetry (POS) but not centre of symmetry (COS)?



64. The instrument which can be used to measure optical activity, i.e., specific rotation

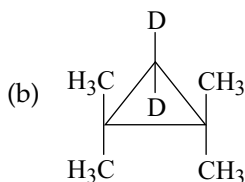
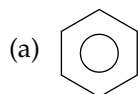
- (a) Refractometer (b) Photometer
(c) Voltmeter (d) Polarimeter

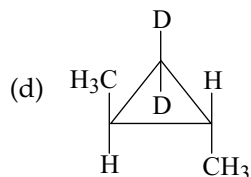
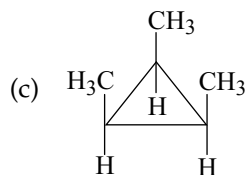
65. The two compounds given below are



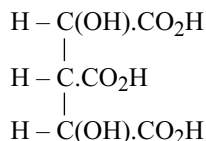
- (a) Enantiomer (b) Identical
(c) Meso compound (d) Diastereomers

66. Which of the following compounds do not possess a C_2 axis of symmetry?

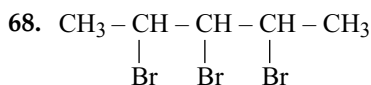




67. How many stereoisomers can exist for the following acid?



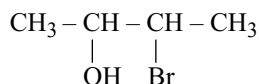
- (a) Two (b) Four (c) Eight (d) Sixteen



Total number of stereoisomers in the above compound is

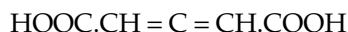
- (a) 6 (b) 4 (c) 8 (d) 16

69. Total number of stereoisomers of the compound is given below



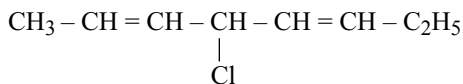
- (a) 2 (b) 4 (c) 6 (d) 8

70. How many stereoisomers of the following molecule are possible?

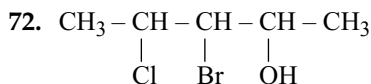


- (a) two optical isomers
 (b) two geometrical isomers
 (c) two optical and two geometrical isomers
 (d) none

71. Total number of stereoisomer of compound is given below



- (a) 2 (b) 4 (c) 6 (d) 8



Total number of stereoisomers in the above compound is

- (a) 6 (b) 4 (c) 8 (d) 16

73. The enantiomeric excess and observed specific rotation of a mixture containing 6 g of (+)-2-butanol and 4 (g) of (–)-2-butanol are respectively (If the specific rotation of enantiomerically pure (+)-2-butanol is +13.5 units)

- (a) 80%, +2.7 unit (b) 20%, –27 unit
 (c) 20%, +2.7 unit (d) 80%, –27 unit

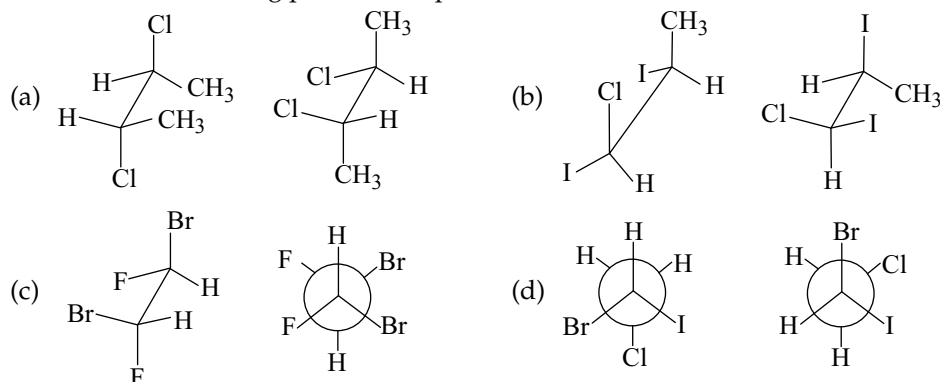
74. Which of the following pair of isomers cannot be separated by fractional crystallisation or fractional distillation?

- (a) Maleic acid and fumaric acid
 (b) (+)-Tartaric acid and meso-tartaric acid
 (c) $\text{CH}_3 - \underset{\text{NH}_2}{\text{CH}} - \text{COOH}$ and $\text{H}_2\text{N} - \text{CH}_2 - \text{CH}_2 - \text{COOH}$
 (d) (+)-lactic acid and (-)-lactic acid

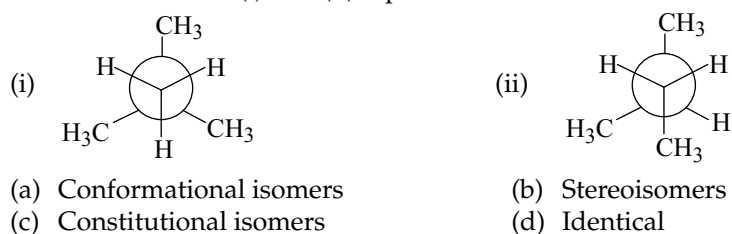
75. Increasing order of stability among the three main conformation (i.e., eclipse, anti, gauche) of ethylene glycol is

- (a) Eclipse, gauche, anti
 (b) Gauche, eclipse, anti
 (c) Eclipse, anti, gauche
 (d) Anti, gauche, eclipse

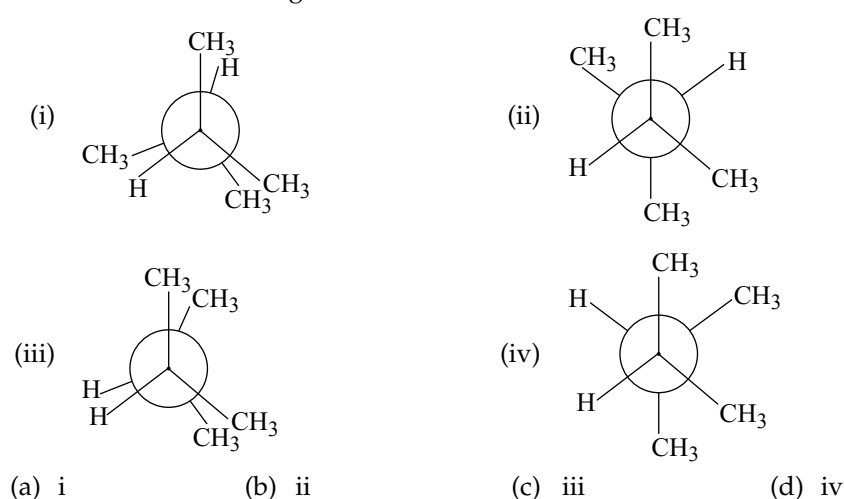
76. Which of the following pairs of compound is/are identical?



77. The two structures (i) and (ii) represent



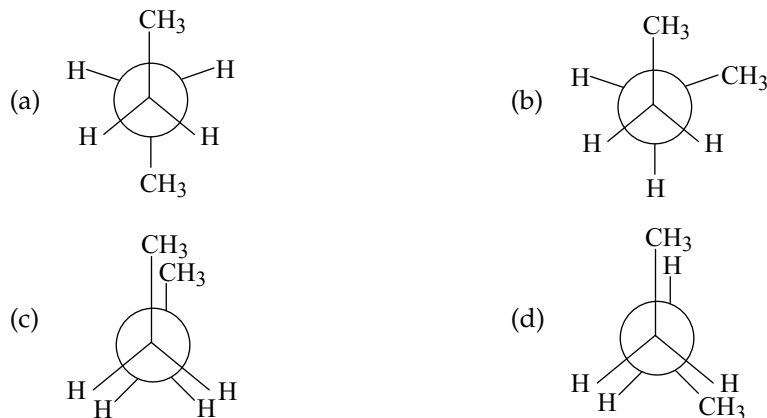
78. In which of the following has minimum torsional strain and minimum Vander waal strain?



79. In the Newman projection formula of the least stable staggered form of n-butane, which of the following reasons is the causes of its unstability?

- (a) Van der Waal's strain (b) Torsional strain
(c) Combination of both (d) None of these

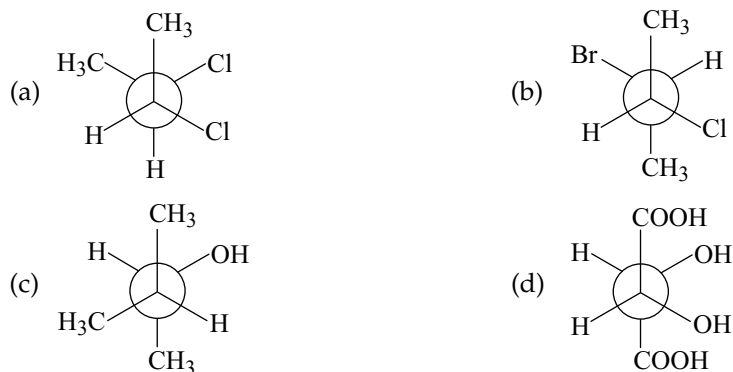
80. Which of the following represent the staggered conformation with dihedral angle $\phi = 60^\circ$?



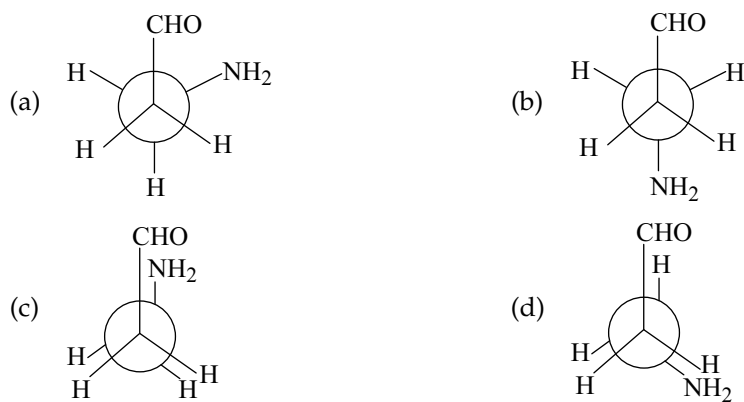
81. The dihedral angle between two methyl groups in partially eclipsed conformation of n-butane is

- (a) 180° (b) 120° (c) 90° (d) $109^\circ 28'$

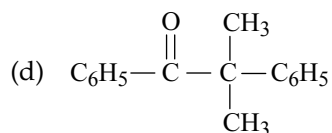
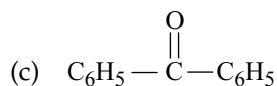
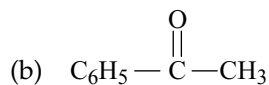
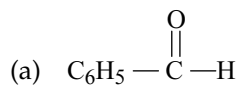
82. Which of the following is an achiral molecule?



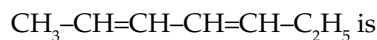
83. Which of the following is most stable?



84. Evaporation of an aqueous solution of ammonium cyanate gives urea. This reaction follows the class of
 (a) Polymerisation (b) Isomerisation
 (c) Association (d) Dissociation
85. The possible number of alkynes with the formula C_5H_8 is
 (a) 2 (b) 3 (c) 4 (d) 5
86. How many isomers of $C_5H_{11}OH$ will be primary alcohols
 (a) 2 (b) 3 (c) 4 (d) 5
87. Number of isomeric forms of C_7H_9N having benzene ring will be
 (a) 7 (b) 6 (c) 5 (d) 4
88. Which of the following is an isomer of diethyl ether
 (a) $(CH_3)_3COH$ (b) CH_3CHO
 (c) C_3H_7OH (d) $(C_2H_5)_2CHOH$
89. Total number of isomeric alcohols with the formula $C_4H_{10}O$ is
 (a) 1 (b) 2 (c) 3 (d) 4
90. The molecular formula of a saturated compound is $C_2H_4Cl_2$. The formula permits the existence of two
 (a) functional isomers (b) position isomers
 (c) optical isomers (d) cis-trans isomers
91. The type of isomerism found in urea molecule is
 (a) Chain (b) Position
 (c) Tautomerism (d) None of these
92. An alkane can show structural isomerism if it has number of minimum carbon atoms
 (a) 1 (b) 2 (c) 3 (d) 4
93. How many chain isomers can be obtained from the alkane C_6H_{14} ?
 (a) 4 (b) 5 (c) 6 (d) 7
94. Keto-enol tautomerism is observed in



95. The number of geometrical isomers in case of a compound with the structure



- (a) 4 (b) 3 (c) 2 (d) 5

96. Which one of the following will show geometrical isomerism?

- (a) $\text{CH}_2\text{Cl} \begin{array}{c} \diagup \\ \text{H} \end{array} \text{C} \begin{array}{c} \diagdown \\ \text{CH}=\text{C}(\text{CH}_3)_2 \end{array}$ (b) $\text{CH}_3 \begin{array}{c} \diagup \\ \text{CH}_2\text{Cl} \end{array} \text{C} \begin{array}{c} \diagdown \\ \text{H} \\ \text{CH}=\text{C}(\text{CH}_3)_2 \end{array}$
- (c) $\text{CH}_2=\text{CH} \begin{array}{c} \diagup \\ \text{H} \end{array} \text{C} \begin{array}{c} \diagdown \\ \text{CH}_2\text{Cl} \\ \text{CH}=\text{CH}_2 \end{array}$ (d) $\text{CH}_3\text{CH}_2\text{CH}=\text{CHCH}_2\text{CH}_3$

97. In the reaction: $\text{CH}_3\text{CHO} + \text{HCN} \longrightarrow \text{CH}_3\text{CH}(\text{OH})\text{CN}$

a chiral centre is produced. The number of stereoisomers of the product is

- (a) 3 (b) 2
(c) 4 (d) none of these

98. The molecule 3-penten-2-ol can exhibit

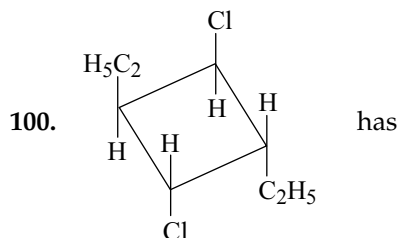
- (a) Optical isomerism (b) Geometrical isomerism
(c) Metamerism (d) Tautomerism

The correct answer is

- (a) (a) and (b) (b) (a) and (c) (c) (b) and (c) (d) (a) and (d)

99. Find the total number of isomers (including stereo isomers) in dimethyl cyclopropane and dimethyl cyclobutane

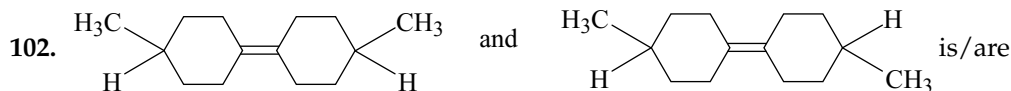
- (a) 6, 8 (b) 5, 6 (c) 4, 5 (d) 4, 6



- (a) plane of symmetry (b) centre of symmetry
(c) C_3 axis of symmetry (d) C_4 axis of symmetry

101. How many optically active cycloalkanones are possible with the molecular formula $\text{C}_5\text{H}_8\text{O}$?

- (a) 8 (b) 6 (c) 5 (d) 4



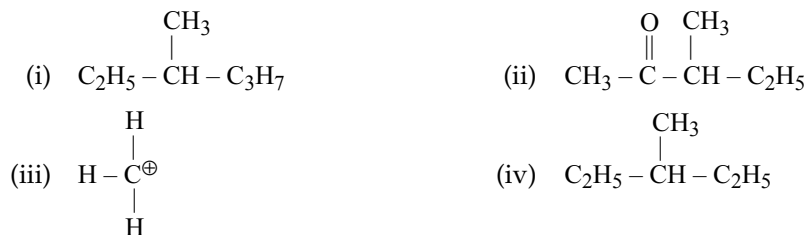
- (a) Geometrical isomers (b) Position isomers
(c) Chain isomers (d) Enantiomers

103. For the given compound which of the $\text{CH}_3 - \underset{\text{D}}{\text{C}} = \text{CH} - \overset{\text{CH}_3}{\underset{\text{D}}{\text{C}}} - \text{CH} = \underset{\text{D}}{\text{C}} - \text{CH}_3$ following statement(s) are correct?

- (a) It has 4 stereoisomers
(b) It has 3 stereoisomers
(c) It has 2 chiral centres
(d) The compound does not show G.I.

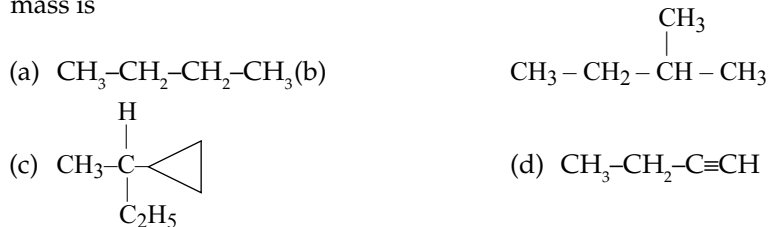
104. Racemic mixture is formed by mixing two
 (a) Isomeric compounds (b) Chiral compounds
 (c) Meso compounds (d) Enantiomers
105. Which of the following does not show geometrical isomerism?
 (a) 1,2-dichloro-1-pentene (b) 1,3-dichloro-2-pentene
 (c) 1,1-dichloro-1-pentene (d) 1,4-dichloro-2-pentene
106. The general formula $C_nH_{2n}O_2$ could be for open chain
 (a) Diketones (b) Carboxylic acids
 (c) Diols (d) Dialdehydes

107. Among the following four structures i to iv



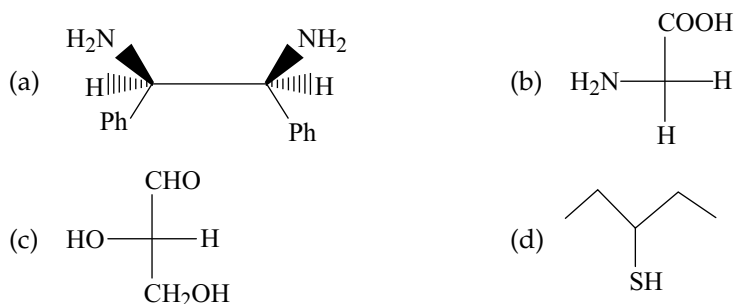
it is true that

- (a) All four are chiral compounds
 (b) Only i and ii are chiral compounds
 (c) Only iii is a chiral compound
 (d) Only ii and iv are chiral compounds
108. Amongst the following compounds, the optically active alkane having lowest molecular mass is

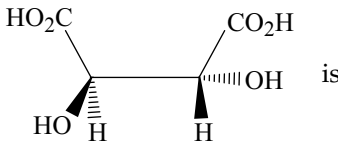


109. Which of the following compounds is not chiral?
 (a) 1-chloropentane (b) 2-chloropentane
 (c) 1-chloro-2-methylpentane (d) 3-chloro-2-methylpentane

110. Which of the following molecules is expected to rotate the plane of polarised light?



111. The correct decreasing order of priority for the functional groups of organic compounds in the IUPAC system of nomenclature is
- $-\text{SO}_3\text{H}$, $-\text{COOH}$, $-\text{CONH}_2$, $-\text{CHO}$
 - $-\text{CHO}$, $-\text{COOH}$, $-\text{SO}_3\text{H}$, $-\text{CONH}_2$
 - $-\text{CONH}_2$, $-\text{CHO}$, $-\text{SO}_3\text{H}$, $-\text{COOH}$
 - $-\text{COOH}$, $-\text{SO}_3\text{H}$, $-\text{CONH}_2$, $-\text{CHO}$

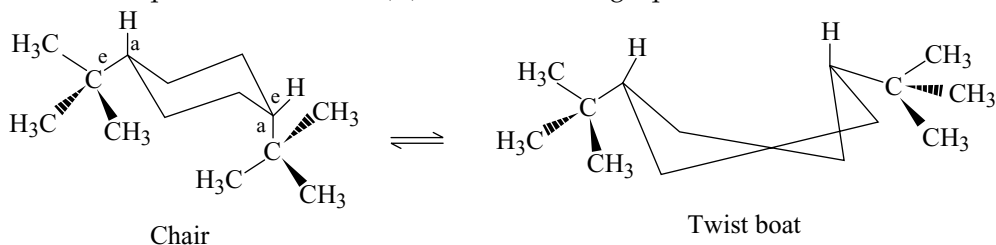
112. The absolute configuration of  is
- R, R
 - R, S
 - S, R
 - S, S

113. The alkene that exhibits geometrical isomerism is
- 2-methyl propene
 - 2-butene
 - 2-methyl-2-butene
 - propene
114. The number of stereoisomers possible for a compound of the molecular formula $\text{CH}_3\text{--CH=CH--CH(OH)--Me}$ is
- 2
 - 4
 - 6
 - 3
115. Out of the following, the alkene that exhibits optical isomerism is
- 3-methyl-2-pentene
 - 4-methyl-1-pentene
 - 3-methyl-1-pentene
 - 2-methyl-2-pentene
116. Identify the compound that exhibits tautomerism
- 2-butene
 - Lactic acid
 - 2-pentanone
 - Phenol

LEVEL 2

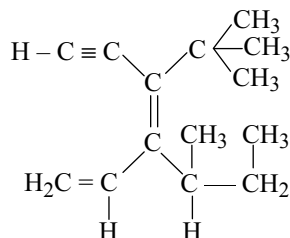
Single and Multiple-choice Type

1. The value of equilibrium constant (K) for the following equilibria



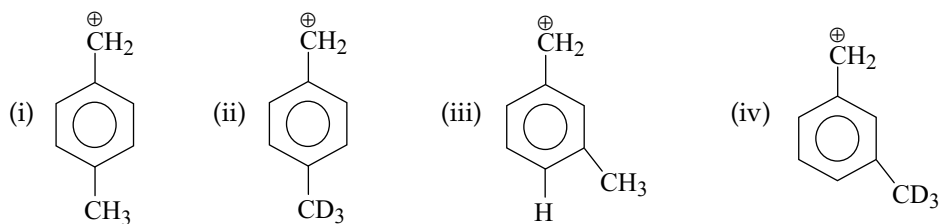
- (a) $K = 1$
 (c) $K < 1$
- (b) $K > 1$
 (d) Cannot relate

2. E/Z nomenclature of the following compound is



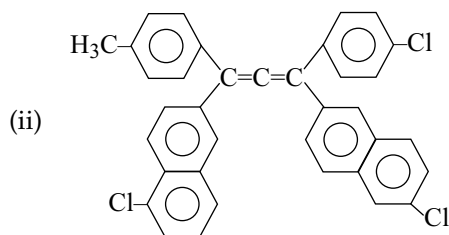
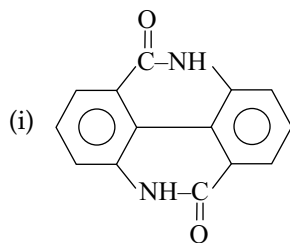
- (a) E (b) Z
(c) Does not show geometrical isomerism (d) None

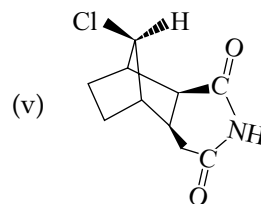
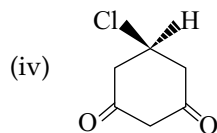
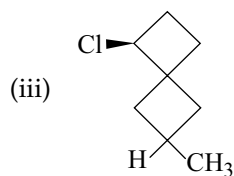
3. Correct order of stability of the following carbocations is



- (a) $i > ii > iii > iv$
 (b) $i > ii > iv > iii$
 (c) $ii > i > iv > iii$
 (d) $i > iv > ii > iii$

4. Which of the following compounds are chiral?





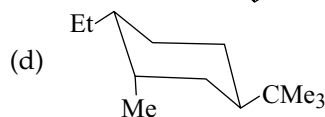
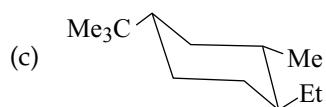
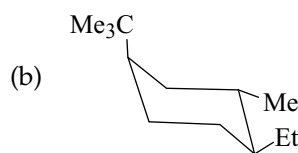
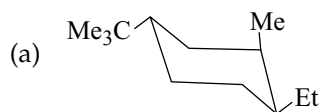
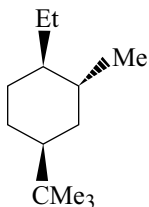
(a) i, ii, iii, v

(b) ii, iii, v

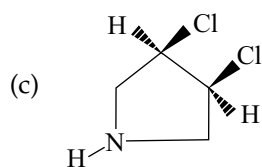
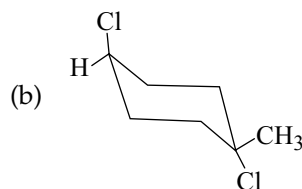
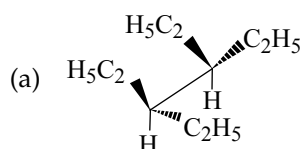
(c) i, ii, iii, v

(d) i, iv, v

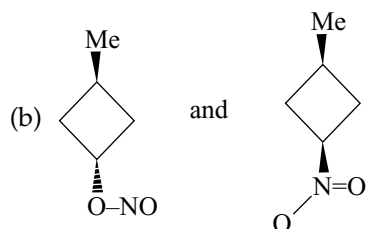
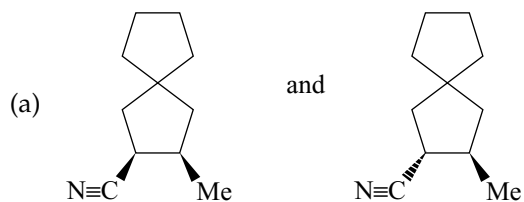
5. The conformation of the following compound is

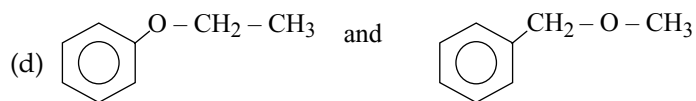
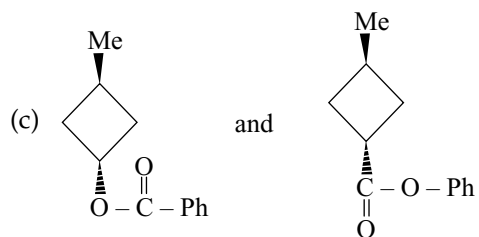


6. Which of the following represent the meso compound?

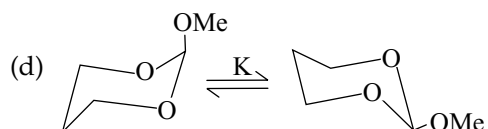
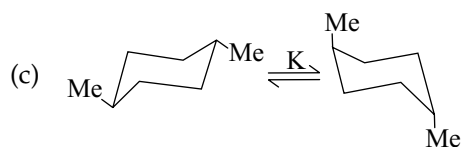
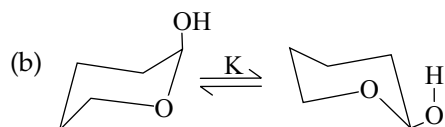
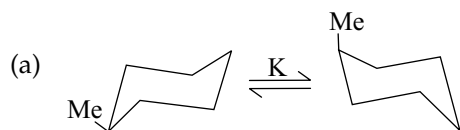


7. Among the following pair of compounds functional isomer is

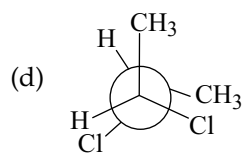
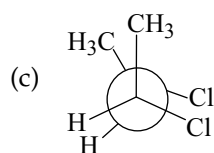
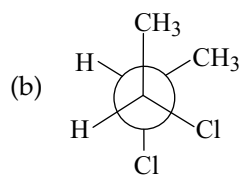
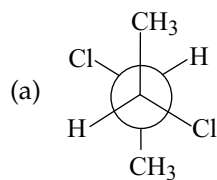
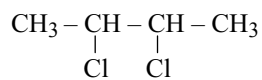




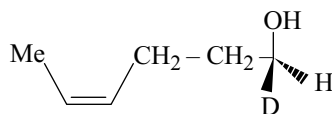
8. Identify equilibrium which has maximum K (equilibrium constant)



9. The most stable Newmann projection of the 2,3-dichlorobutane, whose Fischer projection is given below is

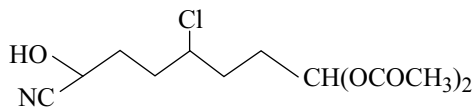


10. The correct stereochemical descriptions for the structure given below are



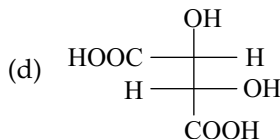
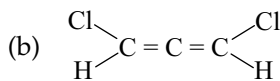
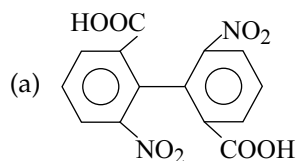
- (a) 1S, 4E (b) 1R, 4E (c) 1R, 4Z (d) 1S, 4Z

11. The number of optical isomers possible for the compound is

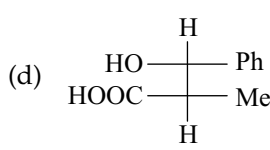
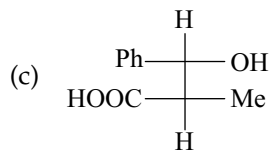
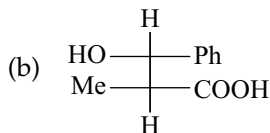
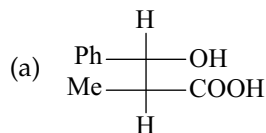
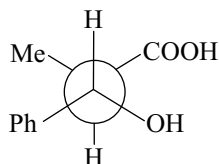


- (a) 2 (b) 4 (c) 8 (d) 6

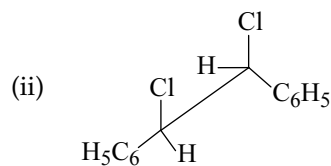
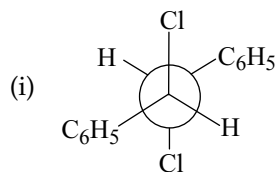
12. Which one of the following compounds will not rotate the plane of plane polarised light?



13. The correct Fischer projection formula of the Newman projection representation is

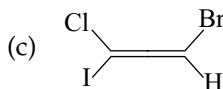
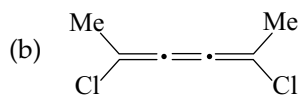
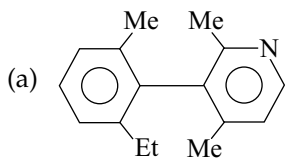


14. Which one of the following statements regarding the projections shown below (i and ii) is correct?



- (a) Both the projections represent the same configuration
 (b) Both (i) and (ii) are optically active
 (c) Only (i) is optically active
 (d) Only (ii) is optically active

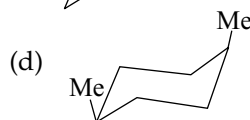
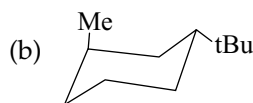
15. Among the following compounds which is used for resolution of racemic mixture?



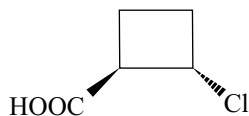
16. Identify specific rotation of a mixture have 5 g of (+)2-butanol and 7 g of (-)2-butanol (If specific rotation of 100% pure compound is 13.5°)

- (a) -2.25° (b) -1.6° (c) 12.2° (d) 4.45°

17. Identify compound having highest heat of combustion

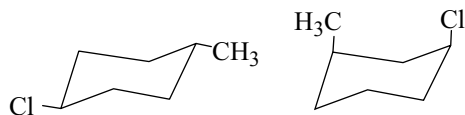


18. Identify R and S configurations of chiral centres in the following compound



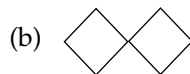
- (a) (i)-R (ii)-S (b) (i)-S (ii)-R (c) (i)-S (ii)-S (d) (i)-R (ii)-S

19. What is the relationship between the two structures shown?

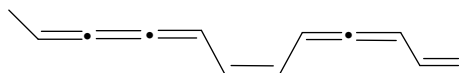


- (a) Different drawings of the same conformation of the same compound
(b) Stereoisomers
(c) Constitutional isomers
(d) Different conformations of the same compound

20. C_8H_{12} has 3° of unsaturation. Thus, it can have the structure

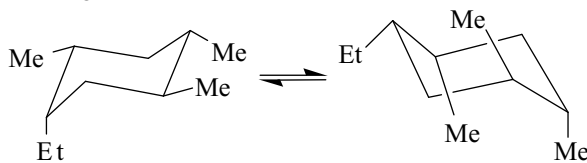


21. Calculate the total number of geometrical isomers for the following compound



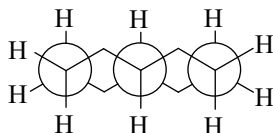
- (a) 2 (b) 4 (c) 8 (d) 16

22. Identify the value of K_C for the following equilibrium

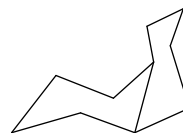


- (a) $K_C > 1$ (b) $K_C < 1$ (c) $K_C = 1$ (d) None of these

23. Identify the relationship between the following pairs of compound

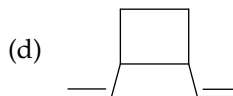
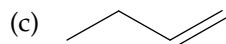
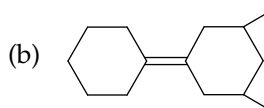
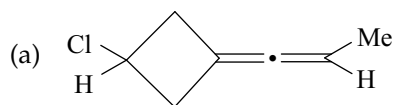


and



- (a) Positional isomers (b) Geometrical isomers
(c) Functional isomers (d) Identical compounds

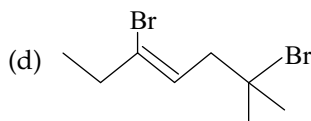
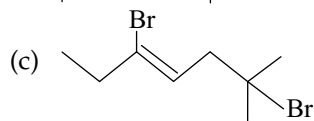
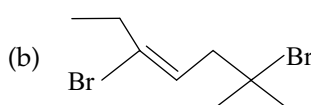
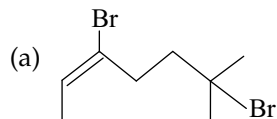
24. Identify compounds that give geometrical isomerisation



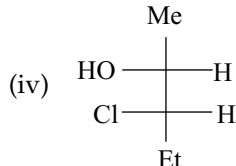
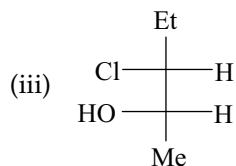
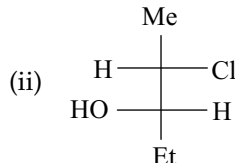
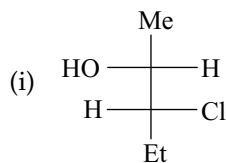
25. Which conformation has a C_3 axis of symmetry?

- (a) Boat (b) Twist boat (c) Chair (d) Enveloped

26. Which of the following represent (E)-3, 6-dibromo-6-methyl-3-heptene?



27. Which of the following represent a pair of enantiomers?

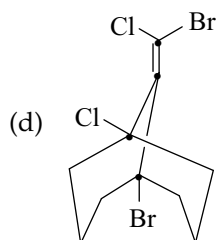
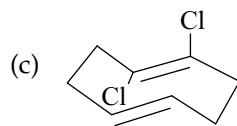
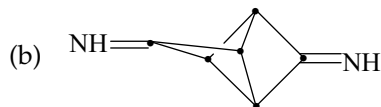
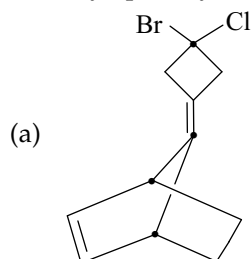


- (a) i and ii (b) iii and iv (c) i and iv (d) ii and iii

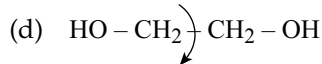
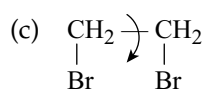
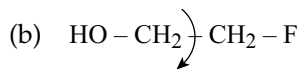
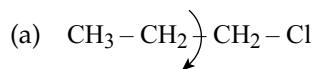
28. Choose the total number of constitutional isomers with the formula $C_4H_{10}O$.

- (a) 9 (b) 7 (c) 5 (d) 3

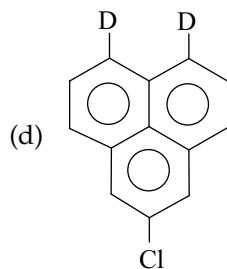
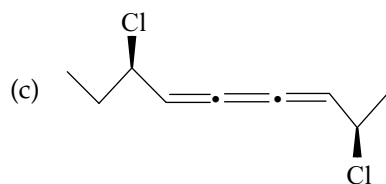
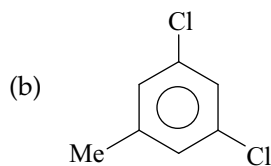
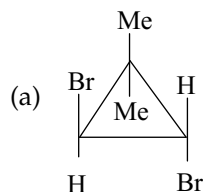
29. Identify optically active molecules



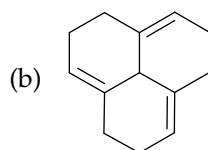
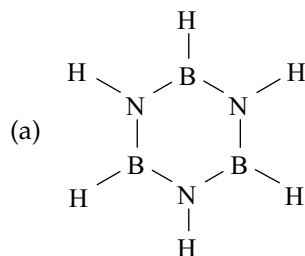
30. In which structure Gauche form has less potential energy than anti form

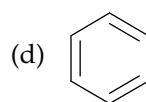
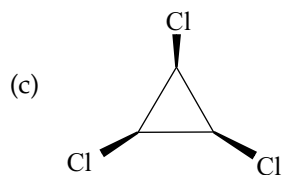


31. Which of the following molecule/s show the plane of symmetry as well as axis of symmetry?

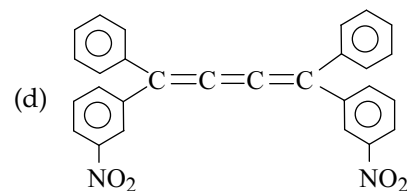
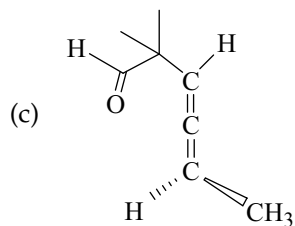
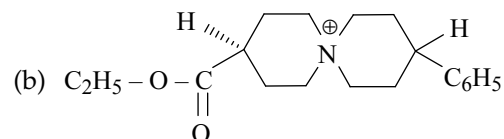
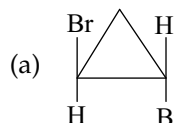


32. The C_3 axis of symmetry is present in which of the following compounds?

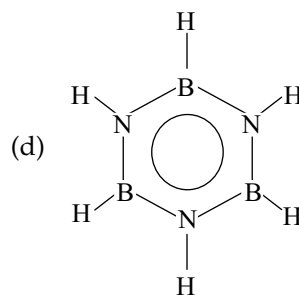
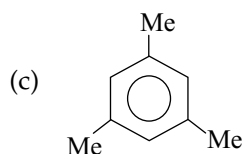
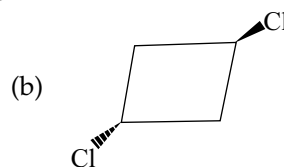
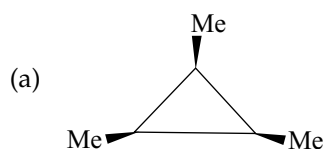




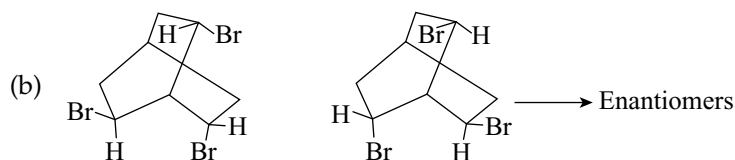
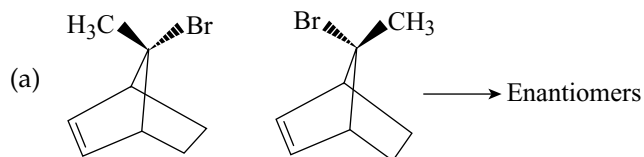
33. Which of the following compounds are chiral?

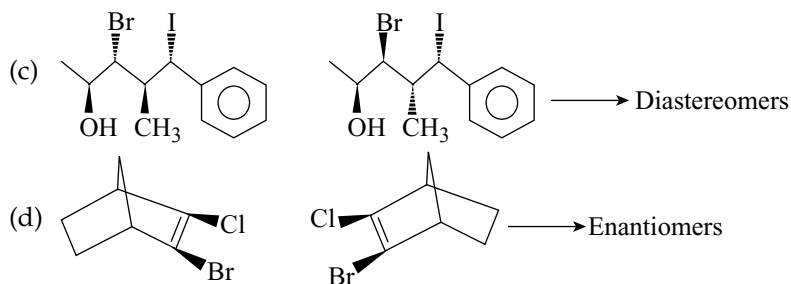


34. Which of the following molecule(s) has C_3 axis of symmetry and plane of symmetry?

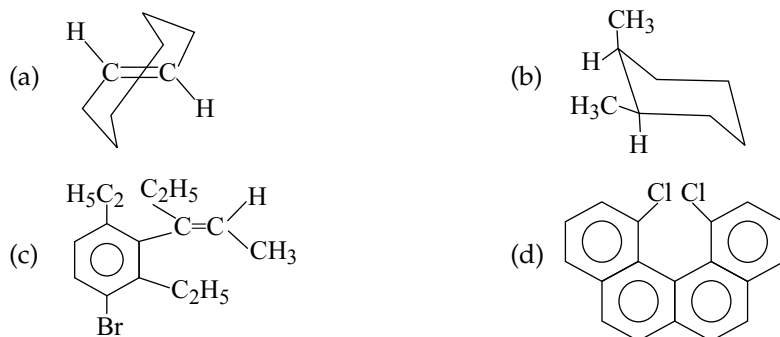


35. In which of the following case correct relationship is given?

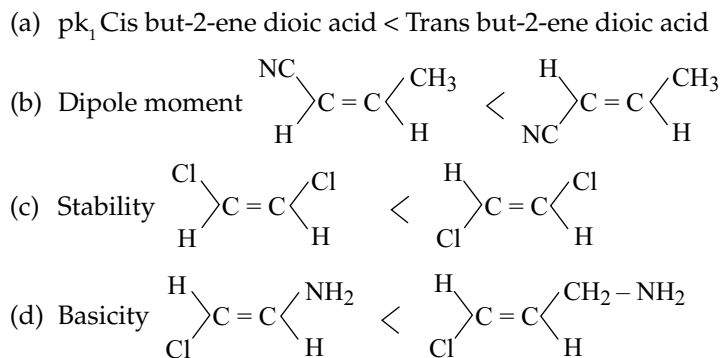




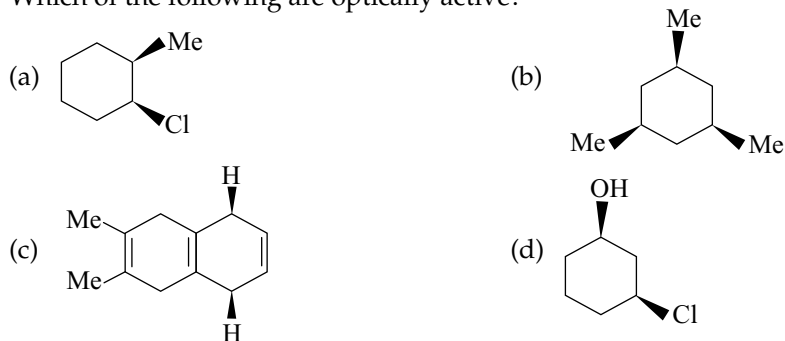
36. Which of the following is an optically active compound?



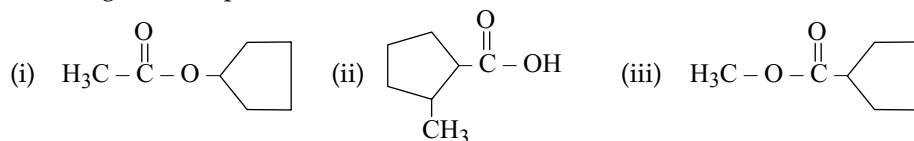
37. Which of the following options is correct?



38. Which of the following are optically active?

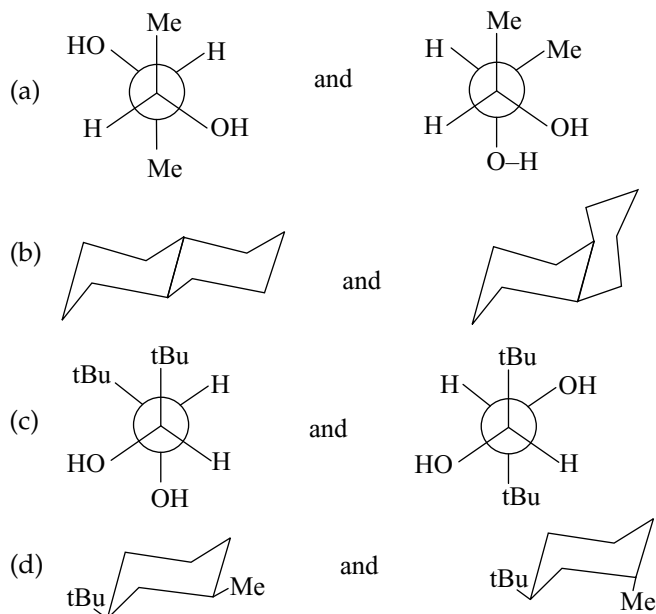


39. For the given compounds, correct statement is/are

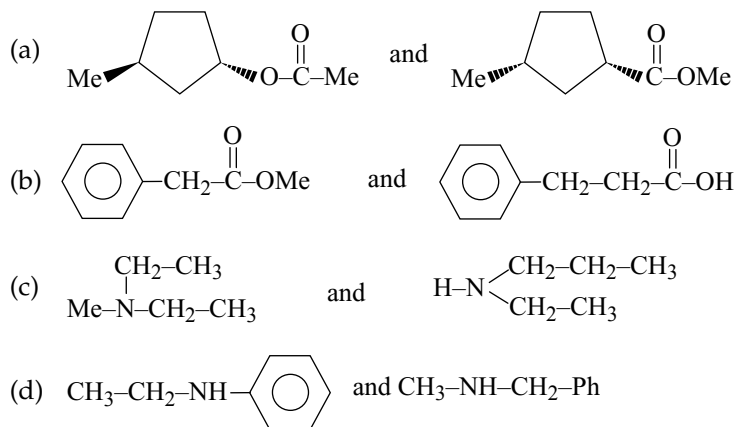


- (a) i and ii are positional isomers
- (b) ii and iii are functional group isomers
- (c) i and iii are metamers
- (d) i and iii are positional isomers

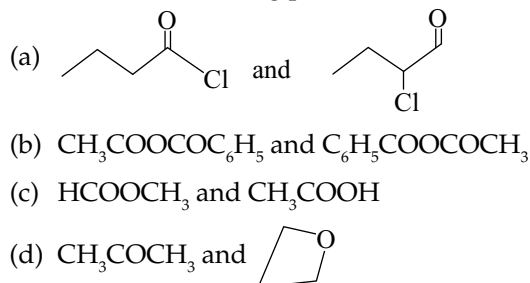
40. Among the following pair of compounds or conformers, identify pair(s) in which the Ist compound has more stability than the IInd



41. Among the following pair of compounds identify metamers



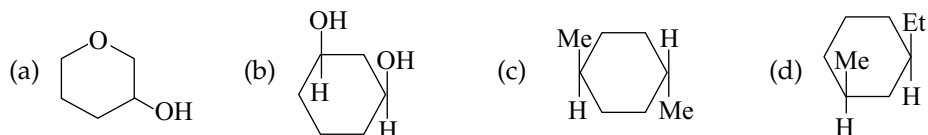
42. Which of the following pairs show functional group isomerism?



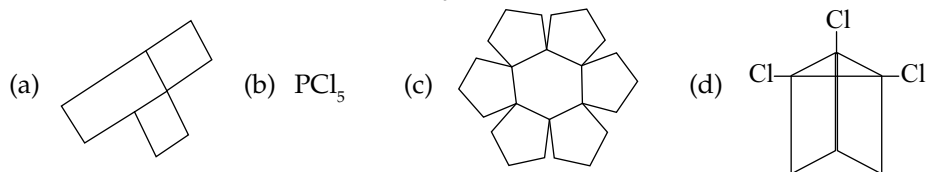
43. Identify compound(s) in which gauche conformer is more stable than staggered

- (a) Ethylene diamine (b) Succinic acid
(c) Ethylene glycol (d) n-butane

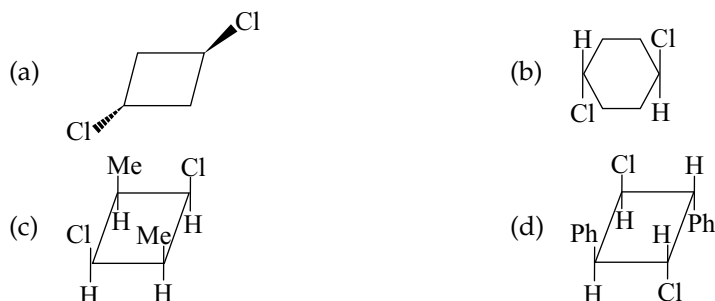
44. Identify the compound which has axial conformer more stable than equatorial



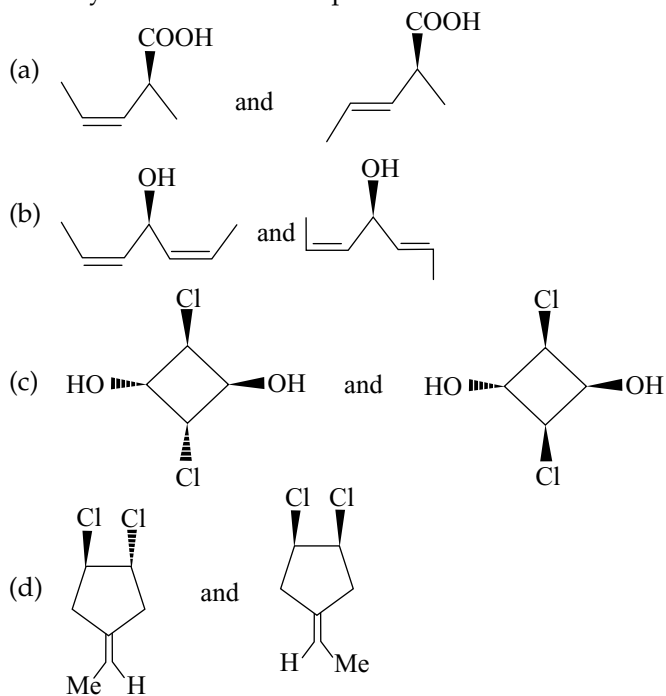
45. Among the following compounds, C_3 axis is present in



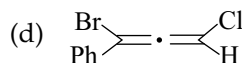
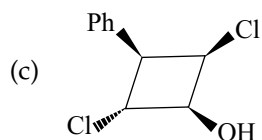
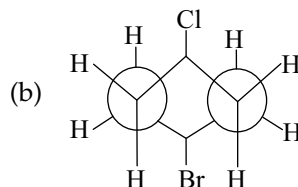
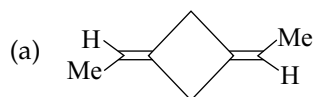
46. Identify among the following compounds having plane of symmetry, centre of symmetry and axis of symmetry



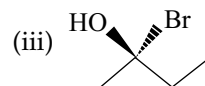
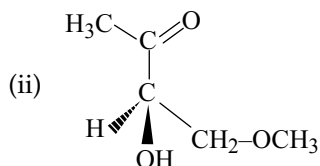
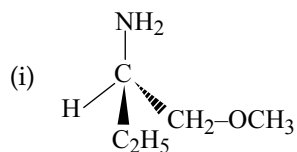
47. Identify diastereo isomeric pairs



48. Identify the optically active compound

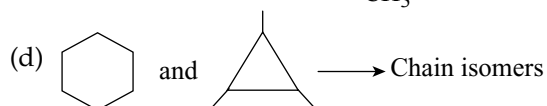
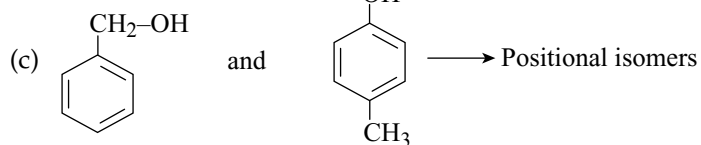
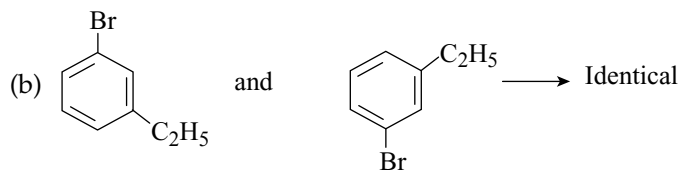
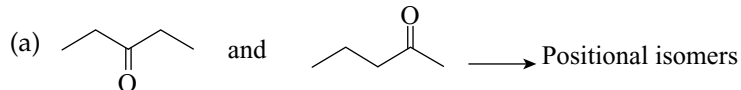


49. Which of the following statements is correct?

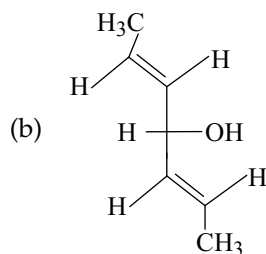
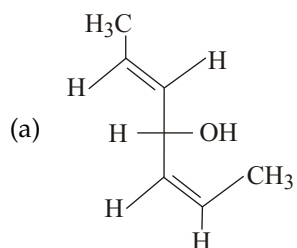


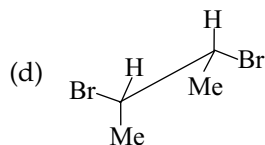
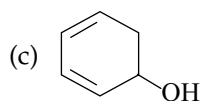
- (a) i and ii have R-configuration
 (b) i and iii have R-configuration
 (c) Only iii has R-configuration
 (d) i and iii have S-configuration

50. Which of the following relationships are correctly matched?



51. Which of the following molecules is/are optically active?

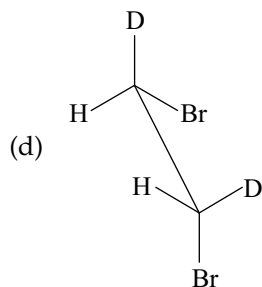
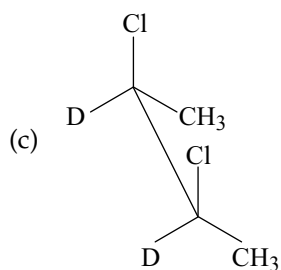
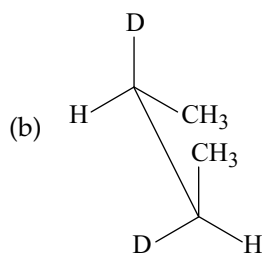
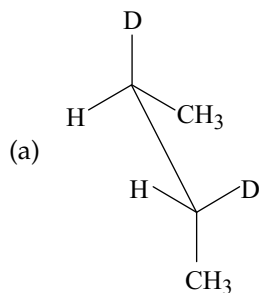




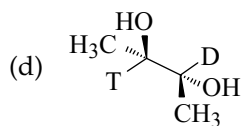
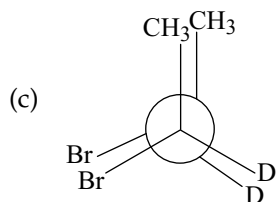
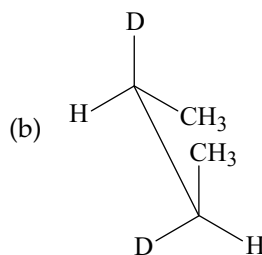
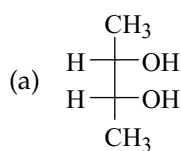
52. Identify compound(s) in which gauche conformer is more stable than staggered

- (a) 1, 2-difluoroethane
(b) Chloropropane
(c) Ethylene glycol
(d) Succinic acid

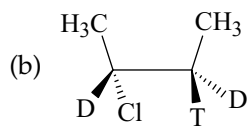
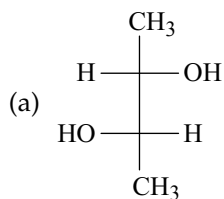
53. Identify the structure of Erythro

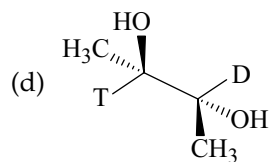
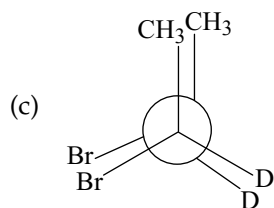


54. Identify the structure of Erythro

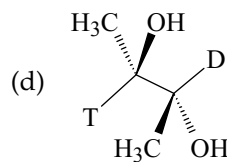
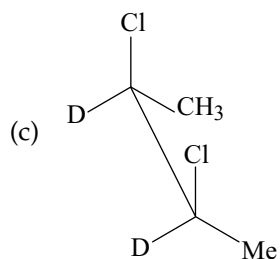
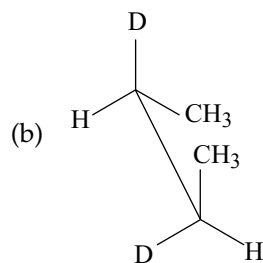
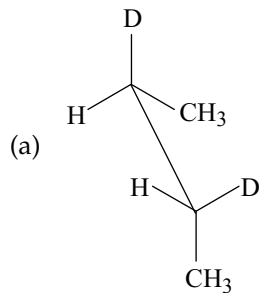


55. Identify the structure of Threo

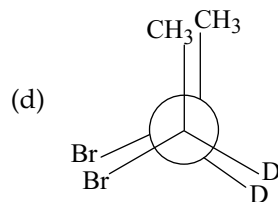
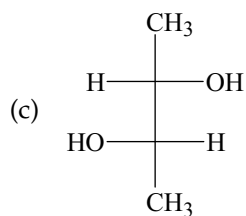
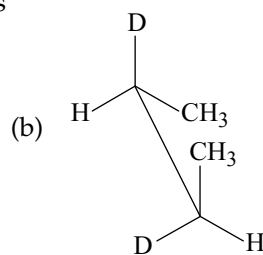
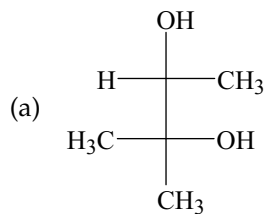




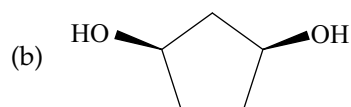
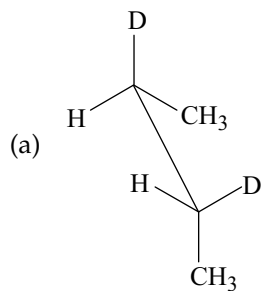
56. Identify the structure of meso compounds

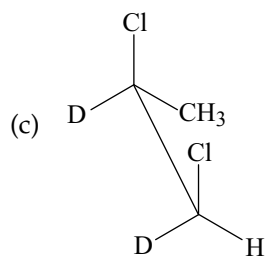


57. Identify the structure of meso compounds

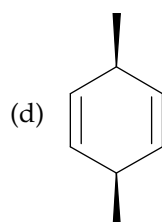
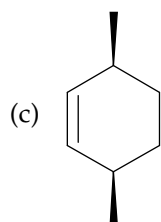
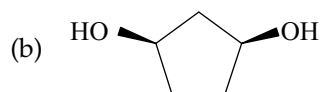
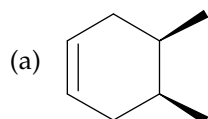


58. Identify the structure of optically inactive compounds

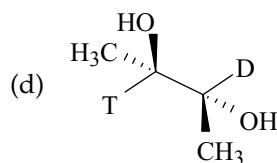
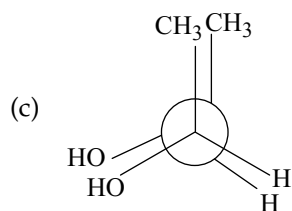
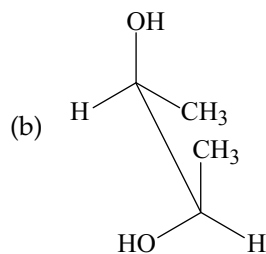
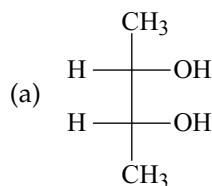




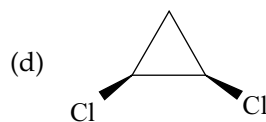
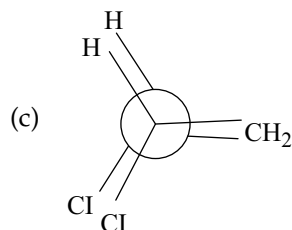
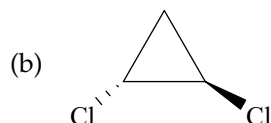
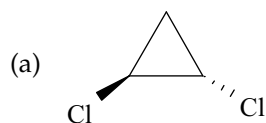
59. Identify the structure of Meso



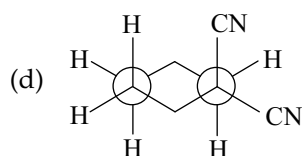
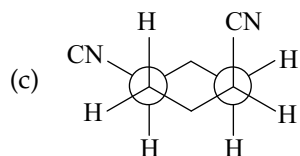
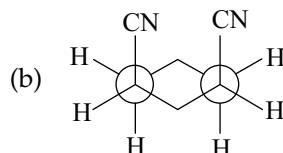
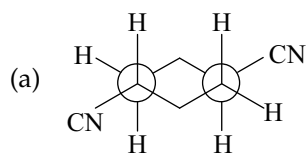
60. Identify the structure of identical compounds



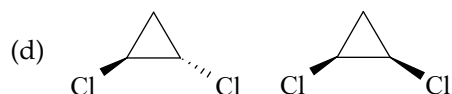
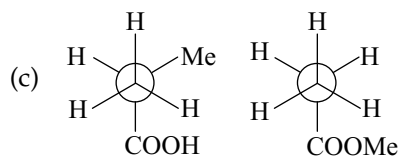
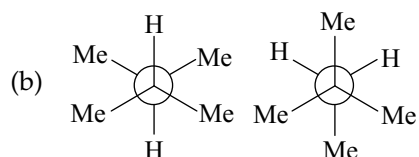
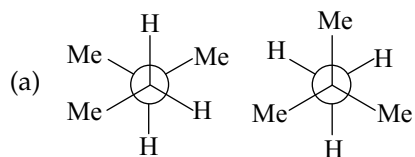
61. Identify the structure of identical compounds



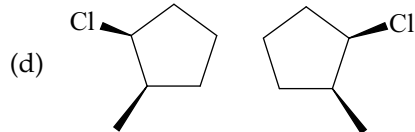
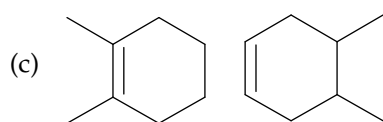
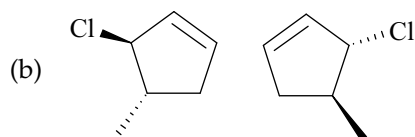
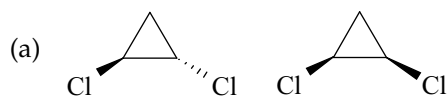
62. Identify the geometrical isomers



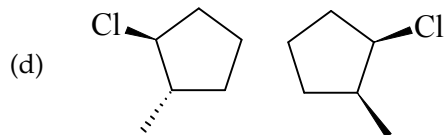
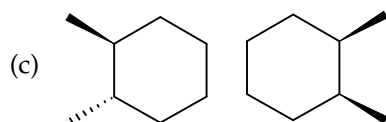
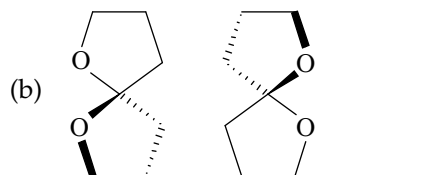
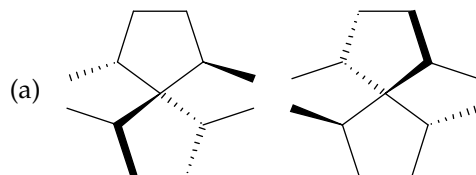
63. Identify the pair of chain isomers



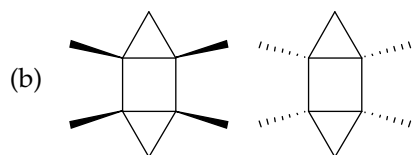
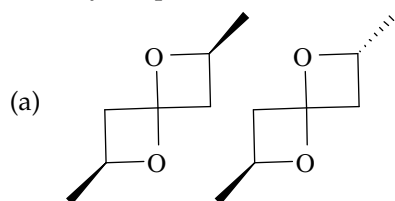
64. Identify the pair of diastereoisomers

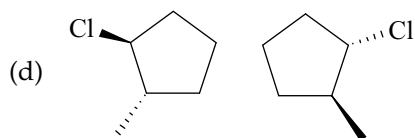
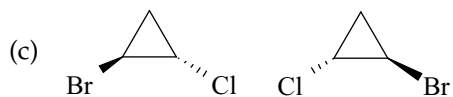


65. Identify the pair of diastereoisomers

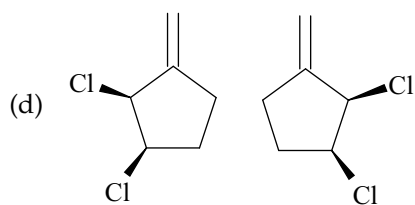
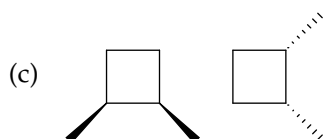
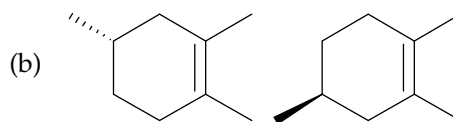
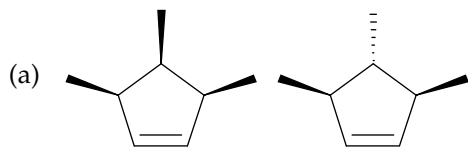


66. Identify the pair of diastereoisomers

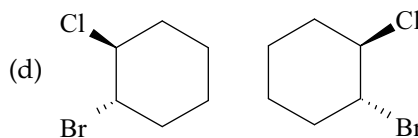
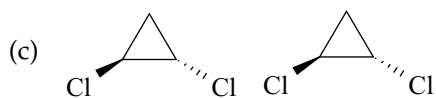
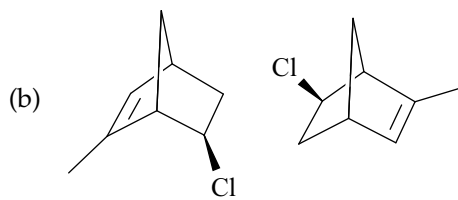
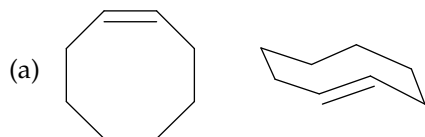




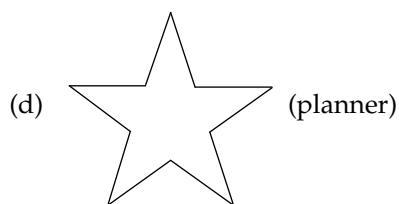
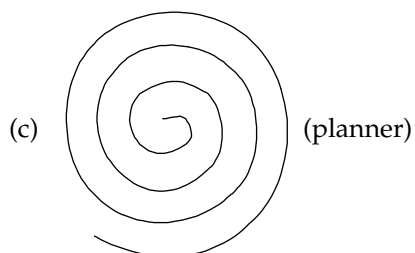
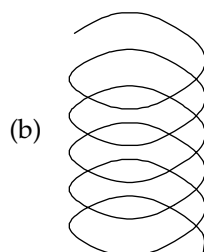
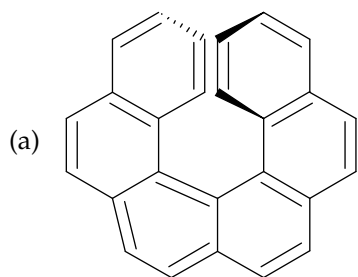
67. Identify the pair of diastereoisomers



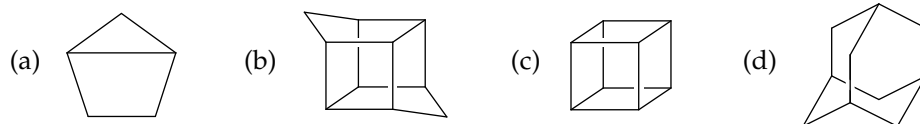
68. Identify the pair of enantiomers



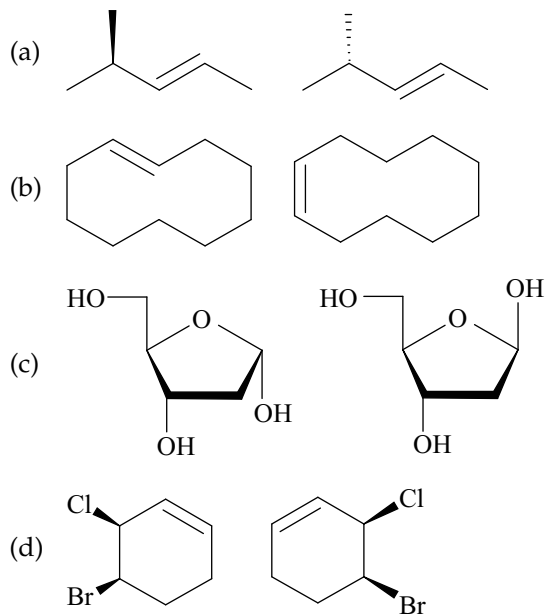
69. Identify the optically active shape



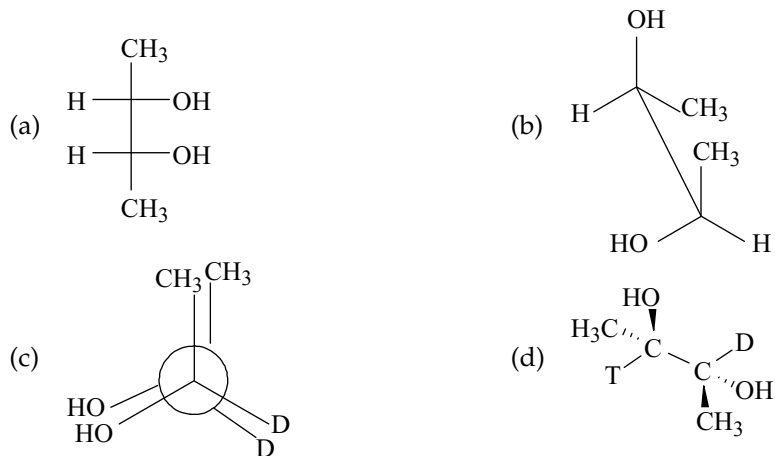
70. Identify the structures having centre of symmetry



71. Identify the pair of enantiomers

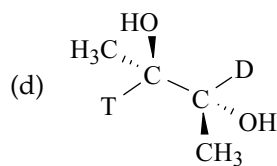
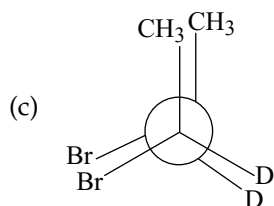


72. Identify the structure of Erythro-butane-2, 3-diol

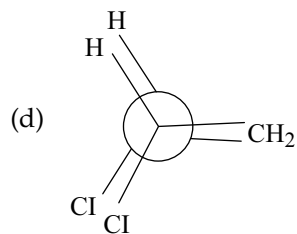
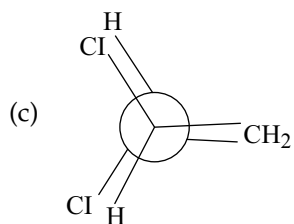
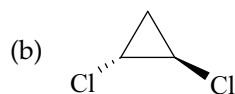


73. Identify the structure of Threobutane-2,3-diol

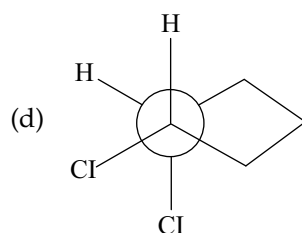
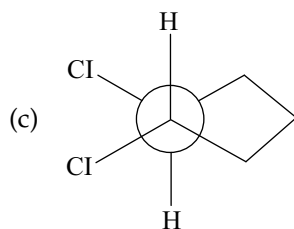
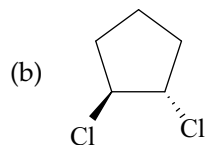
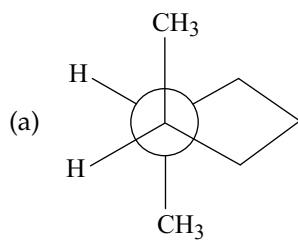




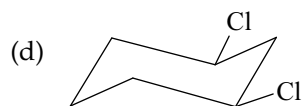
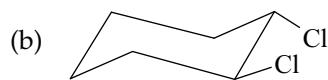
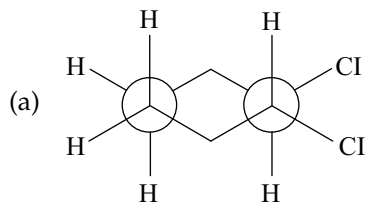
74. Identify the structure of identical compounds



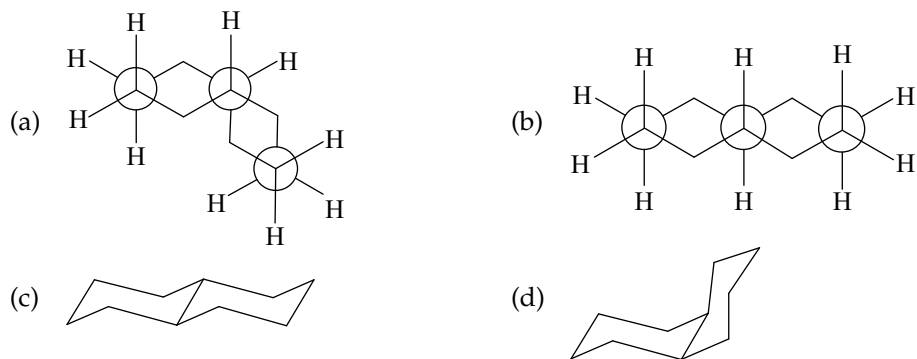
75. Identify the structure of identical compounds



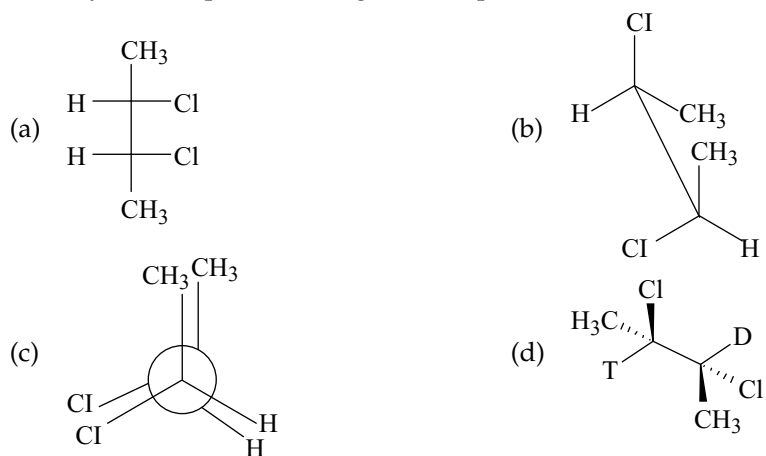
76. Identify the structure of enantiomeric compounds



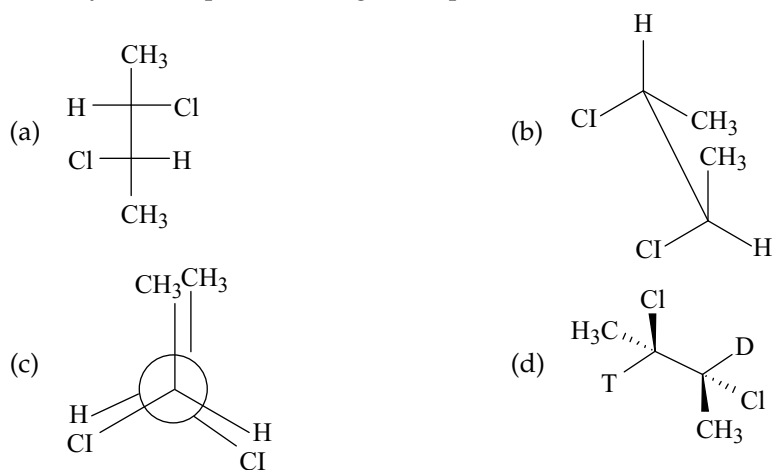
77. Identify the structure of transdecaline



78. Identify the compounds that give trans product on reaction with Zn dust and heat

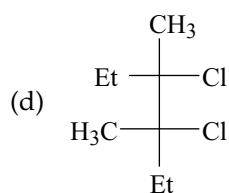
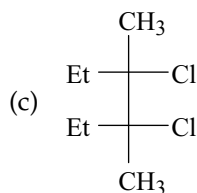


79. Identify the compounds that give cis product on reaction with Zn dust and heat

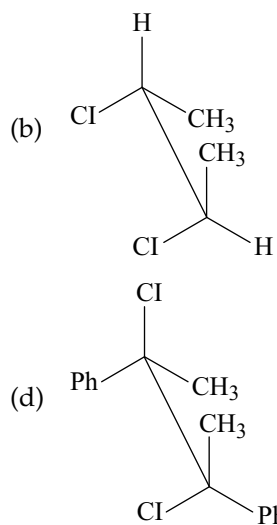
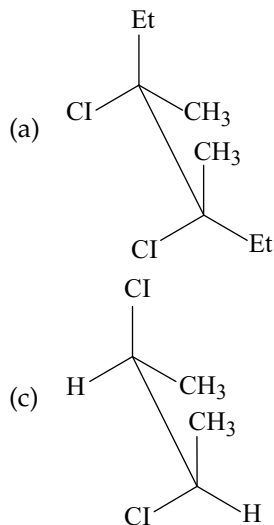


80. Identify the compounds that give cis product on reaction with Zn dust and heat

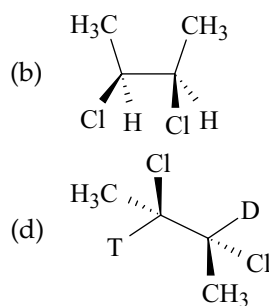
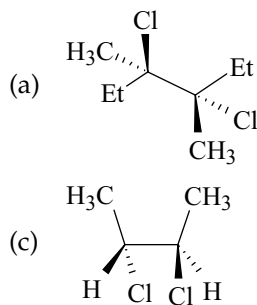




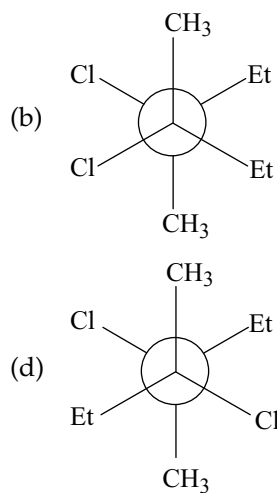
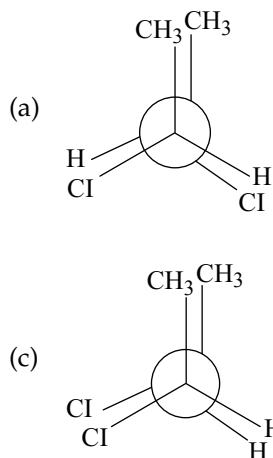
81. Identify the compounds that give cis product on reaction with Zn dust and heat



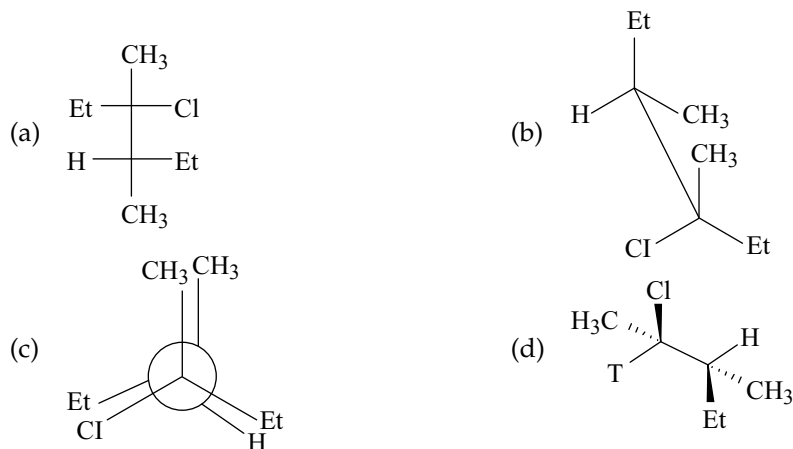
82. Identify the compounds that give trans product on reaction with Zn dust and heat



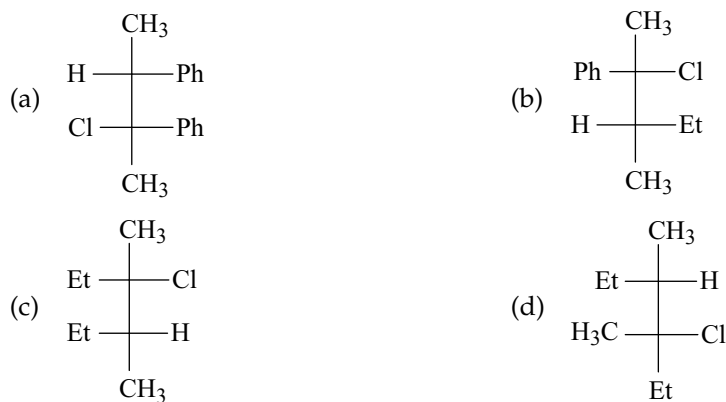
83. Identify the compounds that give trans product on reaction with Zn dust and heat



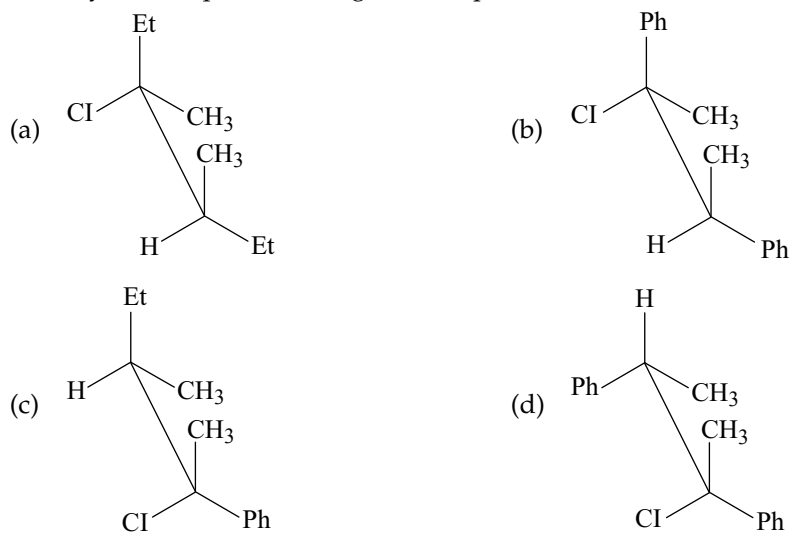
84. Identify the compounds that give trans product on reaction with alcoholic KOH and heat



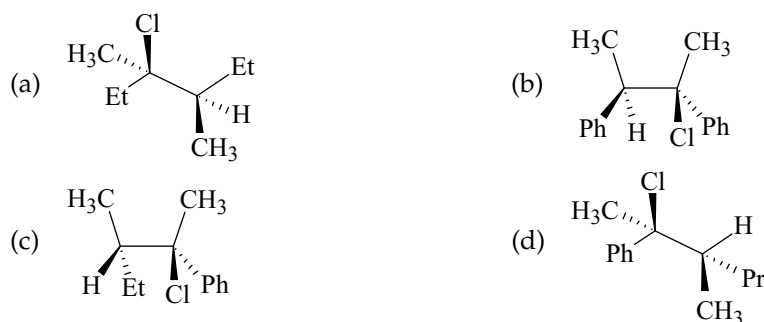
85. Identify the compounds that give trans product on reaction with alcoholic KOH and heat



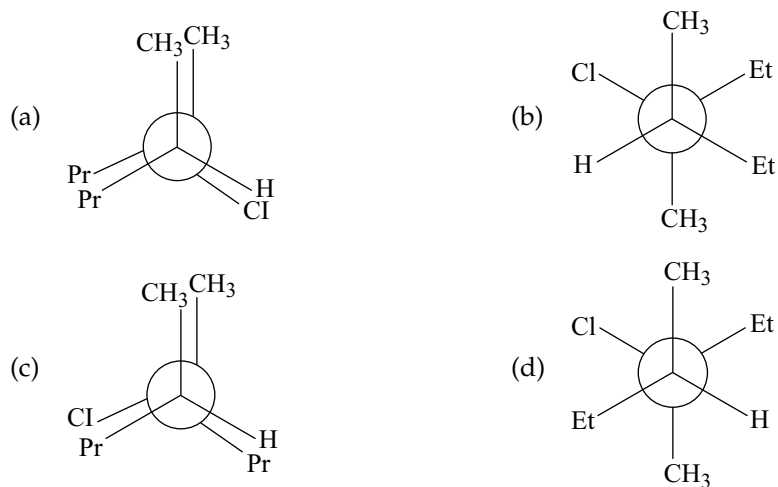
86. Identify the compounds that give trans product on reaction with alcoholic KOH and heat



87. Identify the compounds that give trans product on reaction with alcoholic KOH and heat



88. Identify the compounds that give trans product on reaction with alcoholic KOH and heat



Comprehension Type

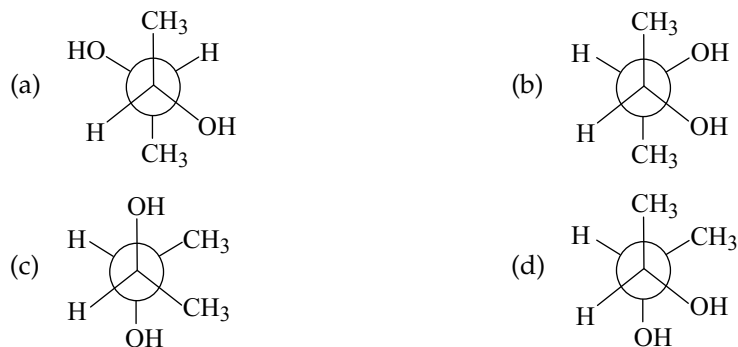
Passage 1

Different spatial arrangements of the atom that result from restricted rotation about a single bond are conformers. The general stability order of these conformer are as follows.

Anti > Gauch > Partially eclipsed > Fully eclipsed

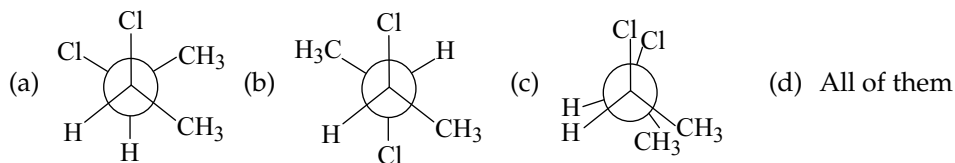
Although anti is more stable than gauch but in some cases gauch is more stable than anti.

89. Which one of the following is the most stable conformer?



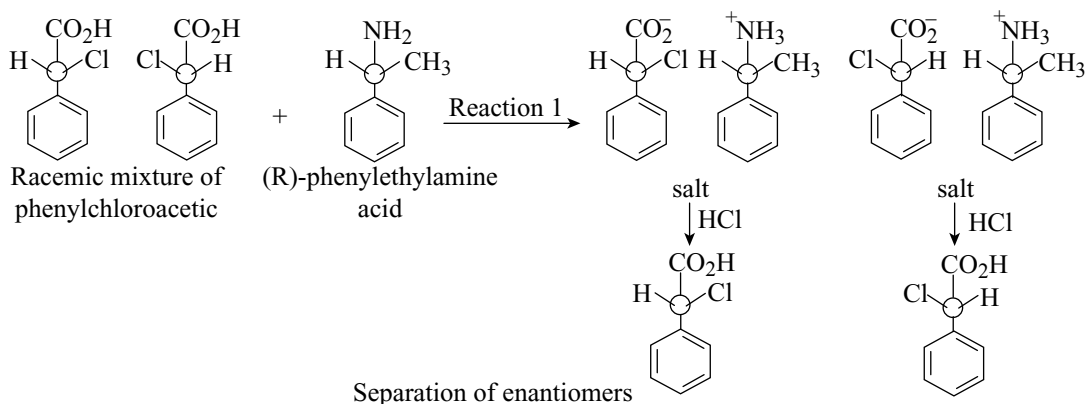
90. Number of possible stable conformers of butane is
 (a) 2 (b) 4 (c) 6 (d) Infinite

91. Which of the following are more stable conformers?



Passage 2

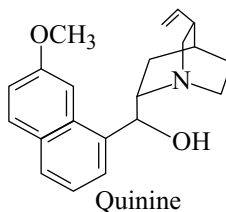
With few exceptions, enantiomers cannot be separated through physical means. When in racemic mixtures, they have the same physical properties. Enantiomers have similar chemical properties as well. The only chemical difference between a pair of enantiomers occurs in reactions with other chiral compounds. Thus resolution of a racemic mixture typically takes place through a reaction with another optically active reagent. Since living organisms usually produce only one of two possible enantiomers, many optically active reagents can be obtained from natural sources. For instance, (S)-(+)-lactic acid can be obtained from animal muscle tissue and (S)-(-)-2-methyl-1-butanol from yeast fermentation.



In the resolution of a racemic acid, a solution of (R)-phenylethylamine is reacted with a racemic mixture of phenylchloroacetic acid to form the corresponding salts. The salts are then separated by careful fractional crystallisation. Hydrochloric acid is added to the separated salts, and the respective acids are precipitated from their solutions.

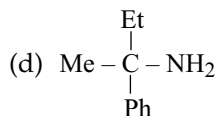
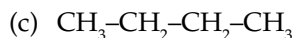
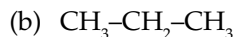
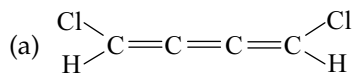
Resolution of a racemic base can be accomplished in the same manner with tartaric acid.

92. Quinine, a natural antimalarial, is commonly used as an optically active reagent to resolve acidic enantiomers. How many chiral carbons exist in the quinine molecule drawn below?

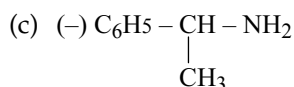
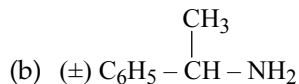
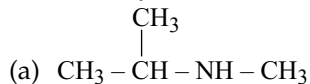


- (a) 5 (b) 2 (c) 3 (d) 4

93. Which of the following compounds might be used to resolve a racemic mixture of acidic enantiomers?



94. Which of the following amines could in principle be used as a resolving agent for a racemic carboxylic acid?



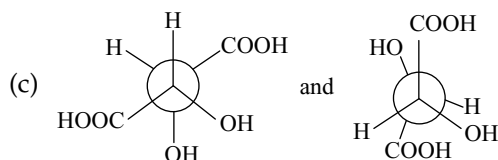
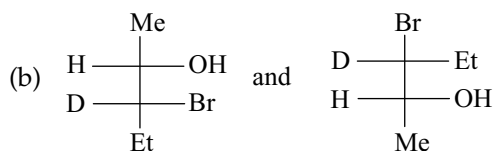
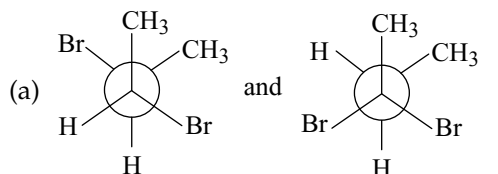
Passage 3

Stereoisomers are compounds that have same sequence of covalent bonds but differ in the relative dispositions of their atoms in space. Geometrical and optical isomers are the two important types of configurational isomers.

The compound with double bonds or ring structure has restricted rotation, so exists in two geometrical forms. The double bonds in larger rings can also cause geometrical isomerism. The optical isomers rotate the plane of plane-polarised light. A sp^3 -hybridised carbon atom bearing four different types of substituents is called an asymmetric centre or chiral centre. A chiral object or molecule cannot be superimposed on its mirror image. Stereoisomers that are mirror images of each other are called enantiomers. The stereoisomers that are not mirror images of each other are called diastereomers. Diastereomers have different physical properties.

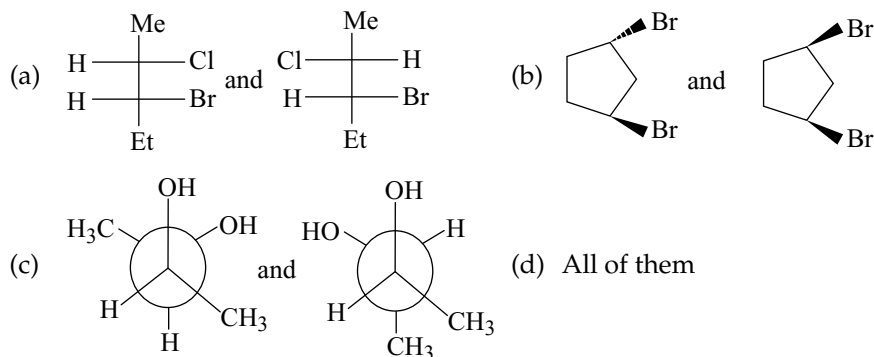
A racemic mixture is optically inactive and contains equal amounts of both the enantiomers. Resolution refers to method of separating a racemic mixture into two pure enantiomers. A meso compound is an optically inactive stereoisomer, which is achiral due to the presence of an internal plane of symmetry or centre of symmetry within the molecule.

95. The pair showing identical species is



(d) None of these

96. Which of the following pairs are diastereomers?



97. The following two compounds are



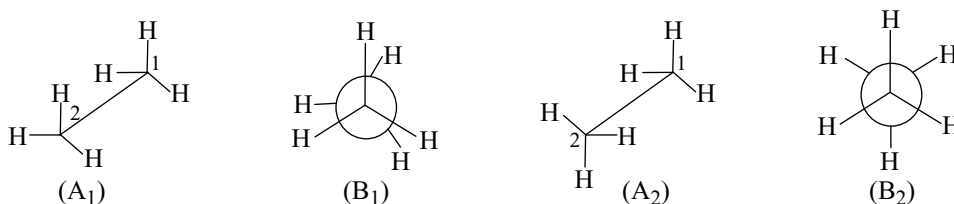
Passage 4

Isomers that have the same skeletons (that is, with component atoms attached in the same sequence) but differ from each other with relative positions of some atoms in three-dimensional space by virtue of rotation about σ bonds are called **conformational isomers or conformers**.

A quantitative description that relates relative atomic positions to the changes in potential energy during rotation about a σ bond describes the energetics of conformational interconversion, a process known as **conformational analysis**.

Rotation about ($C-C$) bond in ethane can give various conformers:

In structure A_1 or B_1 , C—H flagpoles at C-1 completely overlap each other at C-2. This form is called **eclipsed conformation**.



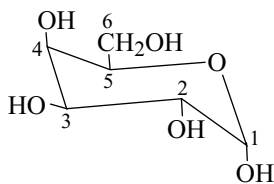
In structure A_2 or B_2 , C—H flagpoles at C-1 is fixed at 60° dihedral angle so that it is exactly between two C—H flagpoles at C-2. This is called staggered conformation.

- Various other structures in between eclipsed and staggered conformations are called **skew conformation**.
- Structures B_1 and B_2 show the orientations of the hydrogens on the front carbon relative to those on the back carbon, these are called **Newman projections**.
- Structures A_1 and A_2 are called **Sawhorse projections**.

98. Among the following conformers, which has highest potential energy for n-butane (along C_2-C_3 bond rotation)?

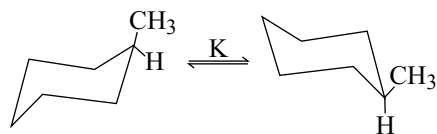
- (a) Skew (b) Fully eclipsed
(c) Staggered (d) Partially eclipsed

99. In the following chair conformer correct orientation of –OH groups is/are



- (a) OH groups at C₁, C₂ and C₄ are axial
- (b) OH groups at C₁ and C₂ are axial
- (c) OH groups at C₁ and C₄ are axial
- (d) OH groups at C₁, C₂ and C₄ are equatorial

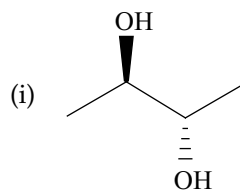
100. In the following equilibrium, the value of “K” is



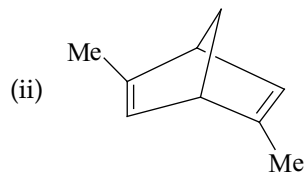
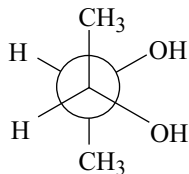
- (a) $K < 1$
- (b) $K > 1$
- (c) $K = 1$
- (d) None of these

Passage 5

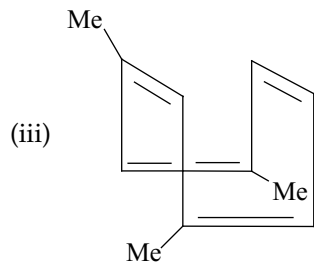
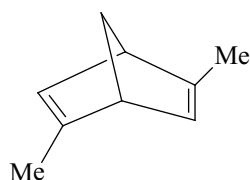
Consider the following pairs of compounds



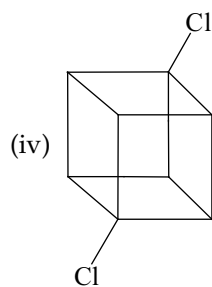
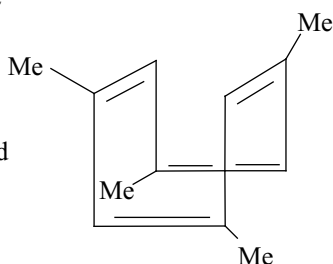
and



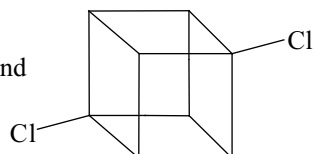
and

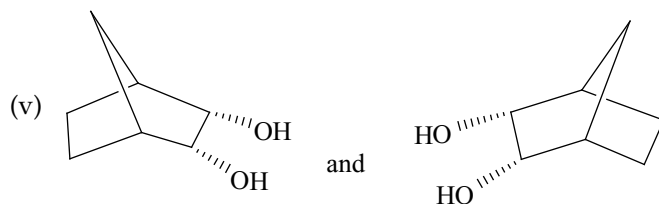


and



and





101. Identical pair of compounds is/are

- (a) i and ii (b) ii and iii (c) iv and v (d) i and v

102. Both compounds in above pair are meso

- (a) 1st pair (b) 2nd pair (c) 5th pair (d) 4th pair

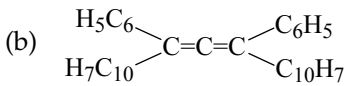
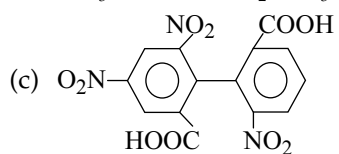
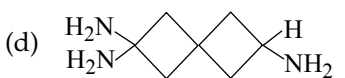
103. Diastereoisomeric pair is

- (a) 1st pair (b) 2nd pair (c) 3rd pair (d) 4th pair

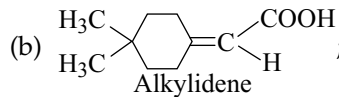
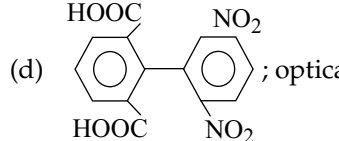
Passage 6

Presence of chiral carbon in organic compound is neither a necessary nor a sufficient condition showing optical activity. The chirality, i.e., dissymmetry of a molecule as a whole is the necessary condition for optical activity.

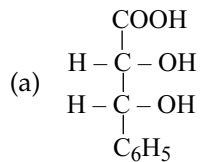
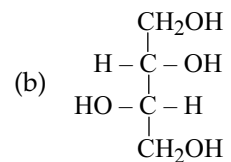
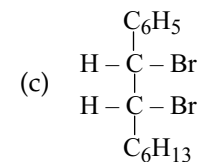
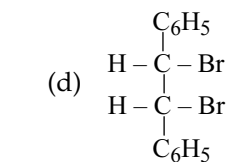
104. Which of these compounds will NOT show optical activity?

- (a) $\text{CH}_3\text{---CHOH---CH}_2\text{---CH}_3$
- (b) 
- (c) 
- (d) 

105. Which of the following pairs is correctly matched?

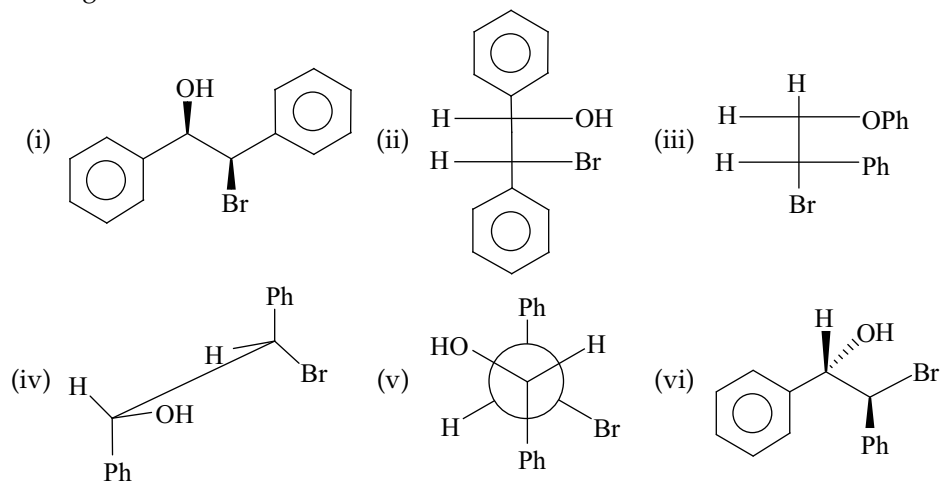
- (a) $\text{CH}_3\text{---CH=C=CH}_2$; optically active
allene
- (b) ; optically active
Alkylidene
- (c) $\text{CH}_3\text{---C=C=C---C}_4\text{H}_9$; optically active
allene
- (d) ; optically active

106. Which one of the following is an achiral molecule?

- (a) 
- (b) 
- (c) 
- (d) 

Passage 7

Observe the given molecule/s



107. Correct statement is

- (a) i and ii are enantiomers
(c) i and iv are identical

- (b) iii and v are diastereomers
(d) i and vi are diastereomers

108. Diastereomeric pair is

- (a) i and ii
(b) i and vi

- (c) ii and v

- (d) iii and vi

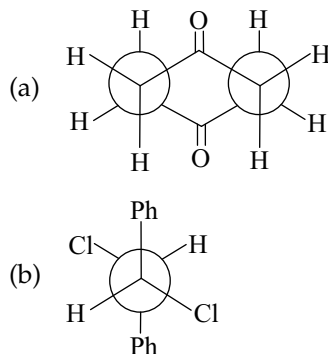
109. If Br is attached in place of $-OH$ group in structure "V" (with same stereochemistry) then resultant structure is

- (a) Meso
(b) Threo
(c) Structure has odd degree of unsaturation
(d) Structure is identical to (i) compound

Matrix Type

Match the columns:

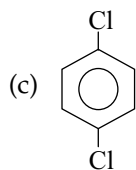
110. Column I



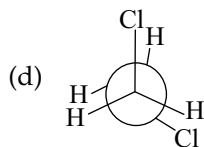
Column II

- (p) Compounds give positional isomerisation with 1,2-dichloro benzene.

- (q) Degree of unsaturation in the given compound is even [excluding zero value]



(r) Given compound or conformer has zero dipole moment.

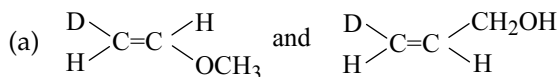


(s) Net dipole of one mole of compound is nonzero.

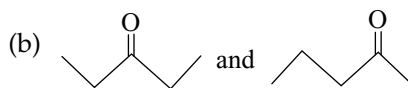
(t) Compound has ketone functional group.

111. Column I (Compound)

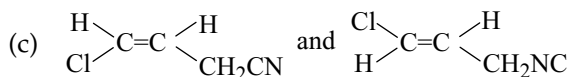
Column II (Isomerism)



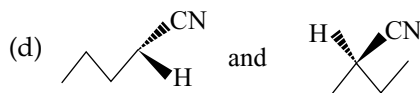
(p) Functional isomers



(q) Geometrical isomers



(r) Position isomers

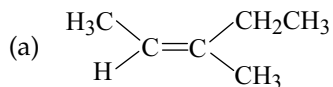


(s) Chain isomers

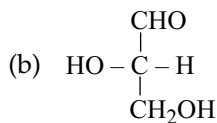
(t) Metamer

112. Column I (Structure)

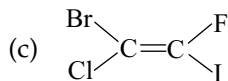
Column II (Configuration)



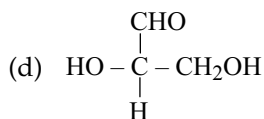
(p) E



(q) Z



(r) R

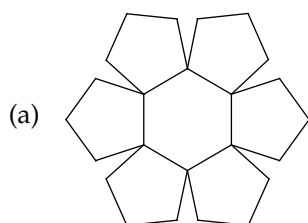


(s) S

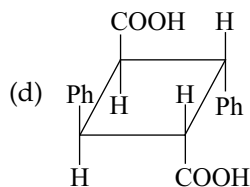
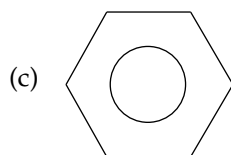
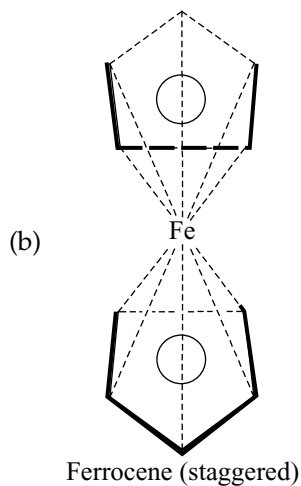
(t) Plane of symmetry

113. Column I

Column II



(p) Plane of symmetry absent



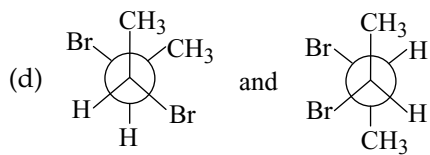
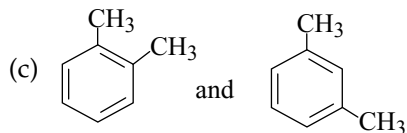
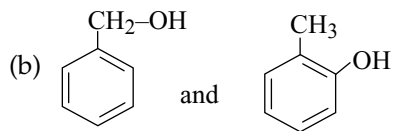
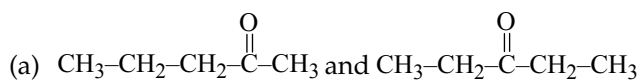
(q) C_6

(r) S_6

(s) C_i/COS

(t) C_5

**114. Column I
(Compounds)**



**Column II
(Type of isomerism)**

(p) Positional

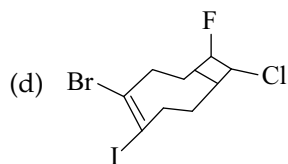
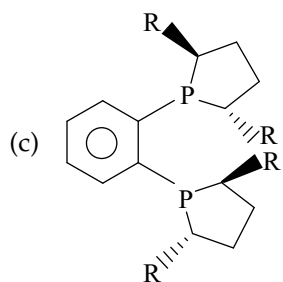
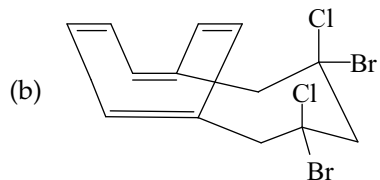
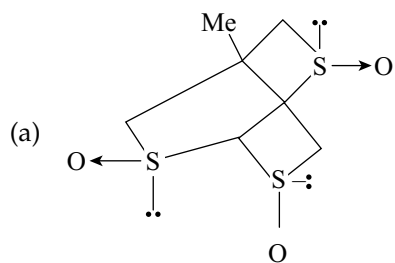
(q) Conformational

(r) Metamerism

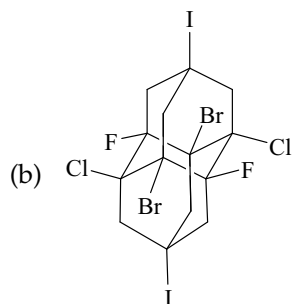
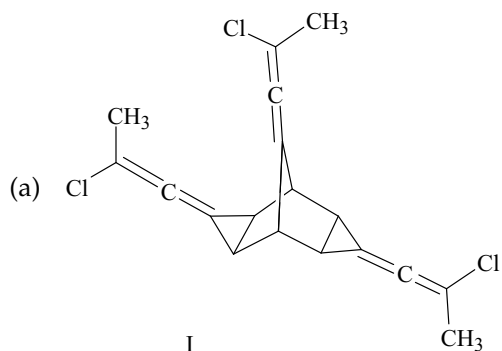
(s) Functional

(t) Optical isomerism

115. Column I



116. Column I



Column II

(p) Optically inactive compound

(q) Optically active compound

(r) Meso compound

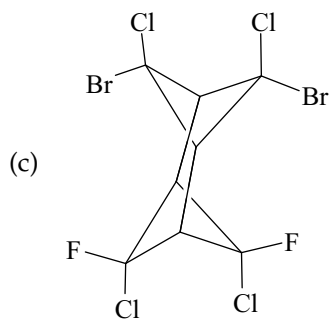
(s) Axis of symmetry present

(t) Asymmetric compound

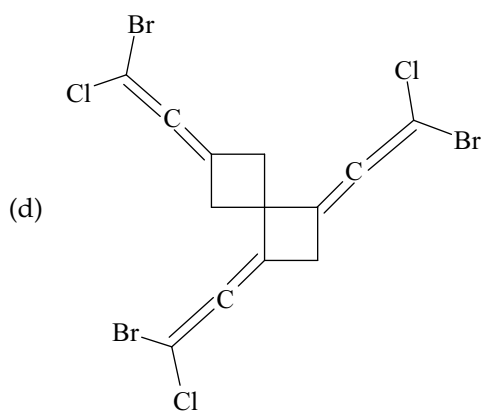
Column II

(p) Optically inactive compound

(q) Optically active compound



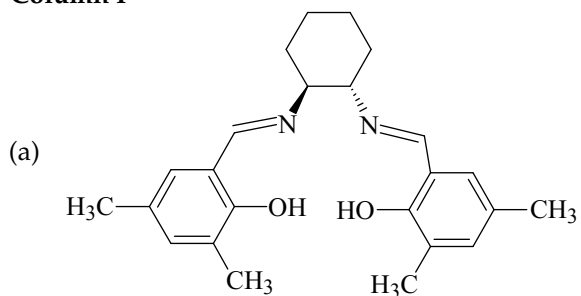
(r) Meso compound



(s) Axis of symmetry present

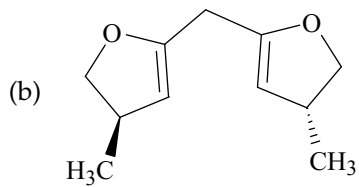
(t) Asymmetric compound

117. Column I

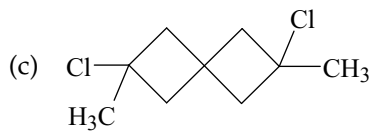


Column II

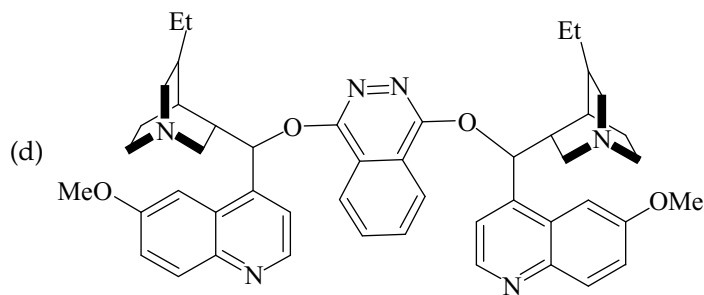
(p) Optically inactive compound



(q) Optically active compound



(r) Meso compound

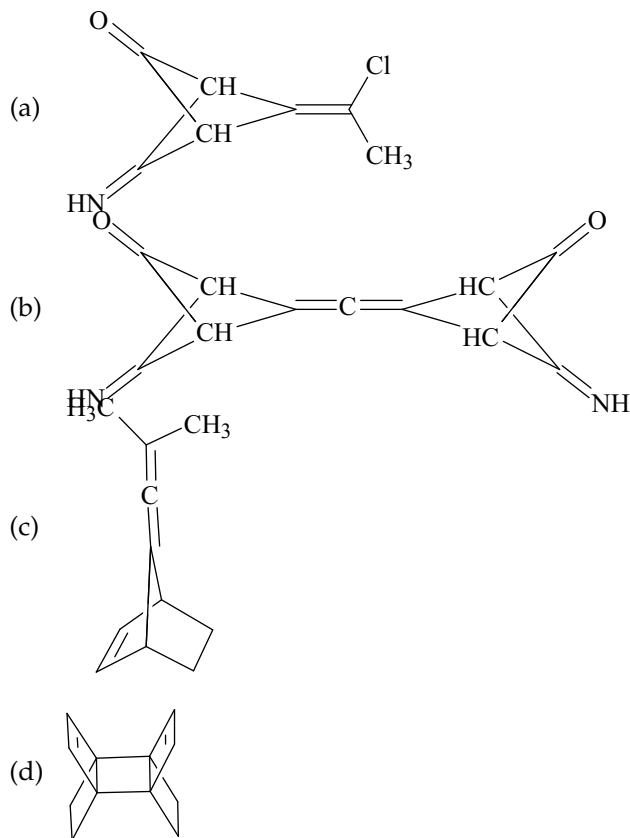


(s) Axis of symmetry present

(t) Dissymmetric compound

118. Column I

Column II



(p) Optically inactive compound

(q) Optically active compound

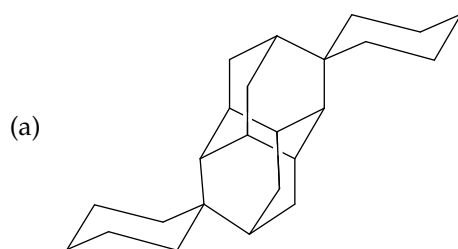
(r) Meso compound

(s) Axis of symmetry present

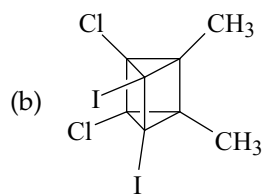
(t) Asymmetric compound

119. Column I

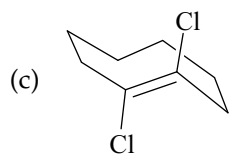
Column II



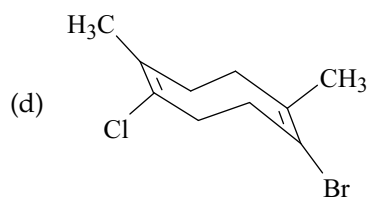
(p) Optically inactive compound



(q) Optically active compound



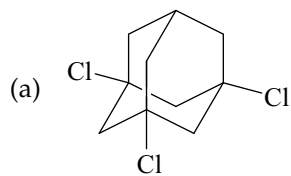
(r) Meso compound



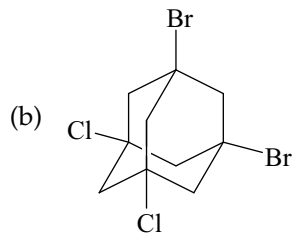
(s) Axis of symmetry present

(t) Asymmetric compound

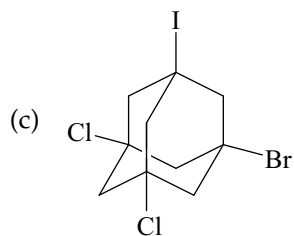
120. Column I



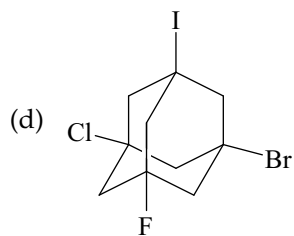
(p) Optically inactive compound



(q) Optically active compound



(r) Dissymmetric compound

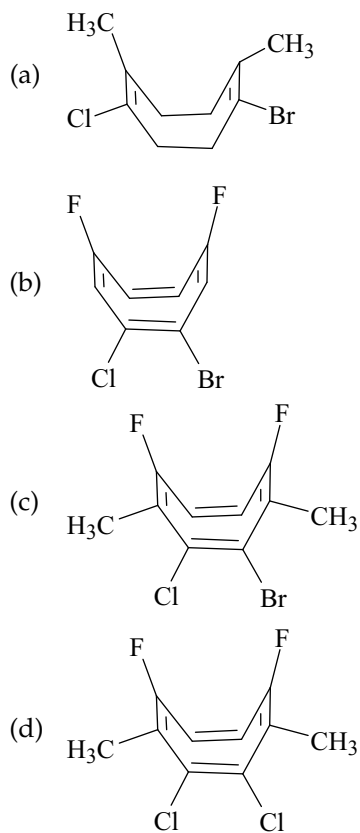


(s) Axis of symmetry present

(t) Asymmetric compound

Column II

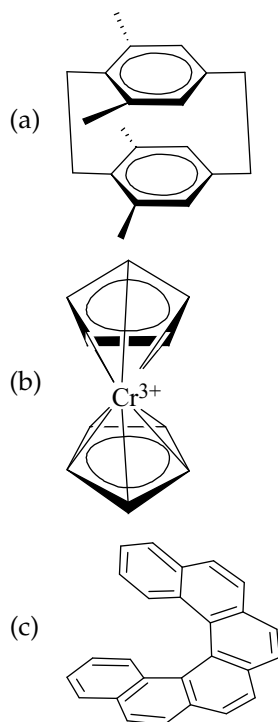
121. Column I



Column II

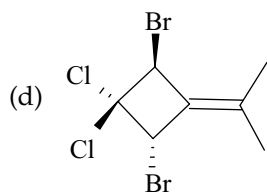
- (p) Optically inactive compound
- (q) Optically active compound
- (r) Degree of unsaturation is odd
- (s) Axis of symmetry present
- (t) Asymmetric compound

122. Column I



Column II

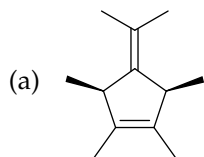
- (p) Optically inactive compound
- (q) Optically active compound
- (r) Dissymmetric compound



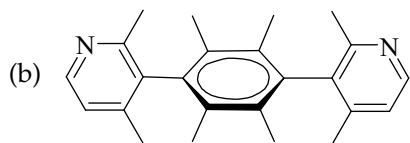
(s) Axis of symmetry present

(t) Asymmetric compound

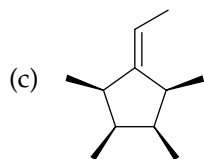
123. Column I



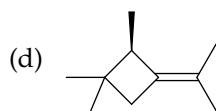
(p) Optically inactive compound



(q) Optically active compound



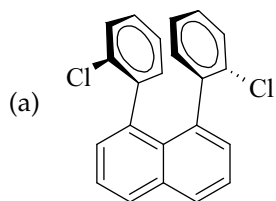
(r) Dissymmetric compound



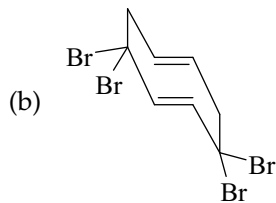
(s) Axis of symmetry present

(t) Asymmetric compound

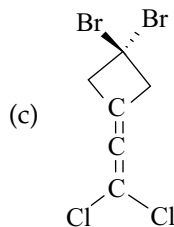
124. Column I



(p) Optically inactive compound



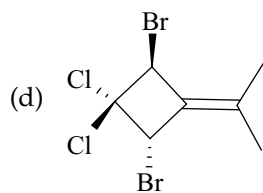
(q) Optically active compound



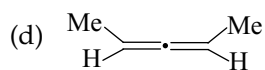
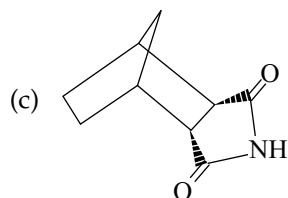
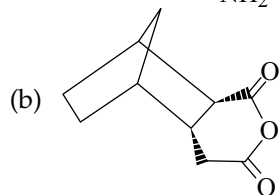
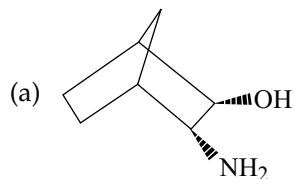
(r) Dissymmetric compound

Column II

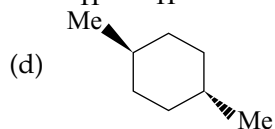
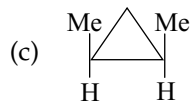
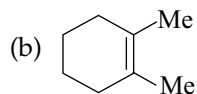
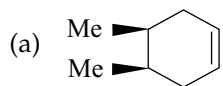
Column II



125. Column I



126. Column I



(s) Axis of symmetry present

(t) Asymmetric compound

Column II

(p) Optically active molecules without chiral centres

(q) Optically active molecules with chiral centres.

(r) Compounds have even number of chiral centres

(s) Optically inactive molecules

Column II

(p) Optically active

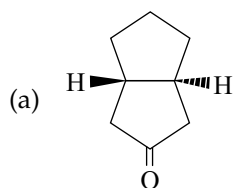
(q) Optically inactive

(r) Compounds show geometrical isomerism

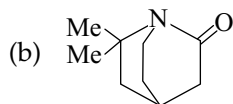
(s) Plane of symmetry

127. Column I

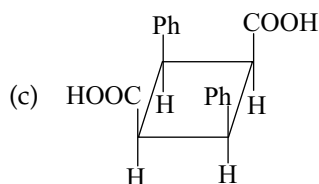
Column II



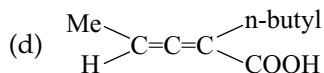
(p) Molecule has chiral centre



(q) Molecule is asymmetric



(r) Molecule is dissymmetric



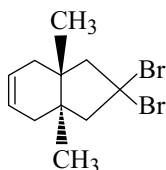
(s) Molecule is optically inactive

Integer Type

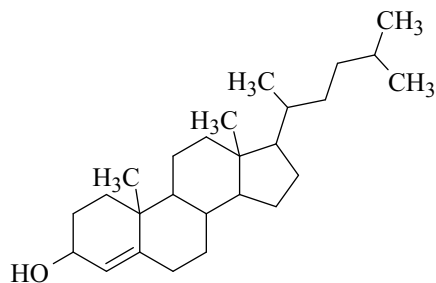
128. $\mu_{\text{obs}} = \sum \mu_i x_i$; where μ_i is the dipole moment of stable conformer and x_i is the mole fraction of that conformer of $Z\text{-CH}_2\text{-CH}_2\text{-Z}$ in Newmann's projection. If μ_{solution} or $\mu_{\text{net}} = 1$ D and mole fraction of anti form = 0.82, find μ_{Gauche} .

129. Number of primary amine possible for $\text{C}_4\text{H}_{11}\text{N}$ is

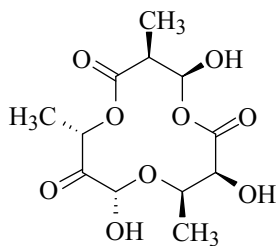
130. How many chiral centres are present in the following compound?



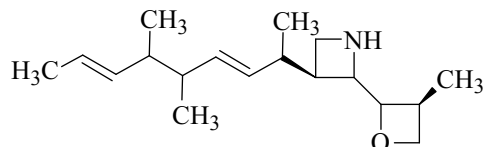
131. How many chiral centres are present in the following compound?



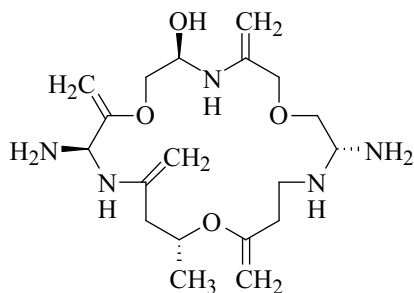
132. How many stereoisomers are possible for the following compound?



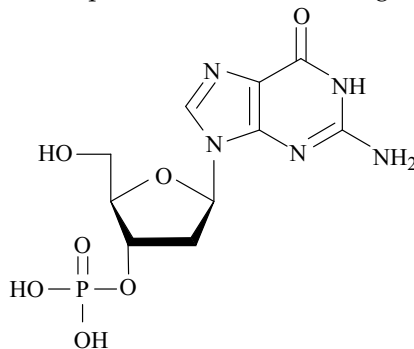
133. How many stereoisomers are possible for the following compound?



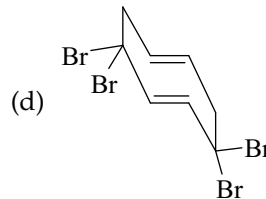
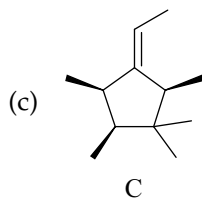
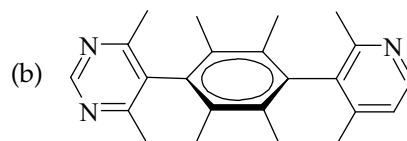
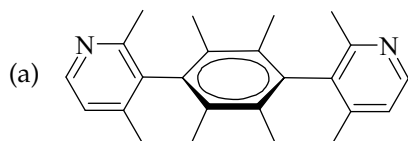
134. How many stereoisomers are possible for the following compound?

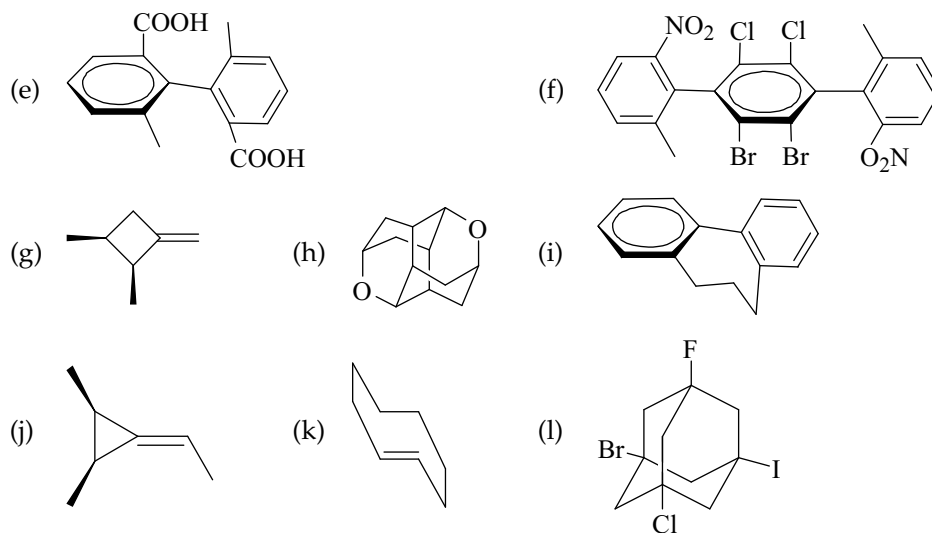


135. How many stereoisomers are possible for the following compound?

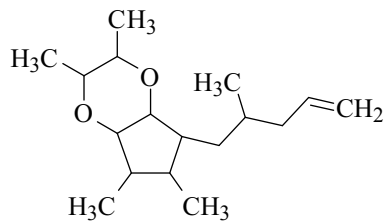


136. How many compounds are optically active?

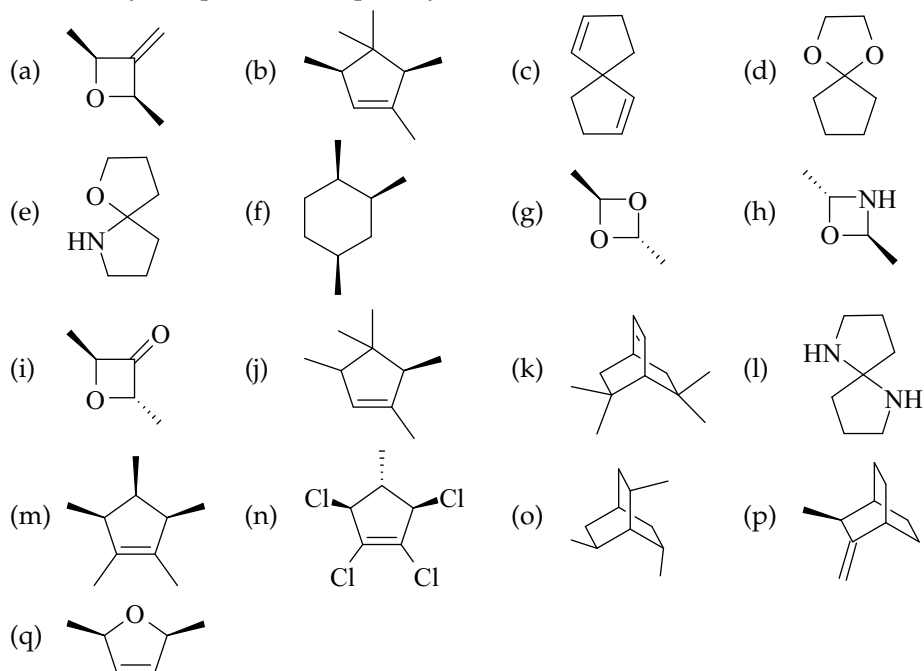




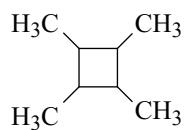
137. How many stereocentres are possible for the following compound?



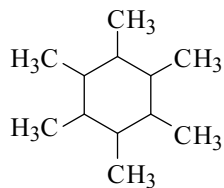
138. How many compounds are optically inactive?



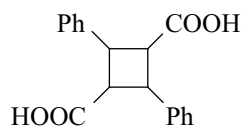
139. How many geometrical isomers are possible for the following compound?



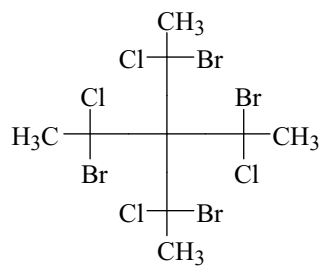
140. How many geometrical isomers are possible for the following compound?



141. How many geometrical isomers are possible for the following compound?



142. How many stereoisomers are possible for the following compound?



Answer Keys

LEVEL 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
b	a	d	d	b	b	b	a	b	c	d	c	c	a	c
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
c	b	d	a	d	c	ac	ab	d	d	d	d	d	a	c
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
d	a	b	d	b	a	b	c	d	d	c	a	b	c	d
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
d	a	d	c	a	a	d	a	b	d	c	d	b	c	b
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
c	a	c	d	a	c	b	b	b	a	d	c	c	d	c
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
a	c	b	a	b	b	a	a	b	b	d	c	a	d	b
91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
c	d	b	b	a	d	b	a	d	b	a	a	a	d	c
106	107	108	109	110	111	112	113	114	115	116				
b	b	c	a	c	a	a	b	b	c	c				

LEVEL 2

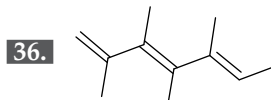
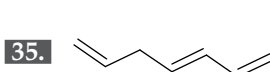
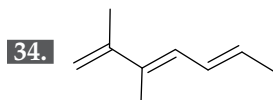
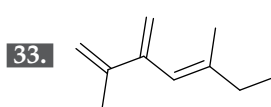
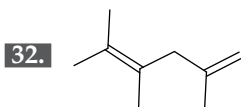
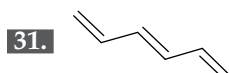
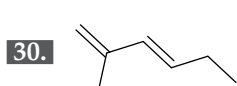
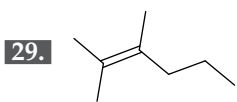
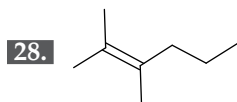
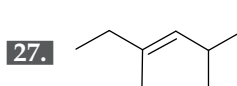
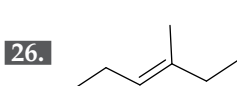
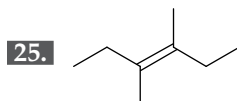
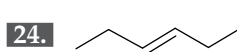
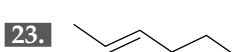
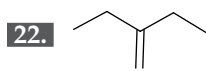
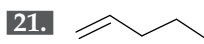
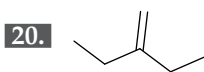
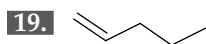
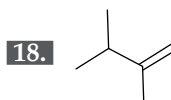
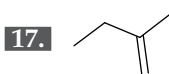
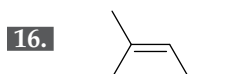
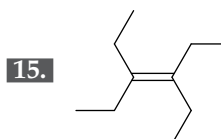
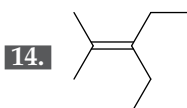
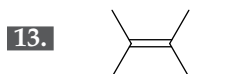
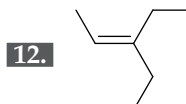
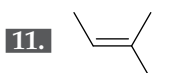
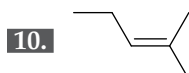
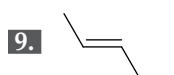
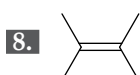
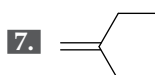
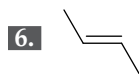
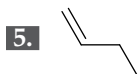
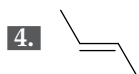
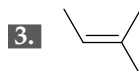
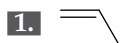
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a	b	c	c	d	b	b	b	abd	c	b	b	b	bc	abd
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
bd	abcd	abc	acd	bcd	acd	abd	ad	bc	bd	ad	acd	abc	ab	abcd
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
ab	abcd	cd	a	abd	acd	abcd	abcd	abcd	ab	abc	bd	abd	abc	abc
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
cd	ac	a	a	cd	a	a	d	ab	bc	ad	ab	ab	bc	bc
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
ab	bc	abcd	abc	acd	ab	abd	cd	d	ac	d	acd	ad	b	a
91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
b	d	d	c	d	ab	b	b	c	b	c	c	a	d	c
106	107	108	109	110(a)	110(b)	110(c)	110(d)	111(a)	111(b)	111(c)	111(d)	112(a)	112(b)	112(c)
d	c	a	a	rst	qrs	pqr	s	p	rt	p	s	qt	s	pt

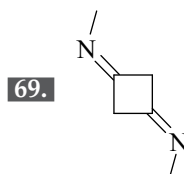
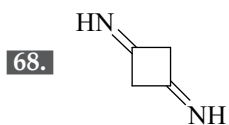
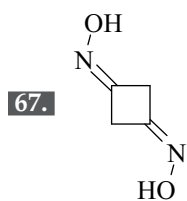
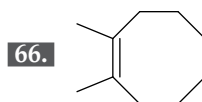
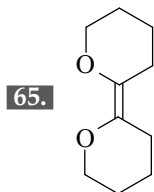
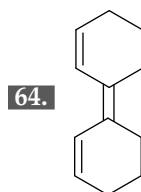
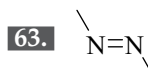
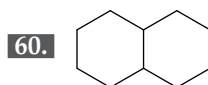
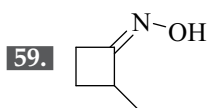
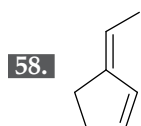
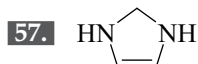
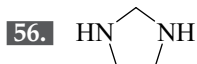
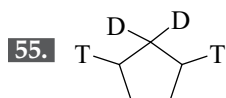
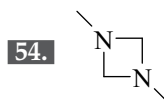
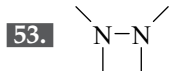
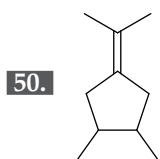
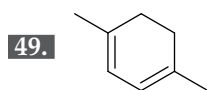
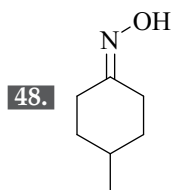
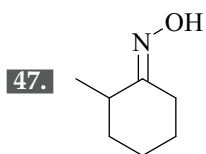
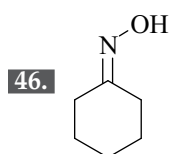
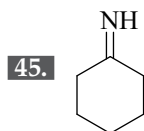
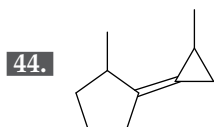
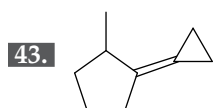
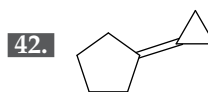
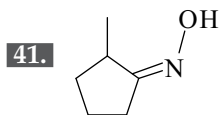
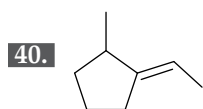
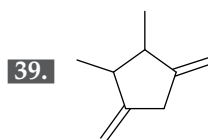
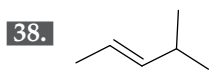
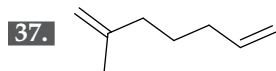
112(d)	113(a)	113(b)	113(c)	113(d)	114(a)	114(b)	114(c)	114(d)	115(a)	115(b)	115(c)	115(d)	116(a)	116(b)
r	rs	st	qrs	ps	pr	s	p	t	qs	pr	qs	qt	pr	pr
116(c)	116(d)	117(a)	117(b)	117(c)	117(d)	118(a)	118(b)	118(c)	118(d)	119(a)	119(b)	119(c)	119(d)	120(a)
ps	qt	qst	qst	qst	pr	qt	qt	pr	prs	prs	pr	qs	qt	ps
120(b)	120(c)	120(d)	121(a)	121(b)	121(c)	121(d)	122(a)	122(b)	122(c)	122(d)	123(a)	123(b)	123(c)	123(d)
ps	p	qt	qrt	qrt	qrt	pr	ps	ps	qrs	qrs	p	ps	qt	qt
124(a)	124(b)	124(c)	124(d)	125(a)	125(b)	125(c)	125(d)	126(a)	126(b)	126(c)	126(d)	127(a)	127(b)	127(c)
qrs	qrs	ps	qrs	qr	qr	rs	p	qrs	qs	qsr	qrs	pr	pq	s
127(d)	128	129	130	131	132	133	134	135	136	137	138	139	140	141
q	5.55	5	2	8	64	1024	32	8	9	8	7	4	8	5
142														
5														

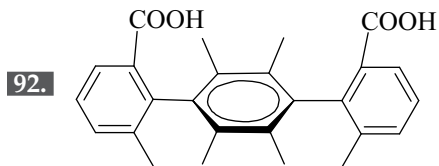
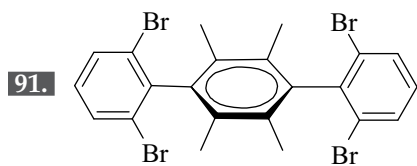
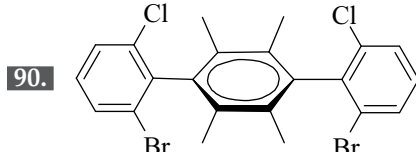
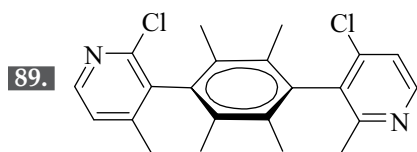
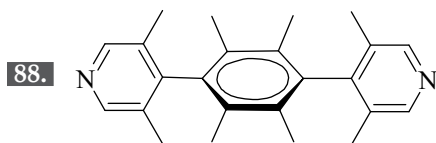
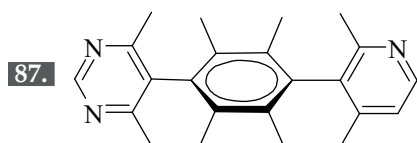
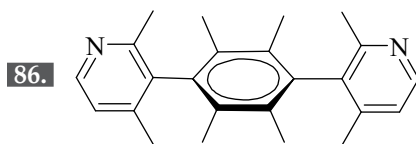
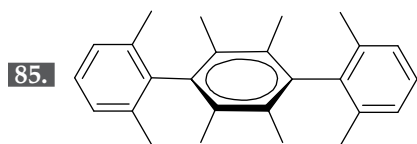
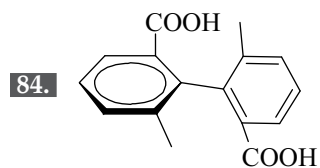
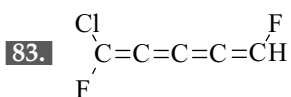
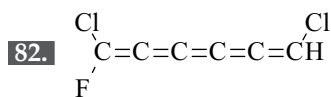
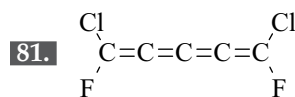
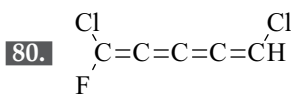
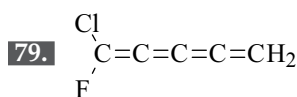
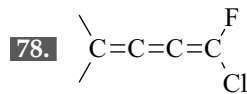
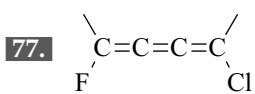
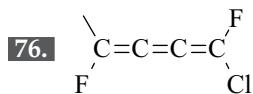
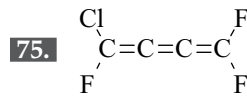
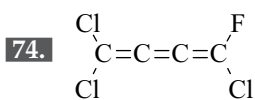
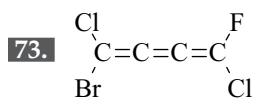
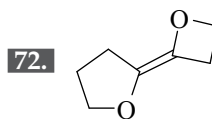
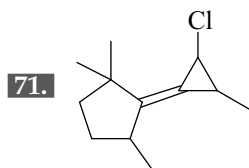
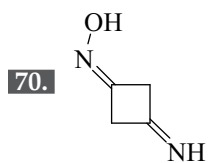
WORKBOOK EXERCISES

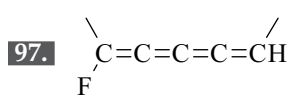
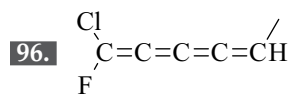
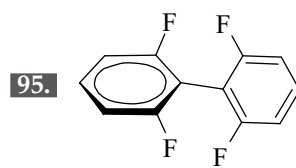
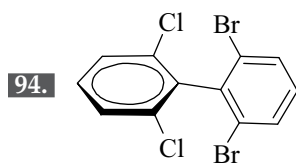
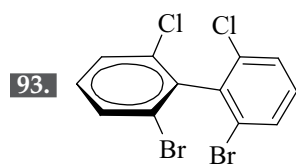
EXERCISE 1

Identify molecules that show Geometrical Isomerism



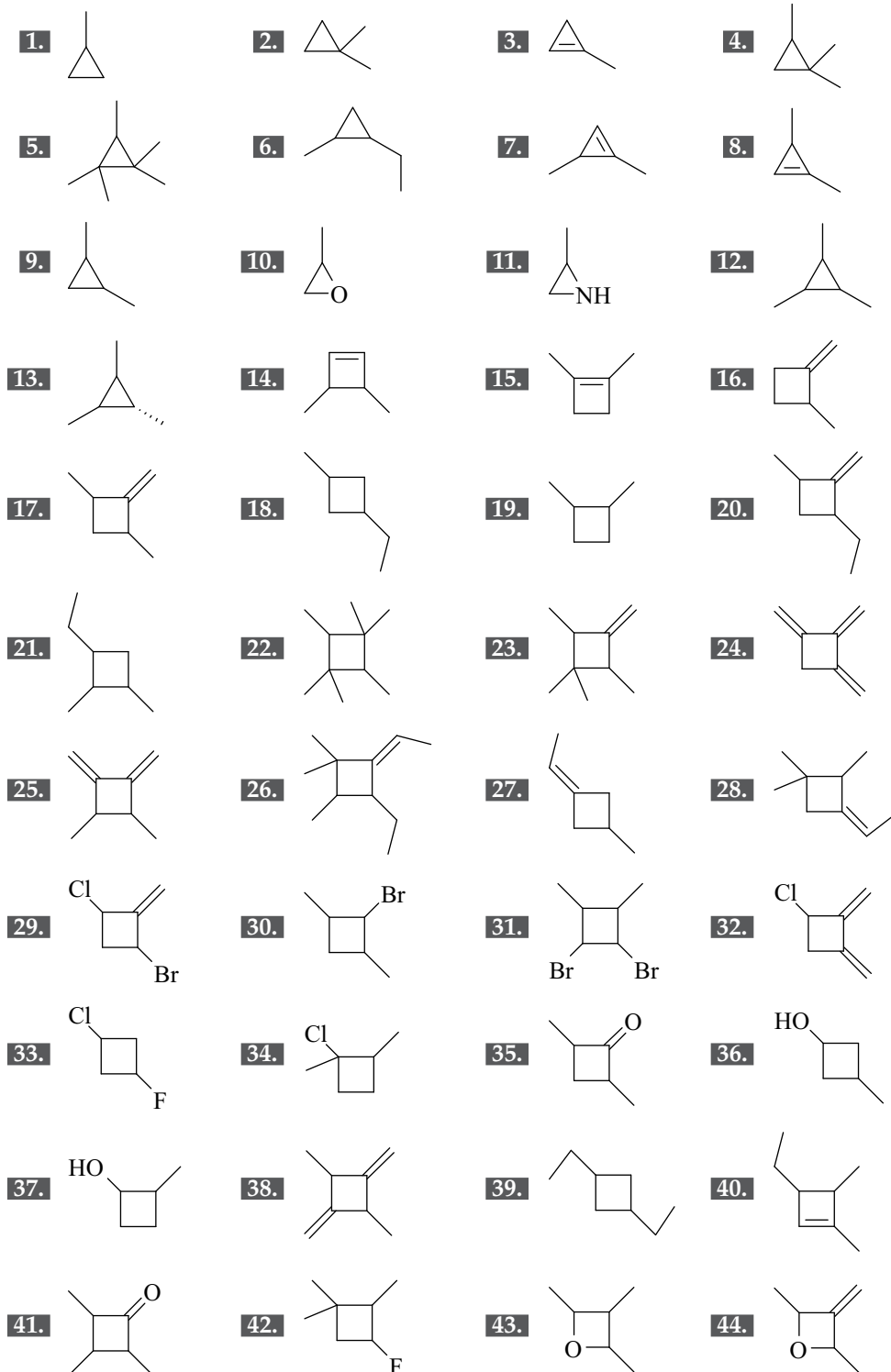


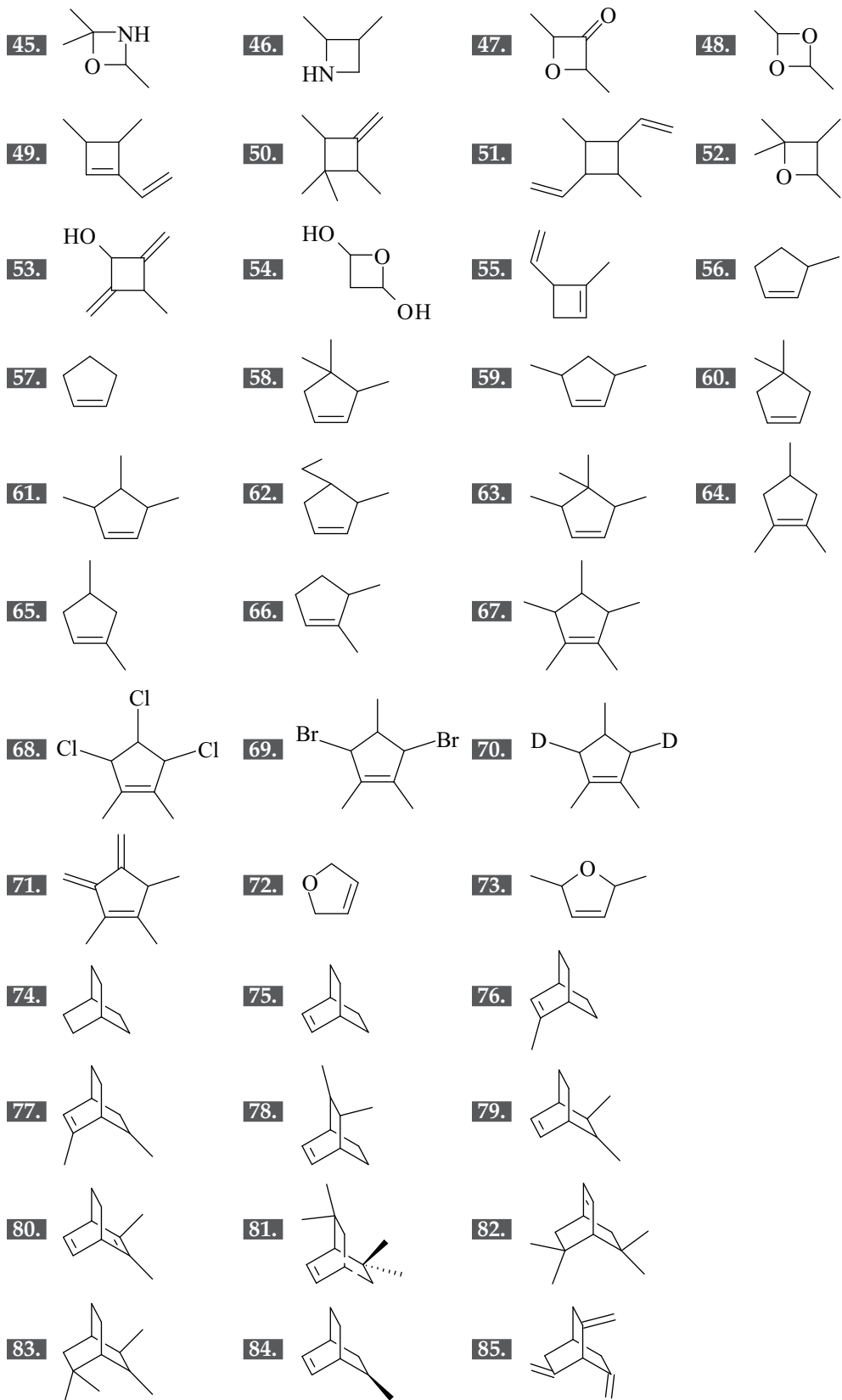




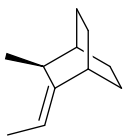
EXERCISE 2

Identify molecules that show Geometrical Isomerism

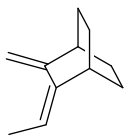




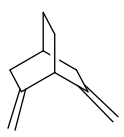
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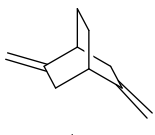
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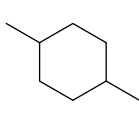
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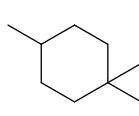
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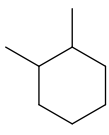
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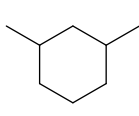
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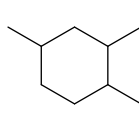
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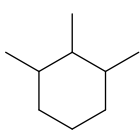
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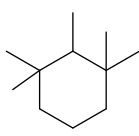
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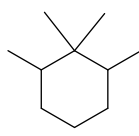
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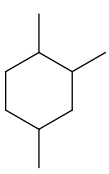
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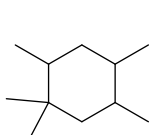
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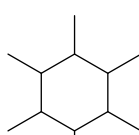
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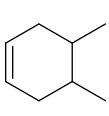
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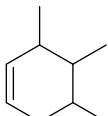
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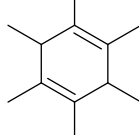
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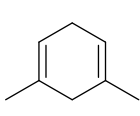
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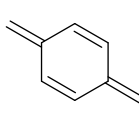
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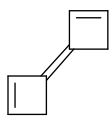
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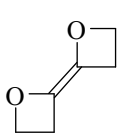
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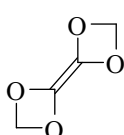
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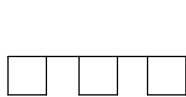
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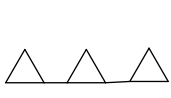
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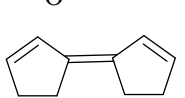
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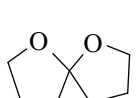
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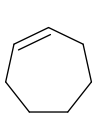
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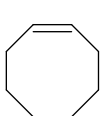
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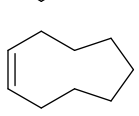
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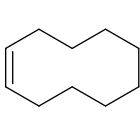
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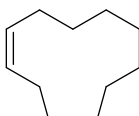
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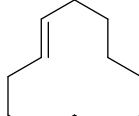
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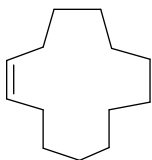
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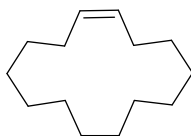
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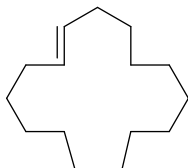
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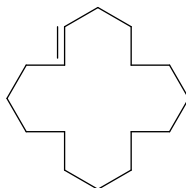
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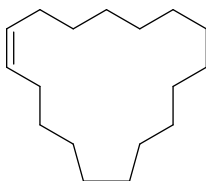
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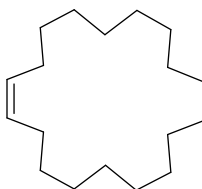
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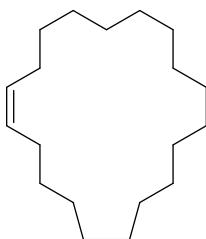
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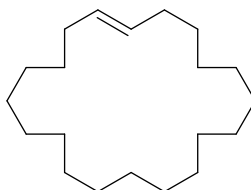
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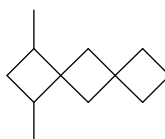
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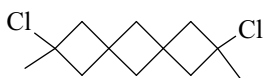
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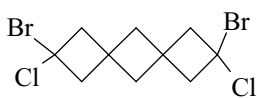
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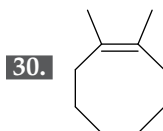
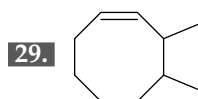
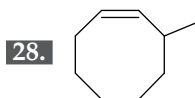
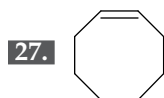
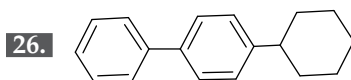
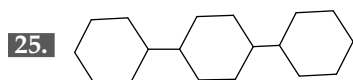
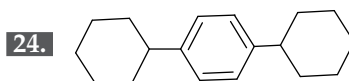
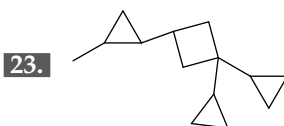
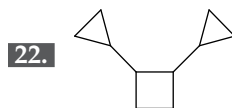
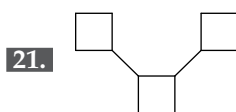
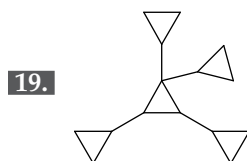
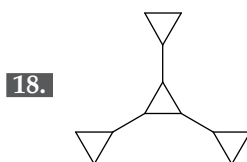
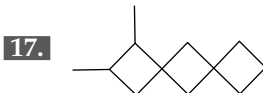
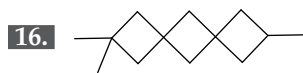
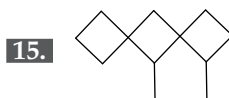
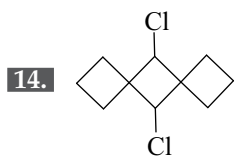
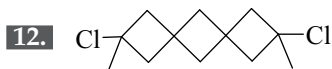
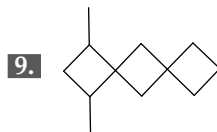
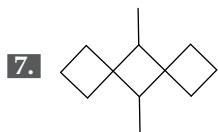
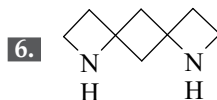
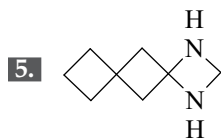
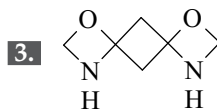
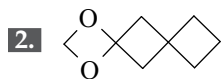
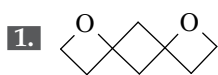


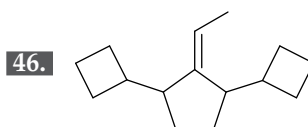
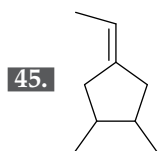
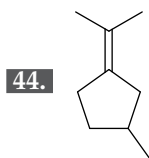
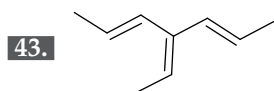
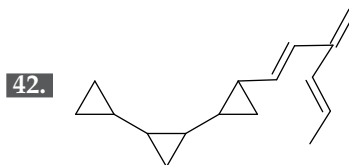
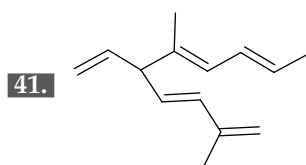
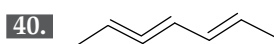
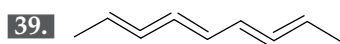
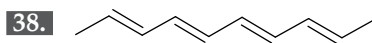
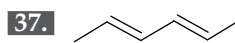
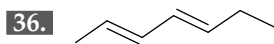
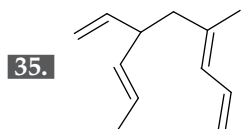
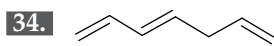
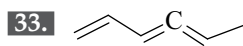
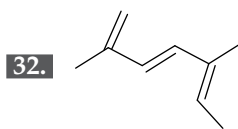
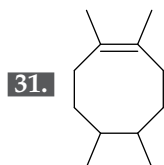
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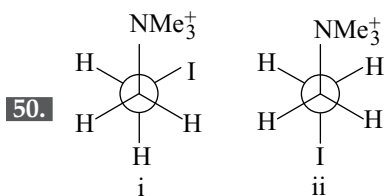
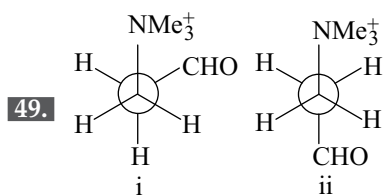
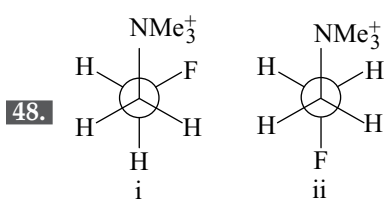
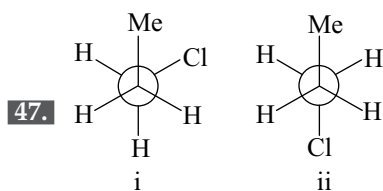
EXERCISE 3

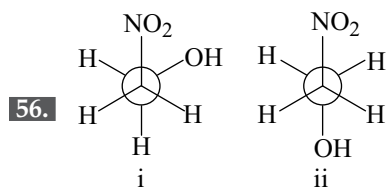
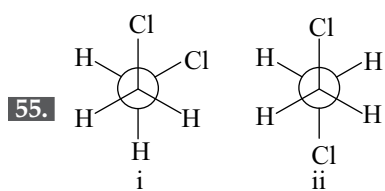
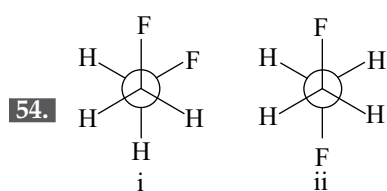
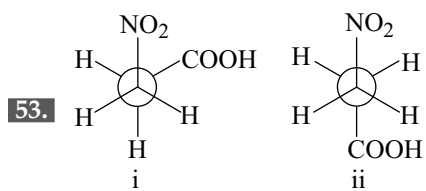
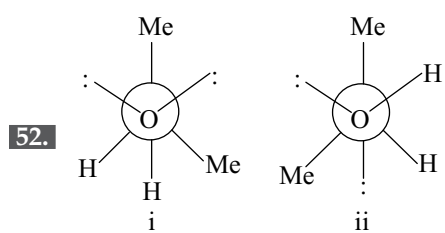
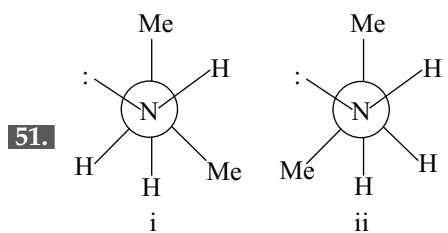
Identify molecule give G.I.





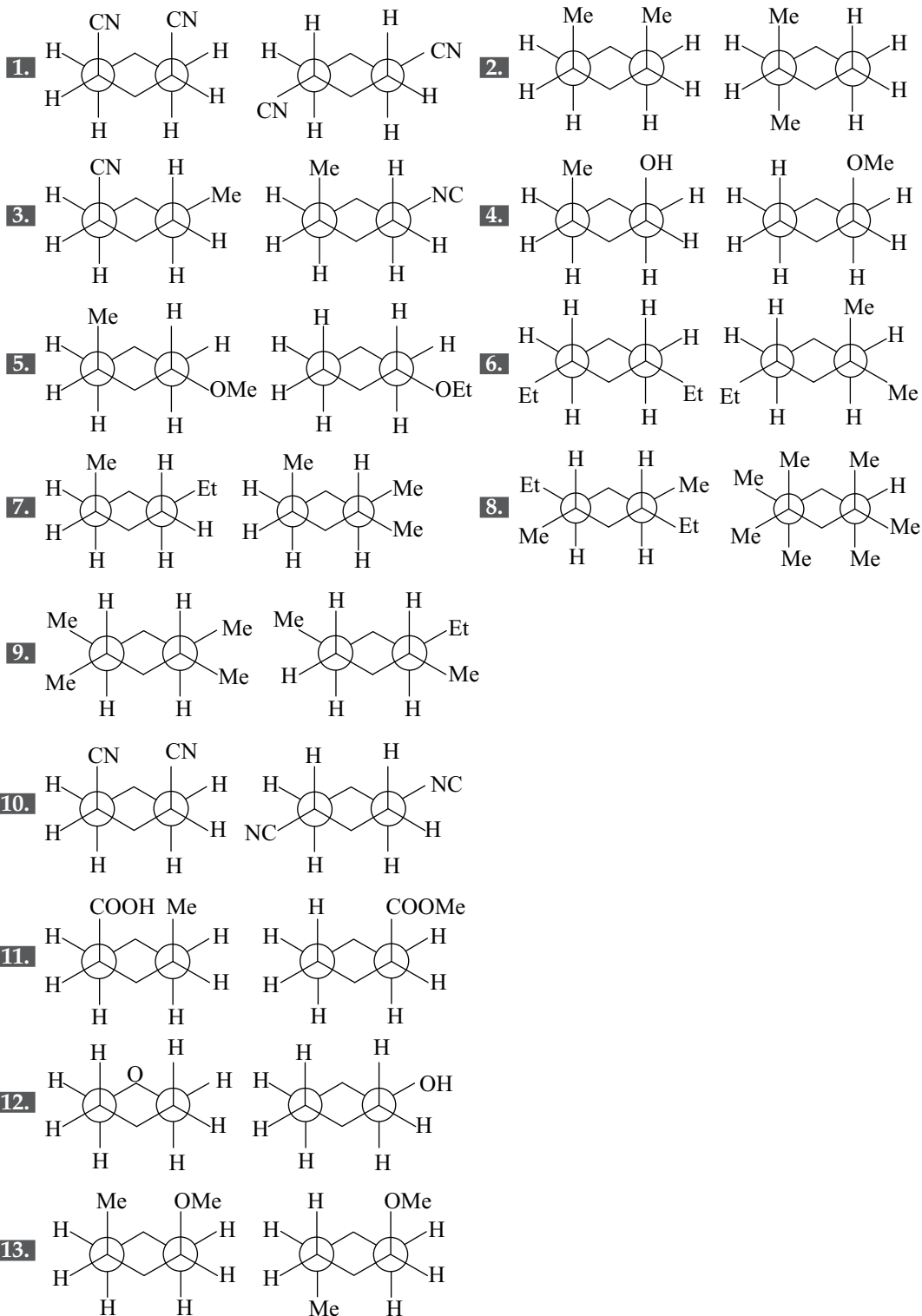
Identify stable conformer

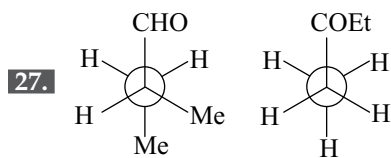
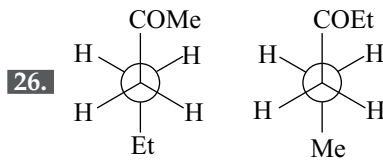
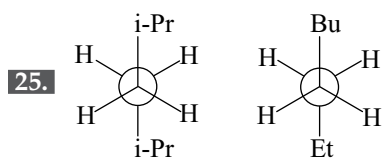
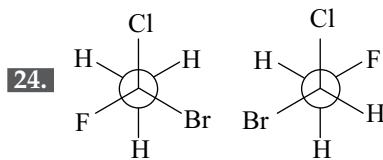
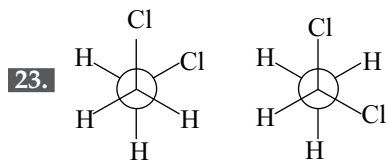
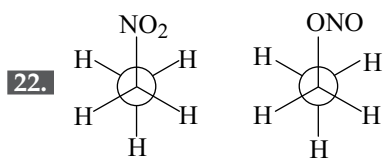
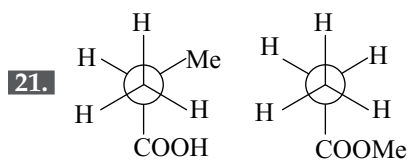
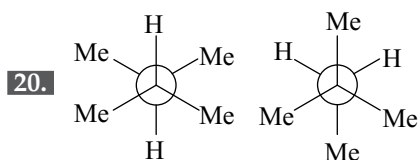
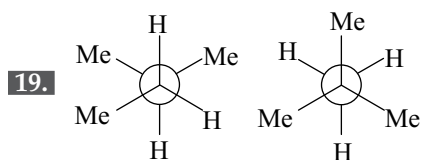
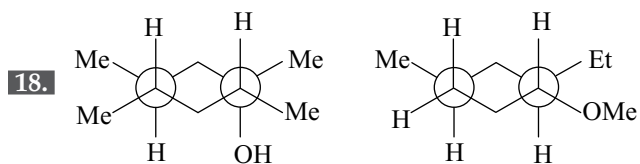
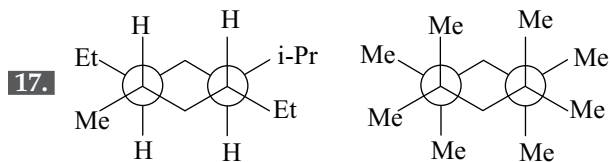
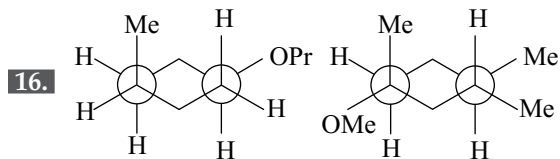
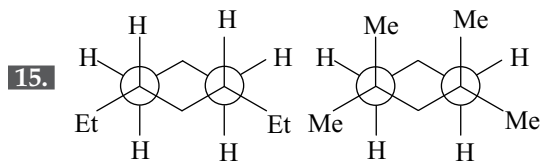
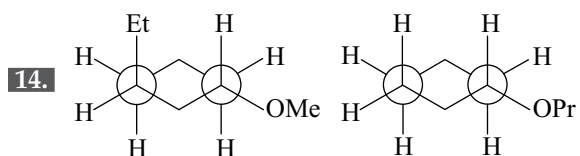




EXERCISE 4

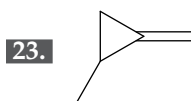
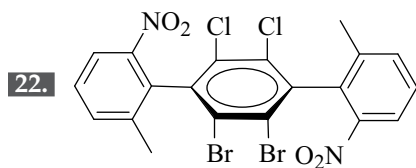
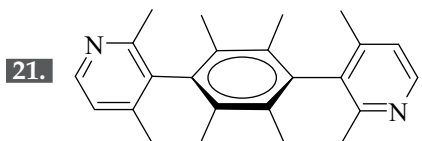
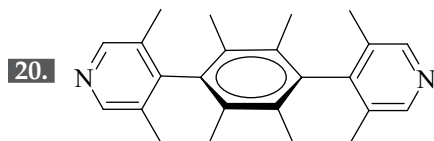
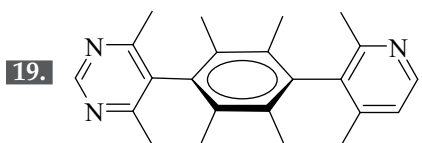
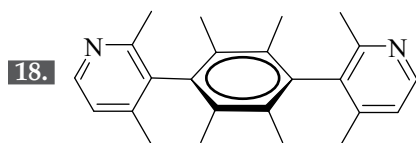
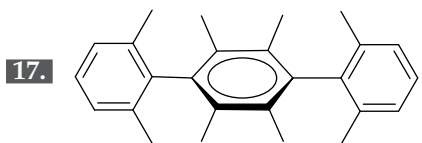
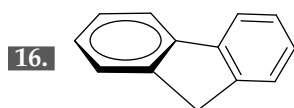
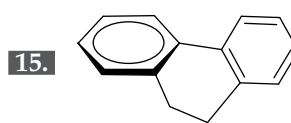
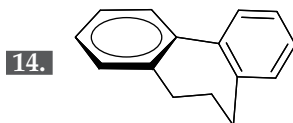
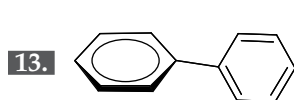
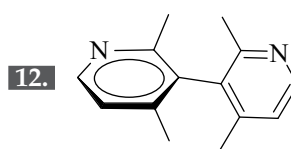
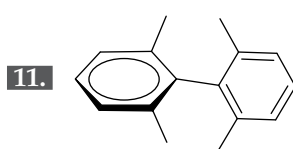
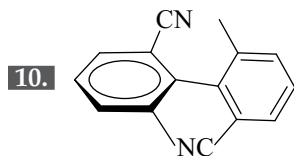
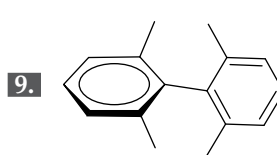
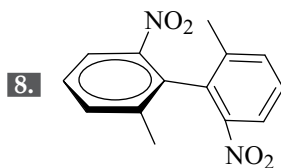
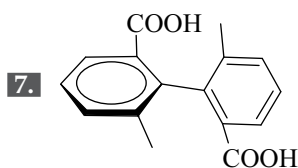
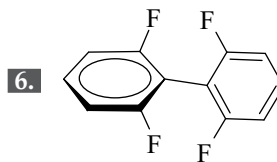
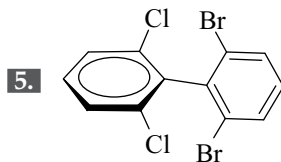
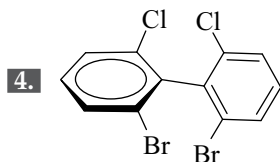
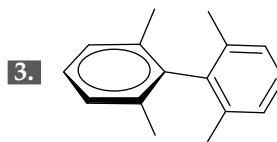
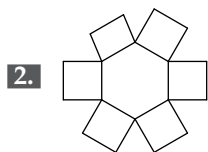
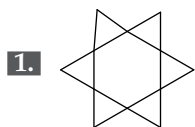
Identify Isomeric Relationship between pair of Compounds



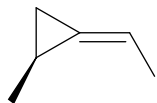


EXERCISE 5

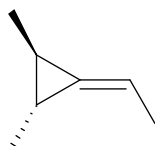
Identify optically active compounds



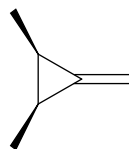
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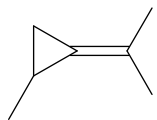
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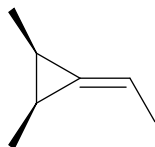
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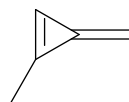
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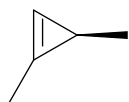
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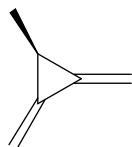
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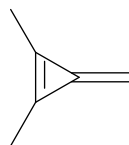
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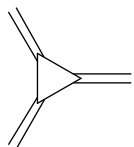
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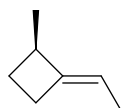
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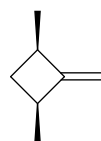
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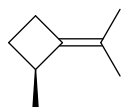
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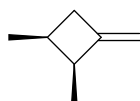
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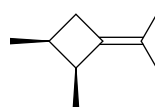
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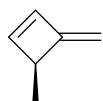
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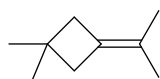
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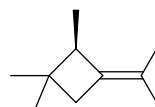
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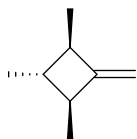
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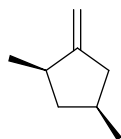
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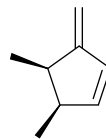
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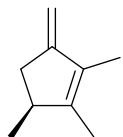
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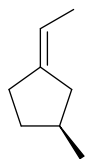
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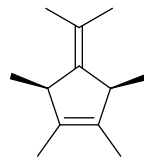
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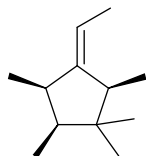
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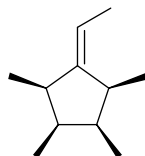
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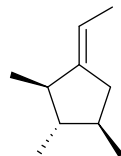
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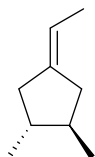
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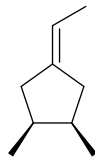
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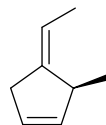
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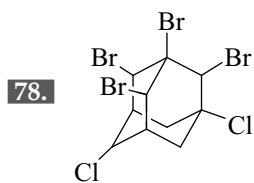
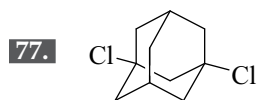
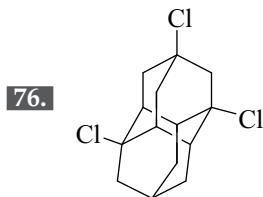
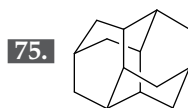
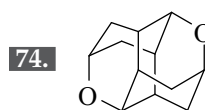
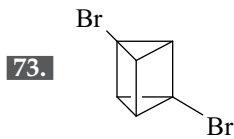
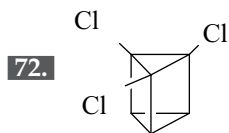
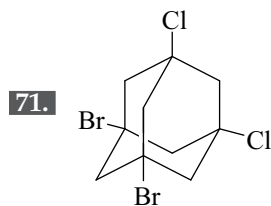
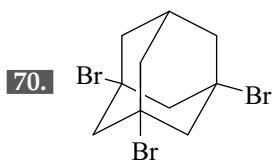
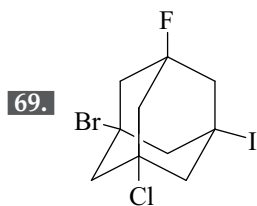
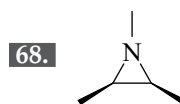
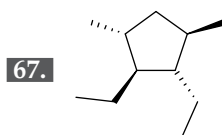
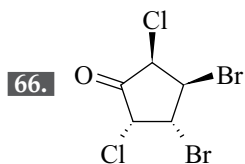
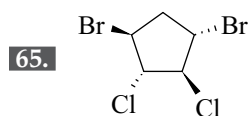
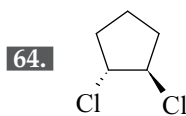
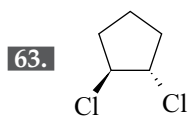
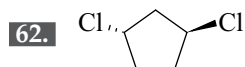
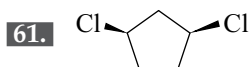
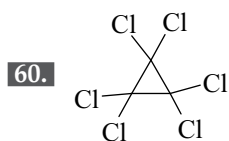
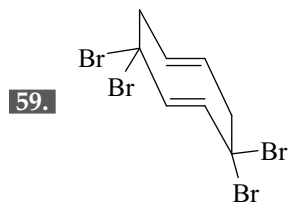
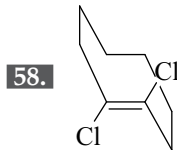
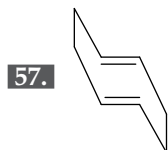
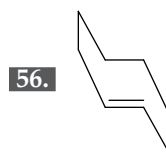
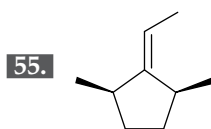
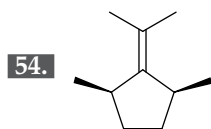


52.



53.





SOLUTION FOR WORKBOOK EXERCISES

EXERCISE 1

Molecules that show Geometrical Isomerism

4, 6, 9, 11, 13, 16, 23, 24, 25, 26, 27, 30, 31, 33, 34, 35, 36, 38, 39, 40, 41, 44, 47, 50, 51, 52, 53, 54, 55, 56, 58, 59, 60, 61, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 76, 77, 82, 86, 89, 90, 92.

EXERCISE 2

Molecules that show Geometrical Isomerism

6, 9, 11, 12, 13, 14, 17, 18, 19, 20, 21, 22, 23, 25, 26, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 59, 61, 62, 63, 67, 68, 69, 70, 73, 78, 79, 83, 77, 86, 87, 90, 92, 93, 94, 95, 97, 98, 99, 100, 101, 102, 103, 106, 107, 109, 110, 111, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134.

EXERCISE 3

Molecules that show Geometrical Isomerism

1, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 25, 27, 28, 29, 30, 31, 32, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 45, 46.

Stable Conformer

47(I), 48(I), 49(I), 50(II), 51(II), 52(I = II), 53(I), 54(I), 55(II), 56(I).

EXERCISE 4

Isomeric Relationship between pair of compounds

- | | |
|------------------------|------------------------|
| 1. Positional Isomers | 2. Positional Isomers |
| 3. Functional Isomers | 4. Functional Isomers |
| 5. Metamers Isomers | 6. Chain Isomers |
| 7. Chain Isomers | 8. Chain Isomers |
| 9. Chain Isomers | 10. Functional Isomers |
| 11. Functional Isomers | 12. Not Isomers |
| 13. Positional Isomers | 14. Metamers Isomers |
| 15. Chain Isomers | 16. Metamers Isomers |
| 17. Chain Isomers | 18. Functional Isomers |
| 19. Chain Isomers | 20. Positional Isomers |
| 21. Functional Isomers | 22. Functional Isomers |
| 23. Positional Isomers | 24. Positional Isomers |
| 25. Chain Isomers | 26. Metamers Isomers |
| 27. Functional Isomers | |

EXERCISE 5

Optically active compounds

4, 7, 8, 10, 12, 14, 15, 22, 23, 24, 25, 27, 28, 30, 34, 36, 37, 38, 39, 41, 43, 44, 45, 46, 48, 49, 50, 51, 52, 53, 55, 56, 58, 59, 62, 63, 64, 65, 66, 67, 69, 73.