*** Chemistry** **[800]**

1. The compound which shows metamerism is :

   (A) C_5H_{12} (B) C_3H_8O (C) C_3H_6O (D) $C_4H_{10}O$

   Ans. : $C_4H_{10}O$

   This molecular formula is applicable for homologous series ether (-O-) a bivalent functional group and as we know ether with minimum four-C shows metamerism. $CH_3-CH_2-O-CH_2-CH_3$ & $CH_3-O-CH_2-CH_2-CH_3$ are metamers.

2. The correct statement regarding ethane conformation is :

   (A) Rotation around carbon-carbon bond in ethane molecule is not possible, because ethane molecule contains a pi (π) bond between the carbon and carbon and ethane has very low melting point.

   (B) Rotation around carbon-carbon bond in ethane molecule is not possible, because ethane molecule contains both sigma (σ) bond, and pi (π) bond between the carbon and carbon.

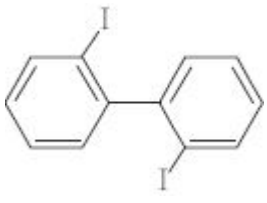
   (C) Rotation around carbon-carbon bond in ethane molecule is possible because of cylindrical symmetry of sigma (σ) bond between carbon-carbon atoms

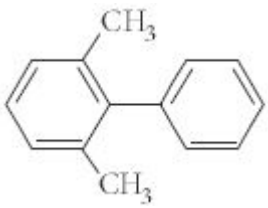
   (D) Rotation around carbon-carbon bond in ethane molecule is not possible, because ethane molecule contains both sigma (σ) bond and pi (π) bond between the carbon and carbon and ethane has very high boiling point.

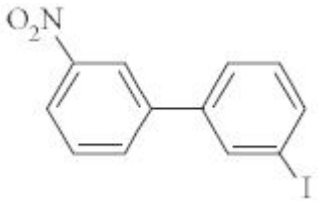
   Ans. : c

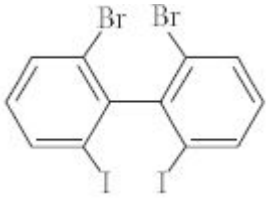
   ઈથેન અણુમાં કાર્બન-કાર્બન બંધની આસપાસ પરિભ્રમણ, શક્ય છે કારણ કે કાર્બન-કાર્બન પરમાણુએ વચ્ચે સિગ્મા (σ) બંધની નળાકાર સંમિતિ છે.

3. Which of the following biphenyls is optically active?

   (A) 

   (B) 

   (C) 

   (D) 

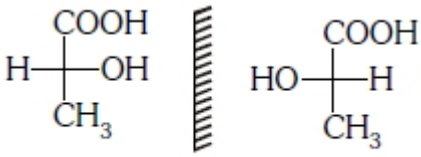
   Ans. : d

   Both phenyl ring placed in different plane so plane of symmetry absent result in it is optically active

4. Two possible stereo-structures of $CH_3CHOHCOOH$, which are optically active, are called

(A) atropisomers (B) enantiomers (C) mesomers (D) diastereomers

Ans. : b



Both are enantiomers

5. The number of structural isomers possible from the molecular formula C_3H_9N is

(A) 5 (B) 2 (C) 3 (D) 4

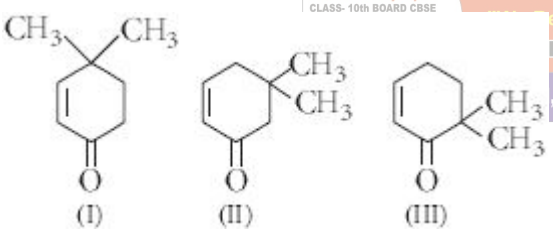
Ans. : Structural isomers of C_3H_9N are

$$\underbrace{CH_3CH_2CH_2NH_2,\ CH_3-\underset{\displaystyle NH_2}{\underset{|}{CH}}-CH_3}_{1^o\ amine}$$

$$CH_3-CH_2-NH-CH_3,\quad \underset{3^o\ amine}{CH_3-\underset{\displaystyle CH_3}{\underset{|}{N}}-CH_3}$$

6. Which of the given compounds can exhibit tautomerism ?

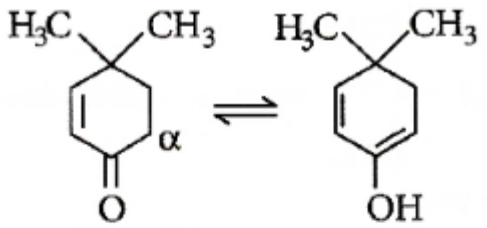
Given :



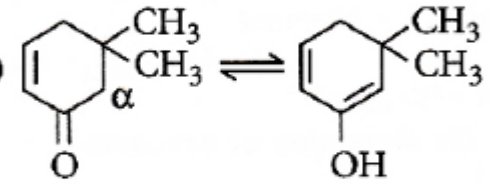
(I) (II) (III)

(A) II and III (B) I and II (C) I, II and III (D) I and III

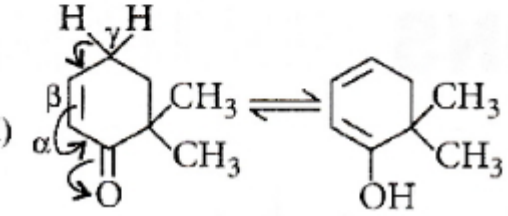
Ans. :

(I) 

here, α-H participates.

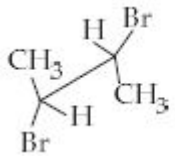
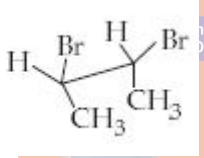
(II) 

here, α-H participates.

(III) 

here, γ-H participates (*p*-tautomerism).

7. Given : I and II are

 and 

(A) identical

(B) a pair of conformers

(C) a pair of geometrical isomers

(D) a pair of optical isomers

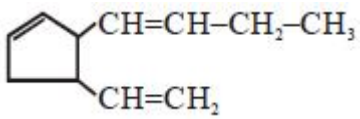
Ans. : b

Rotating in front carbon by 180° we find structure second.

Thus both the structures are conformers of each other.

Out of these two structures, one is in staggered conformation and other is in eclipsed conformation.

8. Stereoisomer possible for following compound



(A) 8 (B) 16 (C) 32 (D) 64

Ans. : a

9. Compound which can show stereisomerism

(A) $2-$ Chloro propane

(B) $2-$ Chloro $-3-$ methyl but $-2-$ ene

(C) $3-$ Ethyl pent $-2-$ ene

(D) $1-$ Chloro but $-1-$ ene

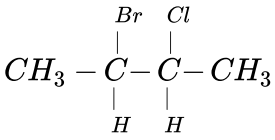
Ans. : d

10. How many chiral isomers can be drawn from $2-$bromo, $3-$chloro butane

(A) 2 (B) 3 (C) 4 (D) 5

Ans. : c

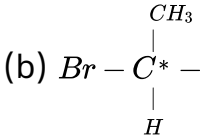
(c) $2-$bromo, $3-$chloro-butane has 2 chiral carbon atoms, hence has $2^2 = 4$ optical isomers.



11. Which of the following will be chiral

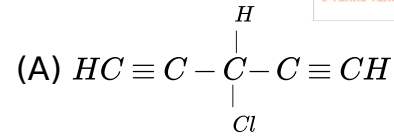
(A) CH_3CHCl_2 (B) $CH_3CHBrCl$ (C) CD_2Cl_2 (D) CH_2ClBr

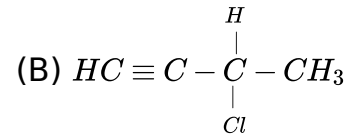
Ans. : b

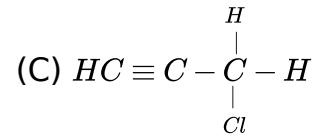
(b)  * asymmetric or chiral carbon

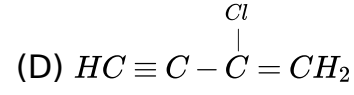
All the four valencies of carbon are satisfied with different atoms/substituents.

12. Which of the following is most likely to show optical isomerism

(A) 

(B) 

(C) 

(D) 

Ans. : b

(b) $HC \equiv C - \overset{\overset{H}{|}}{\underset{\underset{Cl}{|}}{C}} - CH_3$ shows optical isomerism because of molecule is unsymmetrical. That is called chiral.

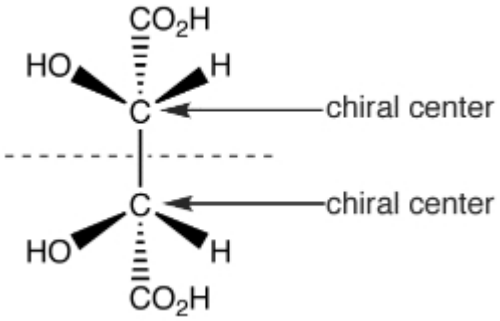
13. A compound whose molecules are superimposable on their mirror images even through they contain an asymmetric carbon atom is called

(A) A meso compound (B) An erythro isomer

(C) A threo isomer (D) a glycol

Ans. : a

Compound whose moelcules are superimposable on their mirror images even though it contain asymmetric carbon atoms is called a meso compound Due to presence of plane of symmetry, they are optically inactive even though contains chiral carbons.



14. Optically active compound is

(A) $3-$chloropentane (B) $2-$chlorobutane (C) $2-$chloropropane (D) None of these

Ans. : b

(b) $2-$chloro butane will be optically active.

15. Which of the following compounds is optically active

(A) $(CH_3)_2CHCH_2OH$ (B) CH_3CH_2OH

(C) CCl_2F_2 (D) $CH_3CHOHC_2H_5$

Ans. : d

(d) $CH_3 - \overset{\overset{OH}{|}}{\underset{\underset{C_2H_5}{|}}{C^*}} - H$

In this structure chiral carbon is present that is why it is optically active.

16. What is the possible number of optical isomers for a compound containing $2-$dissimilar asymmetric carbon atom

(A) 2 (B) 4 (C) 6 (D) 8

Ans. : b

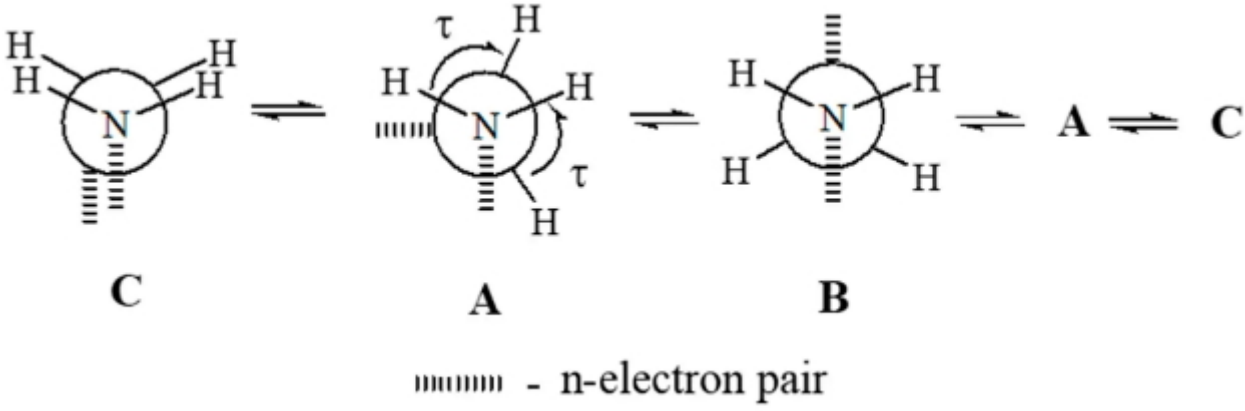
Number of optical isomers $= 2^n = 2^2 = 4$ where, $n =$ number of dissimilar asymmetric C-atoms.

17. Which of the following hydride is capable of showing conformations

(A) $NH_2 - NH_2$ (B) B_2H_6 (C) CH_4 (D) None of these

Ans. : a

$NH_2 - NH_2$ can show conformations.



18. Disymmetric object is one which is

(A) Superimposable on its mirror image

(B) Non-superimposible on its mirror image

(C) Optically inactive

(D) Achiral

Ans. : b

(b) Non superimposible on its mirror image.

19. Which compound is chiral

(A) butane

(B) $1-$chloro$-2-$methyl butane

(C) $2-$methyl butane

(D) $2-$methyl propane

Ans. : b

(b) $CH_3 - CH_2 - \underset{\underset{CH_3}{|}}{\overset{*}{C}}H - CH_2 - Cl$

20. If the light waves pass through a nicol prism then all the oscillations occur only in one plane, such beam of light is called as

(A) Non-polarised light (B) Plane polarised light

(C) Polarised light (D) Optical light

Ans. : b

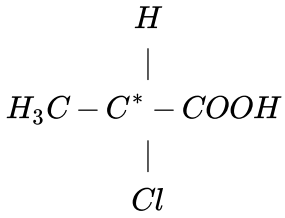
It's obvious.

21. Which of the following molecule contains asymmetric carbon atom

(A) $CH_3CHClCOOH$ (B) CH_3CH_2COOH

(C) $ClCH_2CH_2COOH$ (D) $Cl_2CHCOOH$

Ans. : a



Carbon is attached to four different groups and hence asymmetric carbon atom.

22. The number of possible isomers of the compound with molecular formula C_7H_8O is

(A) 3 (B) 5 (C) 7 (D) 9

Ans. : d

It's obvious.

23. Meso-tartaric acid is

(A) Optically inactive

(B) Optically active because of molecular symmetry

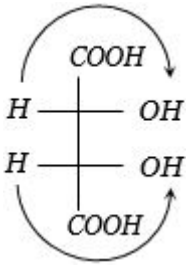
(C) Optically inactive due to external compensation

(D) Optically active because of asymmetric carbon atom

Ans. : a

(a) Meso isomer have two achiral carbon with opposite spin so it becomes optically inactive

Meso tartaric acid



24. Which of the following statements is not true about enantiomers

(A) They have same physical properties

(B) They have different biological properties

(C) They have same chemical properties towards chiral compounds

(D) None of these

Ans. : a

(a) Enantiomers have same chemical properties but different physical properties.

25. An organic compound $^{1}CH_3-^{2}CH_2-^{3}CH_2-^{4}CH_2-^{5}CH_2-^{6}CH_2-^{7}CH_3$
To make it chiral compound the attack should be on which carbon atom

(A) 1 (B) 3 (C) 4 (D) 7

Ans. : b

$^{1}CH_3-^{2}CH_2-^{3}CH_2-^{4}CH_2-^{5}CH_2-^{6}CH_2-^{7}CH_3$

$CH_3-CH_2-CH_2-CH_2-CH_2-CH_2-CH_3$

If we substitute third carbon's hydrogen with another group ' x '. The resultant compound will be chiral.

$$CH_3-CH_2-\underset{\displaystyle CH_2-CH_2-CH_2-CH_3}{\overset{\displaystyle H}{\overset{|}{\underset{|}{C^*}}}}-X$$

26. Glucose has optical isomers

(A) 8 (B) 12

(C) 16 (D) Cannot be predicted

Ans. : c

Glucose has four chiral carbons in it's aldehyde form. So, they are 2^4 or 16 possible stereoisomers of this formula as shown in the above image.

27. Which compound is optically active

(A) $4-$chloro, 1 hydroxy butane

(B) 3^o-butyl alcohol

(C) Secondary butyl amine

(D) $n-$butyl alcohol

Ans. : c

(c) $CH_3-\underset{\displaystyle NH_2}{\overset{\displaystyle H}{\overset{|}{\underset{|}{C}}}}-CH_2-CH_3$

Secondary butyl amine is optically active.

28. $d-$ tartaric acid and $l-$ tartaric acid are

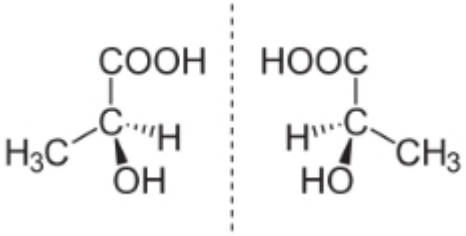
(A) Enantiomers (B) Tautomers

(C) Diastereoisomers (D) Structural isomers

Ans. : a

$(S)-(d)-$lactic acid (left) and $(R)-(l)-$lactic acid (right) are non-superimposable mirror images of each other.

An enantiomer is one of two stereo isomers that are mirror image of each other that are non-superimposable (not identical), much as one's left and right hands are the same except for being reversed along one axis (the hands cannot be made to appear identical simply by reorientation). Organic compounds that contain a chiral carbon usually have two non-superimposable structures. These two structures are mirror images of each other and are, thus, commonly called enantiomorphs.



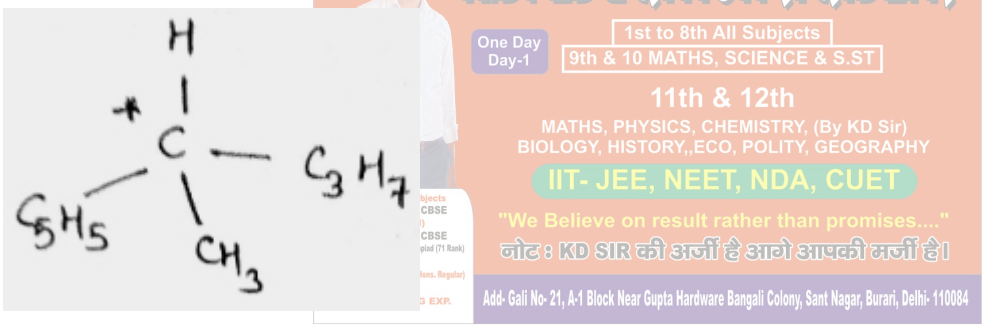
29. Which of the following is expected to be optically active

(A) $(CH_3)_4C$ (B) $C_2H_5CH(CH_3)C_3H_7$

(C) $(C_2H_5)_2CHCH_3$ (D) $CH_3CH=CHCH_3$

Ans. : b

As all the four substituents attached are different. So it is chiral and hence optical active.



30. Which of the following contains asymmetric centre

(A) $2-$butene (B) $2,2-$dimethylpropane

(C) $2-$hexyne (D) Lactic acid

Ans. : d

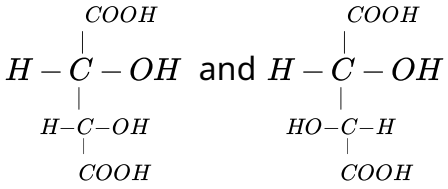
(d) $CH_3-\underset{OH}{\overset{H}{\underset{|}{\overset{|}{C^*}}}}-COOH$ $2-\underset{(\text{lactic acid})}{\text{hydroxy propanoic acid}}$

31. Optically active isomers but not mirror images are called

(A) Enantiomers (B) Mesomers (C) Tautomers (D) Diastereoisomers

Ans. : d

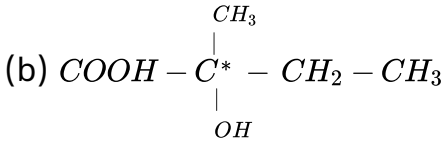
(d) Diastereoisomers -Optical isomers which are not mirror images of each other. e.g.



32. The maximum number of stereoisomers possible for 2-hydroxy- 2-methyl butanoic acid is

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

Ans. : b

(b) 

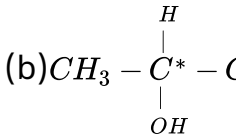
One chiral centre. Therefore two forms are possible.

33. Which of the following compounds exhibits optical isomerism

(A) CH_3CH_2COOH (B) $CH_3CHOHCOOH$

(C) $CH_3CH_2CH_2OH$ (D) $CH_3CHOHCH_3$

Ans. : b

(b)  * chiral centre is present.

34. The property by virtue of which a compound can turn the plane polarised light is known as

(A) Photolysis (B) Phosphorescence (C) Optical activity (D) Polarization

Ans. : c

Plane polarised light is a light in which the vibrations are aligned in a single plane. When these lights are passed through certain compounds they rotate the plane of Plane Polarised Light at different angles. Some compounds will rotate the plane of Plane Polarised Light in the clockwise direction and some in the anti-clockwise direction.

The property by virtue of which a compound can turn the plane polarised light is known as Optical activity.

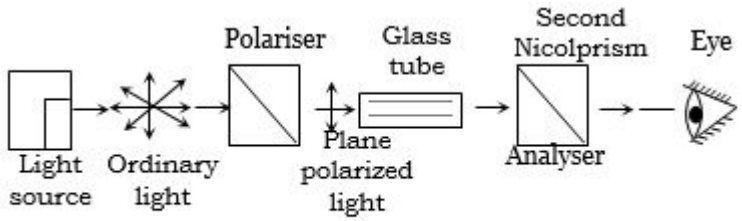
35. Rotation of plane polarised light is measured by

(A) Manometer (B) Polarimeter

(C) Viscometer (D) Refractometer

Ans. : b

(b) Polarimeter is an instrument used for measuring the optical rotation. It consists of two Nicol prisms, one called the polarizer (near the light source) and the other called the analyser (near the eye). In between the polarizer and analyser, a glass tube containing the solution of an optically active compound is placed.



Ray diagram of polarimeter

36. Which of the following has chiral structure

(A) $CH_3 - \overset{CH_3}{\overset{|}{C}}H - CH_2COOH$

(B) $CH_3 - CH = CH - CH_3$

(C) $CH_3 - \overset{CH_3}{\overset{|}{C}}H - CH_2OH$

(D) $CH_3 - CHOH - CH_2CH_3$

Ans. : d

(d) $CH_3 - \overset{H}{\overset{|}{\underset{OH}{\underset{|}{C^*}}}} - CH_2 - CH_3$ Chiral structure is that in which one carbon atom is attached to 4 different atoms or groups.

37. Which one of the following compounds shows optical isomerism

(A) $CH_3CHCl - CH_2 - CH_3$

(B) $CH_3 - CH_2 - CHCl - CH_2 - CH_3$

(C) $ClCH_2 - CH_2 - CH_2 - CH_3$

(D) $ClCH_2 - CH_2 - CH_3$

Ans. : a

(a) $CH_3 - \overset{H}{\overset{|}{\underset{Cl}{\underset{|}{C^*}}}} - CH_2 - CH_3$

In other compounds chiral carbon is absent.

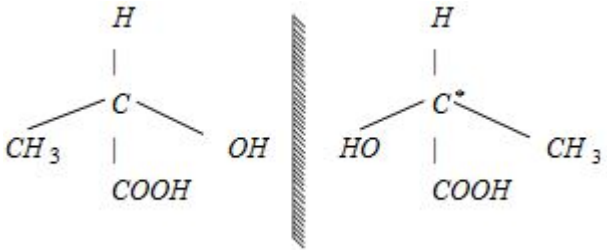
38. Lactic acid shows which type of isomerism

(A) Geometrical isomerism (B) Tautomerism

(C) Optical isomerism (D) Metamerism

Ans. : c

(c) Lactic acid shows optical isomerism



39. Which of the following compounds may not exist as enantiomers

(A) $CH_3CH(OH)CO_2H$ (B) $CH_3CH_2CH(CH_3)CH_2OH$

(C) $C_6H_5CH_2CH_3$ (D) $C_6H_5CHClCH_3$

Ans. : c

(c) In $C_6H_5CH_2CH_3$ chiral centre is absent.

40. Which one of the following shows optical activity

(A) $HO-\overset{\overset{H}{|}}{\underset{\underset{H}{|}}{C}}-COOH$

(B) $CH_3-\overset{\overset{H}{|}}{\underset{\underset{Cl}{|}}{C}}-COOH$

(C) $CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{OH}{|}}{C}}-COOH$

(D) $CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{Cl}{|}}{C}}-COOH$

Ans. : b

(b) $CH_3-\overset{\overset{H}{|}}{\underset{\underset{Cl}{|}}{C^*}}-COOH$

In this structure chiral carbon atom is present since it is optical active.

41. The total number of geometrical isomers for the compound hexa $-1,3,5-$ triene is

(A) 2 (B) 3 (C) 4 (D) 5

Ans. : a

The number of geometrical isomers possible in $1,3,5$ – Hexatriene is 2. (cis and trans at middle double bond)

42. Which of the following compounds will show geometrical isomerism

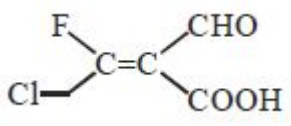
(A) $2-$ Butene (B) Propene

(C) Ethylene (D) $2-$ Methyl $-2-$ butene

Ans. : a

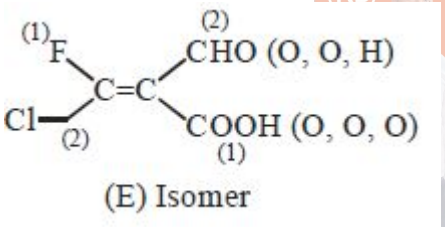
Both sp^2 hybridized carbon of $2-$ butene have different atom or group.

43. Which is correct configuration of the given compound ?



(A) E (B) z (C) Cis (D) Trans

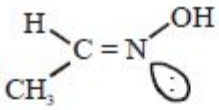
Ans. : a



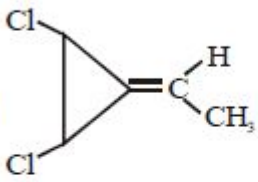
(E) Isomer

44. Which of the following can show Geometrical isomerism

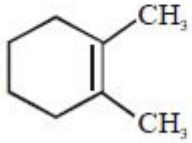
(a)



(b)



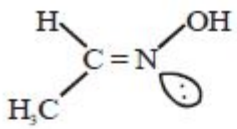
(c)



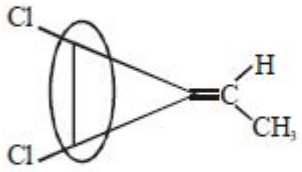
(d) $CH_2 = CH - CH = CH - Ph$

(A) a,b,d (B) a,c,d (C) a,b,c (D) All of the above

Ans. : a



→ show geometrical isomerism because sp^2C of oxime individually has different groups.



→ show geometrical isomerism because minimum 2 sp^3 atom of cycle has different atom or group

CH_2= CH –<u>CH=CH</u> – Ph → show Geometrical isomerism each underlined of C = C has different atoms or groups

45. Which of the following compounds will show geometrical isomerism ?

(A) 2– pentyne (B) 2– pentene

(C) 2– methyl propene (D) 2– methyl –2– butene

Ans. : b

$$CH_3 - \underset{2-pentene}{CH = CH - CH_2 - CH_3}$$

$$CH_3 - \underset{2-pentyne}{C \equiv C - CH_2 - CH_3}$$

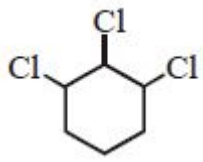
$(No.\ GI.)$

$$CH_3 - \underset{\underset{2-methyl\ propene}{(No\ G.I.)}}{\overset{\overset{CH_3}{|}}{C = CH_2}}$$

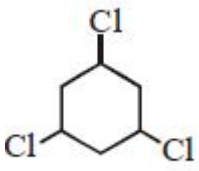
$$\underset{\underset{2-methyl-2-butene}{(No\ G.I.)}}{\overset{\overset{CH_3}{|}}{CH_3 - C = CH - CH_3}}$$

46. Which of the following compounds does not have any geometrical isomer ?

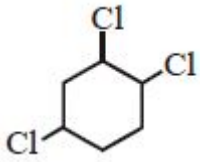
(A)



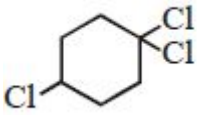
(B)



(C)



(D)

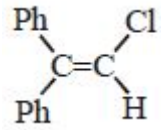


Ans. : d

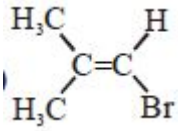
To show $G.I.$ atleast two sp^3 carbons of ring must be attached with two diff. groups

47. Which can show geometrical isomerism ?

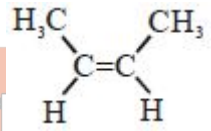
(A)



(B)

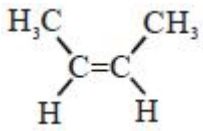


(C)



(D) $H_3C - C \equiv C - CH_3$

Ans. : (C)



48. Which of the following would exhibit cis-trans isomerism ?

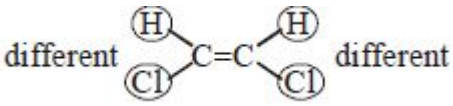
(A) $CH_3CH_2CH = CH_2$

(B) $ClCH = CHCl$

(C) $ClCH = CCl_2$

(D) $CH_2 = CH - COOH$

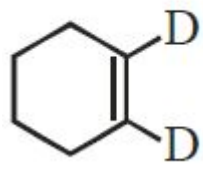
Ans. : b



49. Which of the following can show Geometrical isomerism

(A) $Ph - CH = CH - CH_3$

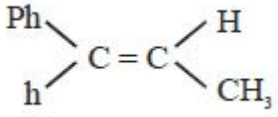
(B)



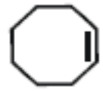
(C)

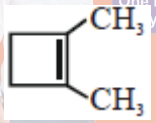
(D) All of above

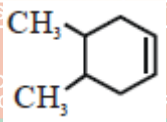
Ans. : a

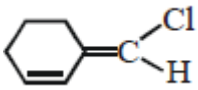


50. Which of the following compound does not show geometrical isomerism

(A) 

(B) 

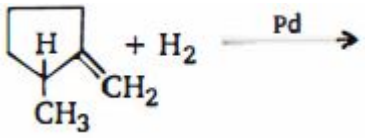
(C) 

(D) 

Ans. : b

Minimum 8 atom are needed to cycloalkene to show GI.

51. Product of the above reaction will be



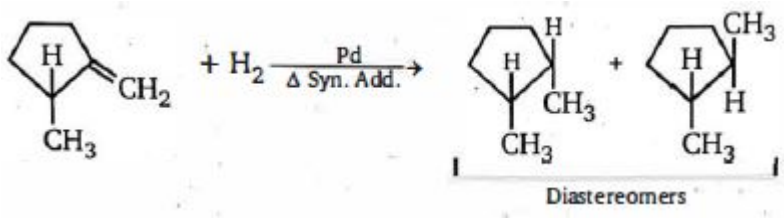
(A) Racemic mixture

(B) Diastereomers

(C) Meso

(D) Constitutional isomers

Ans. : b



52. $CH_3 - CH = CH - CH = CH - CH_3$; total number of geometrical isomer is

(A) 2 (B) 3 (C) 4 (D) 6

Ans. : b

(b) Total number of $G.I.$ is $3; ZZ, EE$ and ZE.

53. $CH_2 = CH - CH = CH - CH = CH_2$

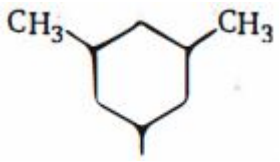
How many geometrical isomers are possible for this compound ?

(A) 2 (B) 3 (C) 4 (D) 8

Ans. : a

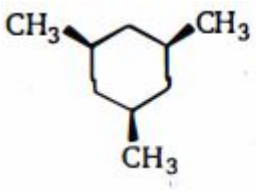
(a) cis & trans across middle π -bond.

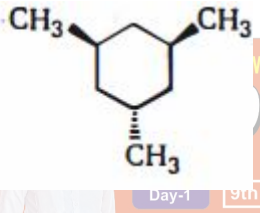
54. How many geometrical isomers are possible for the above compound ?



(A) 0 (B) 2 (C) 3 (D) 4

Ans. : b





55. How many geometrical is isomers are possible for the above compound ?

(A) 0 (B) 2 (C) 3 (D) 4

Ans. : b

(b) 2

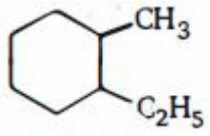
56. How many geometrical isomers are possible for the above compound ?

(A) 0 (B) 2 (C) 3 (D) 4

Ans. : b

(b) cis & trans.

57. How many geometrical isomers are possible for the above compound ?

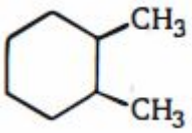


(A) 0 (B) 2 (C) 3 (D) 4

Ans. : b

(b) 2

58. How many geometrical isomers are possible for the above compound ?



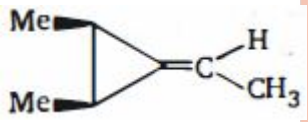
(A) 0 (B) 2 (C) 3 (D) 4

Ans. : b

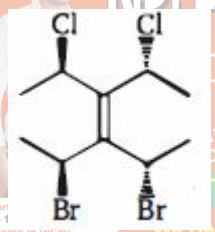
(b) cis & trans.

59. Which of the following compound will not show geometrical isomerism across the π -bond?

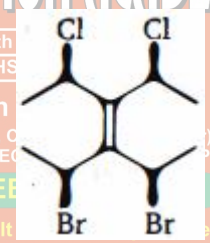
(A)



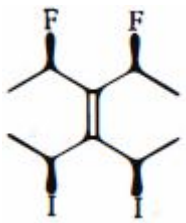
(B)



(C)

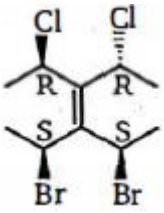


(D)

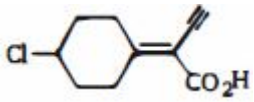


Ans. : b

Identical groups are present .



60. What are the correct designations for the structure below ?



(A) E,E

(B) Z,E

(C) E,Z

(D) No geometrical isomers are possible

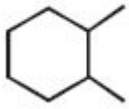
Ans. : d

(d) Given molecule doesn't has $C=C$ bond having different valencies and not has chiral centres so doesn't show stereoisomerism.

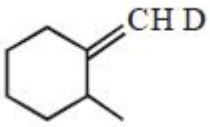
61. Which of the following does not show geometrical isomerism ?

(A) $CH_3-CH=CH-CH_3$ (B) $HClC=C=CHCl$

(C)



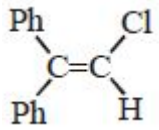
(D)



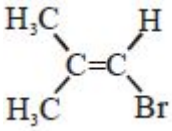
Ans. : (B) $HClC=C=CHCl$

62. Which can show geometrical isomerism ?

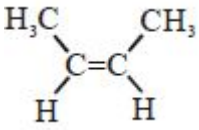
(A)



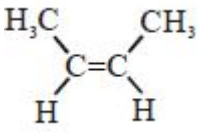
(B)



(C)



Ans. : (C)



(D) $H_3C-C\equiv C-CH_3$

63. How many geometrical isomers can be written for the compound

$CH_3-CH=CH-CH=CH-CH=CH-Cl$

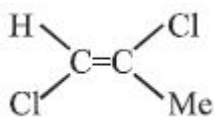
(A) 2 (B) 4 (C) 6 (D) 8

Ans. : d

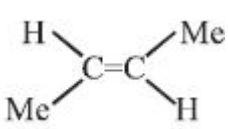
$n=3$, $S.I.=2^n=2^3=8$

64. Which of the following compound has trans as well as Z configuration around double bond

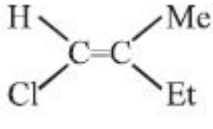
(A)



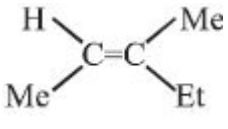
(B)



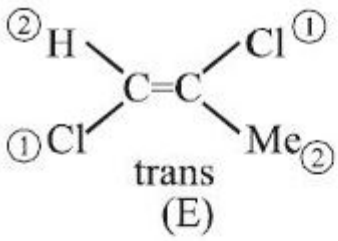
(C)

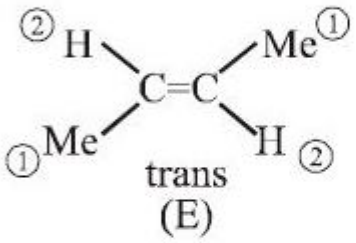


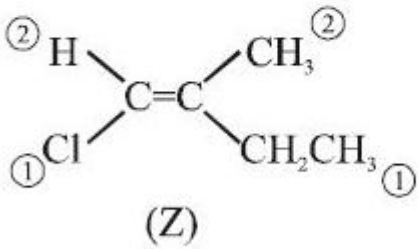
(D)

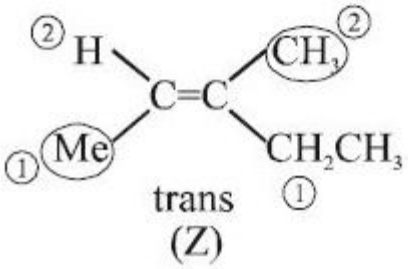


Ans. : d









65. Which of the following compounds will show geometrical isomerism

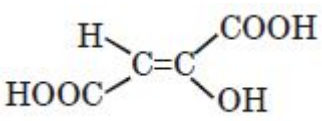
(A) 2– Butene (B) Propene

(C) Ethylene (D) 2– Methyl –2– butene

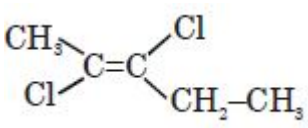
Ans.: (A) 2– Butene

66. Which compound is Z but not cis

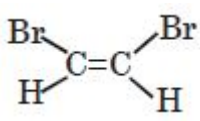
(A)



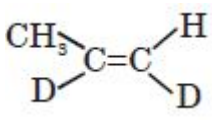
(B)



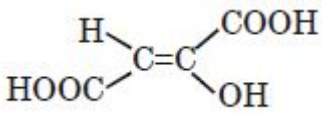
(C)



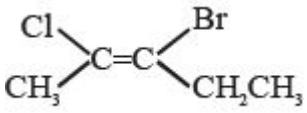
(D)

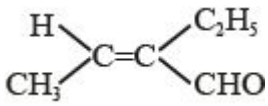


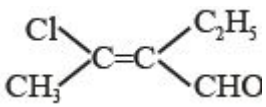
Ans.: (A)

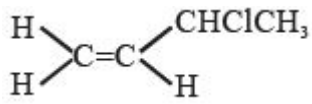


67. Which among the following has E configuration?

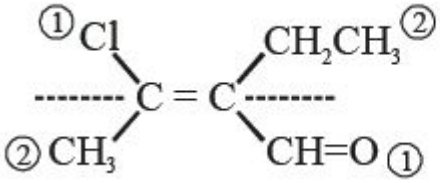
(A) 

(B) 

(C) 

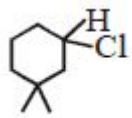
(D) 

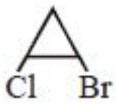
Ans. : c

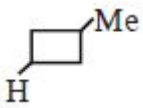


; E-configuration

68. Which of the following can show geometrical isomerism :-

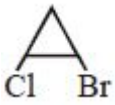
(A) 

(B) 

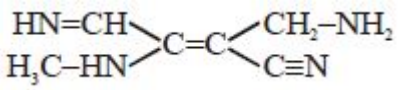
(C) 

(D) All of above

Ans. : (B)



69. Correct configuration of following compound is :-

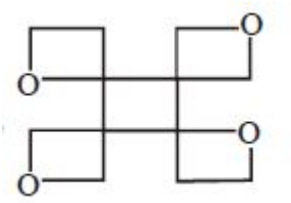


(A) E (B) Z (C) R (D) S

Ans. : (B) Z

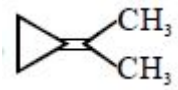
70. Which of the following can not show geometrical isomerism ?

(A)

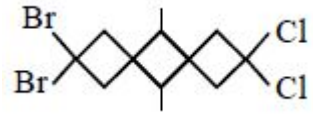


(B) $CH_3 - CH = CH - CH_3$

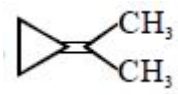
(C)



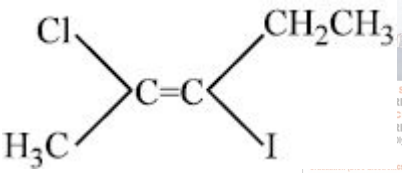
(D)



Ans. : (C)



71. $IUPAC$ name for the below compound is :



(A) $E-3-$iodo$-4-$chloro$-3-$pentene

(B) $E-2-$chloro$-3-$iodo$-2-$pentene

(C) $Z-2-$chloro$-3-$iodo$-2-$pentene

(D) $Z-3-$iodo$-4-$chloro$-3-$pentene

Ans. : (B) $E-2-$chloro$-3-$iodo$-2-$pentene

72. Which of the following will have geometrical isomers

(A) $2-$methylpropene

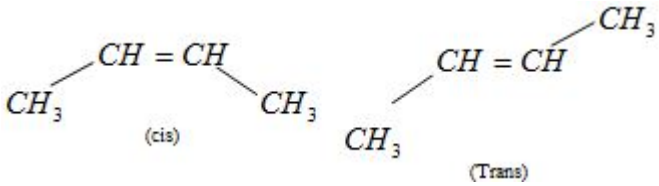
(B) $2-$butene

(C) $1-$butene

(D) Propene

Ans. : b

(b)



73. Which kind of isomerism is possible for $1-$chloro$-2-$nitroethene

(A) Functional group isomerism (B) Position isomerism

(C) E/Z isomerism (D) Optical isomerism

Ans. : c

(c) $\underset{1-\text{chloro}-2-\text{nitroethene}}{O_2NHC=CHCl}$

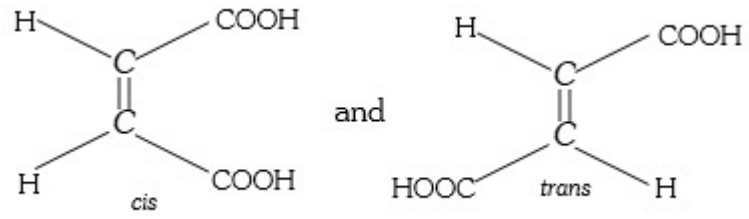
For highly substituted alkenes E and Z system of nomenclature is used, which is based on a priority system developed by Cahn, Ingold and Prelog.

74. Which of the following show geometrical isomerism

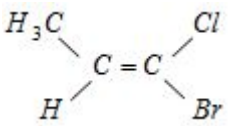
(A) C_2H_5Br (B) $(CH_2)(COOH)_2$ (C) $(CH)_2(COOH)_2$ (D) C_2H_6

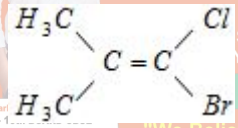
Ans. : c

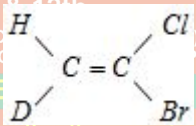
(c)

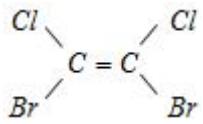


75. Which one of the following will not show geometrical isomerism

(A) 

(B) 

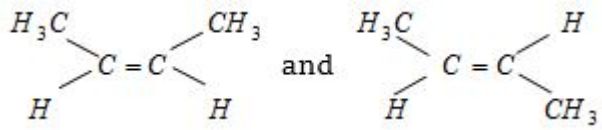
(C) 

(D) 

Ans. : b

(b) Structure have 3 -different atoms and group so it is unable to show geometrical isomerism

76. exhibit which isomerism



(A) Position isomerism (B) Geometrical isomerism

(C) Optical isomerism (D) Functional isomerism

Ans. : b

(b) Geometrical isomerism.

77. Which of the following will show geometrical isomerism

(A) $CH_3CH=CHCH_3$

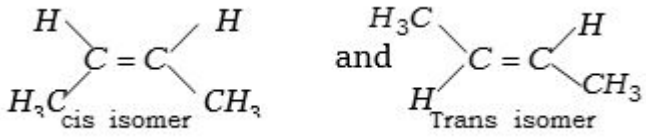
(B) $(CH_3)_2C=C(CH_3)_2$

(C) $N_2O.FeSO_4$

(D) $CH_3 - CH = C(CH_3)_2$

Ans. : a

(a)



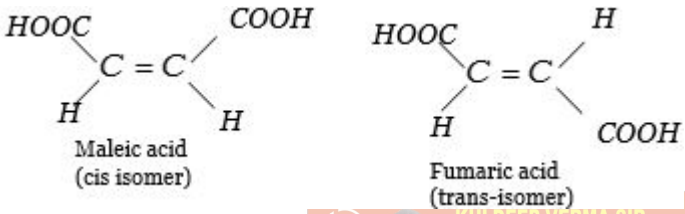
78. Which pair show cis-trans isomerism

(A) Maleic-fumaric acid (B) Lactic-tartaric acid

(C) Malonic-succinic acid (D) Crotonic-acrylic acid

Ans. : a

(a)



79. Which compound does not show geometrical isomerism

(A) $2-$butene

(B) $2-$pentene

(C) $2,3-$dibromo$-2-$butene

(D) $2-$methyl propene

Ans. : d

(d) $CH_3 - \underset{\underset{CH_3}{|}}{C} = CH_2$

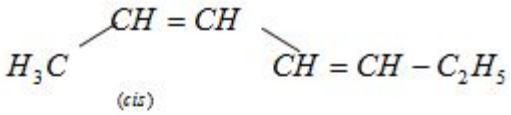
$2-$methyl propene does not show geometrical isomerism.

80. The number of geometrical isomers in case of a compound with the structure $CH_3 - CH = CH - CH = CH - C_2H_5$ is

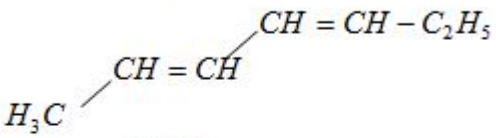
(A) 4 (B) 3 (C) 2 (D) 5

Ans. : a

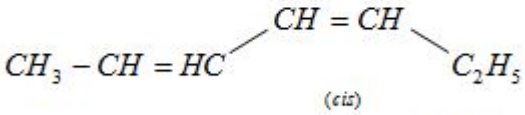
(a) $\overset{1}{C}H_3 - \overset{2}{C}H = \overset{3}{C}H - \overset{4}{C}H = \overset{5}{C}H - \overset{6,7}{C_2}H_5$

1. 

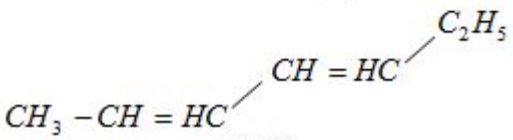
(cis)

2. 

(trans)

3. 

(cis)

4. 

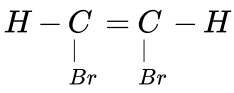
(trans)

81. Number of isomers of molecular formula $C_2H_2Br_2$ are

(A) 1 (B) 2 (C) 3 (D) 0

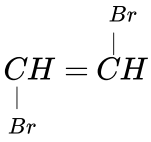
Ans. : c

(c) $C_2H_2Br_2$ has three isomers.

(1) 

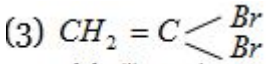
(cis)

1, 2 - dibromoethene

(2) 

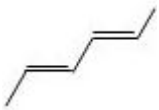
(Trans)

1, 2 - dibromoethene

(3) 

1, 1 – dibromoeth ene

82. The $IUPAC$ name of compound is



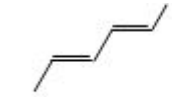
(A) $(2Z,4Z)-2,4-$ hexa di-ene (B) $(2Z,4E)-2,4$ hexa di ene

(C) $(4Z,4Z)-2,4$ hexa di ene (D) $(2E,4E)-2,4$ hexa di ene

Ans. : d

(d) If atom or group of higher priority are on opposite direction at the double bond of each carbon atom then the configuration is known as E and if they are in

same direction then the configuration is known as Z configuration.



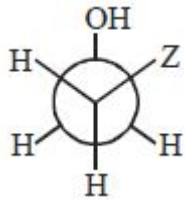
(2E, 4E) –2, 4-Hexa di ene

83. The newman projection formula of most stable conformation of $3-$ Hydroxypropanal is

(A) Gauche (B) Anti (C) Fully eclipsed (D) Partially eclipsed

Ans.: (A) Gauche

84. Above Gauche form is stable when Z is

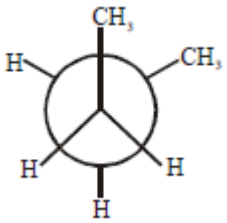


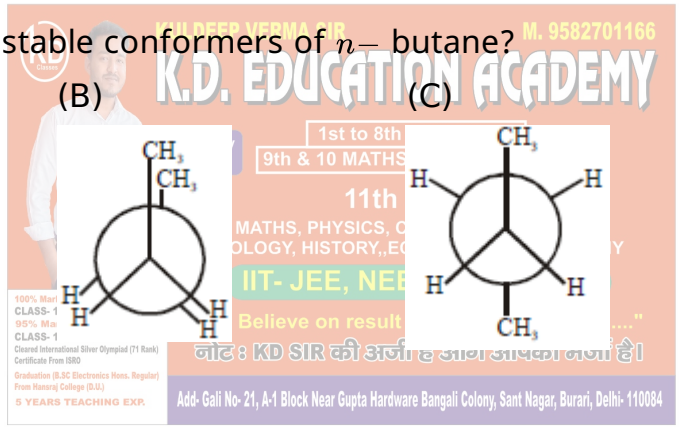
(A) $-F$ (B) $-OH$ (C) $-OCH_3$ (D) All of these

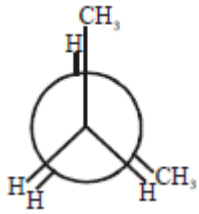
Ans. : (D) All of these

85. Which one is most stable conformers of $n-$ butane?

(A) (B) (C) (D)



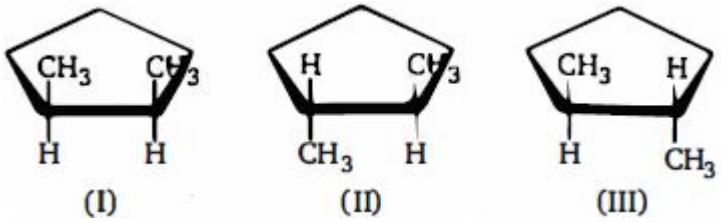




Ans. : c

Anti-form is most stable due to minimum torrisional and steric repulsion.

86. Among the structures given , select the enantiomers



(A) I and II (B) I and III (C) II and III (D) I, II and III

Ans. : c

(c) I is meso, II and III one mirror image of each other.

87. Which conformation of ethane has the lowest potential energy ?

(A) Eclipsed

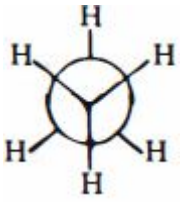
(B) Skew

(C) Staggered

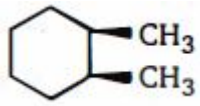
(D) All will have equal potential energy

Ans. : c

The torsional and steric strain in staggered form is appx. zero.

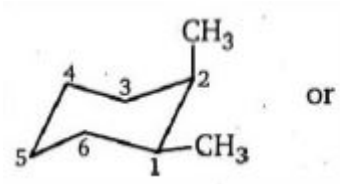


88. Which of the following describes the best relationship between the methyl groups in the chair conformation of the substance shown below ?

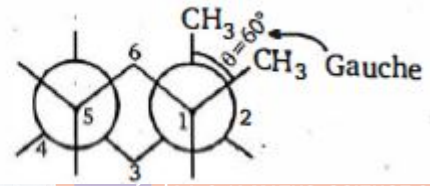


(A) Trans (B) Anti (C) Gauche (D) Eclipsed

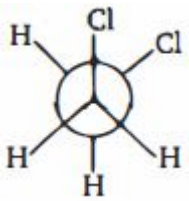
Ans. : c



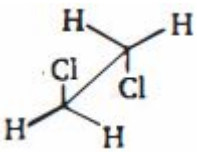
or



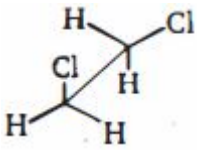
89. For the following Newman projection



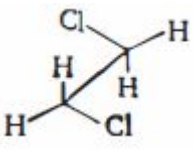
(A)



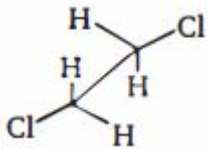
(B)



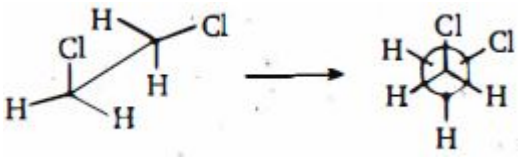
(C)



(D)

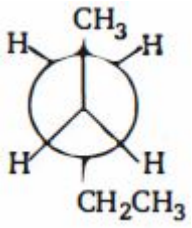
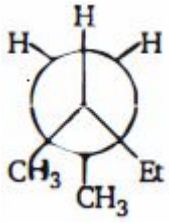
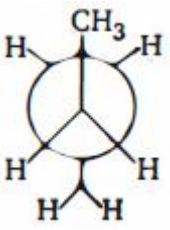
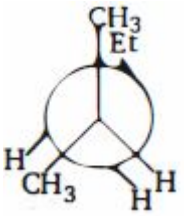


Ans. : b



90. Identify conformer of 2 -methyl pentane

(A) (B) (C) (D)

Ans. : d

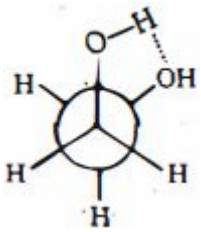
(d)

91. The most stable conformation of ethylene glycol is

(A) Anti (B) Gauche (C) Partially eclipsed (D) Fully eclipsed

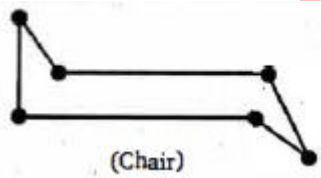
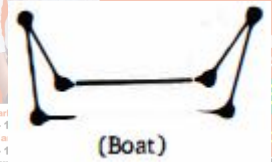
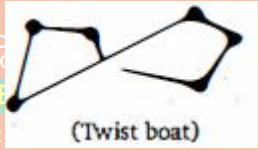
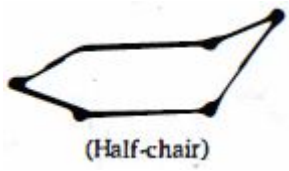
Ans. : b

due to intramolecular H -bonding gauch is most stable



92. Which of the following is the least stable conformer of cyclohexane ?

(A) (B) (C) (D)

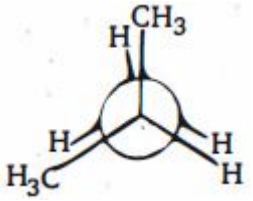
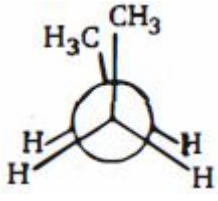
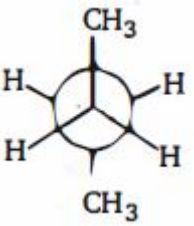
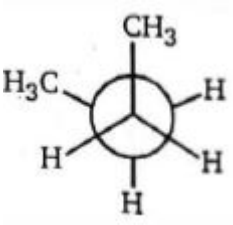

(Chair)

(Boat)

(Twist boat)

(Half-chair)

Ans. : d

(d) Half chair is less stable due to angle strain . .

93. Which is the lowest energy conformation of butane ?

(A) (B) (C) (D)

Ans. : c

(c) Anti conformation of butane is most stable and require lowest energy.

94. Which of the following compounds is most stable ?

(A) (B) (C) (D)




Ans. : d

(d) Trans- $1,4$ -disubstituted compound is most stable ($ee \rightarrow$ most stable) and doesn't have any steric repulsion. ($e,e \rightarrow$ equatorial, equatorial)

95. Most stable conformation of $n-$ butane is

(A) Gauche (B) Anti (C) Partially eclipsed (D) Fully eclipsed

Ans. : b

The lowest energy conformation will be the one, in which the two methyl groups are as far apart as possible i.e., 180° away form each other. This conformation will be maximum staggered and is called anti conformation. Other conformations can be obtained by rotating one of the C_2 or C_3 carbon atoms through an angle of 60° as shown ahead.

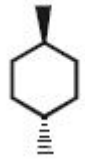
The order of stability of these conformations is, Anti $>$ Skew or Gauche $>$ Eclipsed $>$ Fully eclipsed.

96. Most stable conformation of butane $-1,4-$ dioic acid is

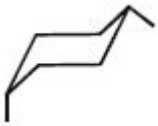
(A) Staggered (B) Gauche (C) Full eclipsed (D) Partial eclipsed

Ans. : (B) Gauche

97. Which of the following repersents same configuration as given molecule



(A)



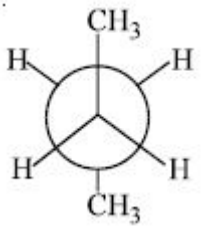
(B)

(C)

(D)

Ans. : (D)

98. One of the configuration of n-butane is drawn in the given figure. Anticlockwise rotation of C_2 around $C_2 - C_3$ bond by 120^{o} will lead to



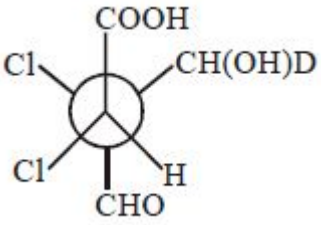
(A) gauche (B) staggerred (C) partially eclipsed (D) fully eclipsed

Ans. : a

C_2 is rotated anticlockwise 120 about $C_2 - C_3$ bond.

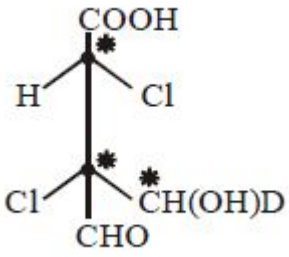
The resulting conformer is a Gauche conformer.

99. Following compound contains how many chiral centres

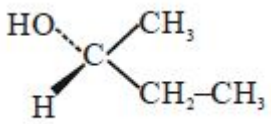


(A) 3 (B) 2 (C) 1 (D) 4

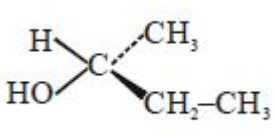
Ans. : a

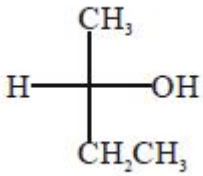


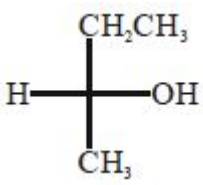
100. The Fischer projection formula of is

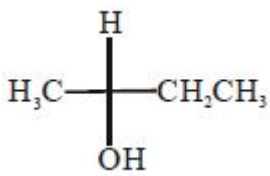


(A) (B) (C) (D)







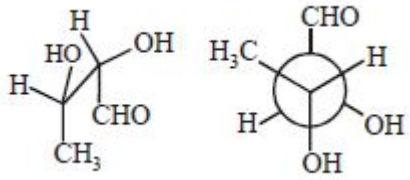


Ans. : c

In Fischer Projection formula, the longest chain of carbon atom is shown by

vertical line and branches and groups attached to the chain by a horizontal line.

101. What is the relation between given compounds



(A) Enantiomers (B) Diastereomers

(C) Conformers (D) Identical

Ans. : (B) Diastereomers

102. On another planet jupiter, gauche & anti form of $1,2-$ dichloroethane freezes and single bond rotation stops. Under these conditions these two forms can be considered as :

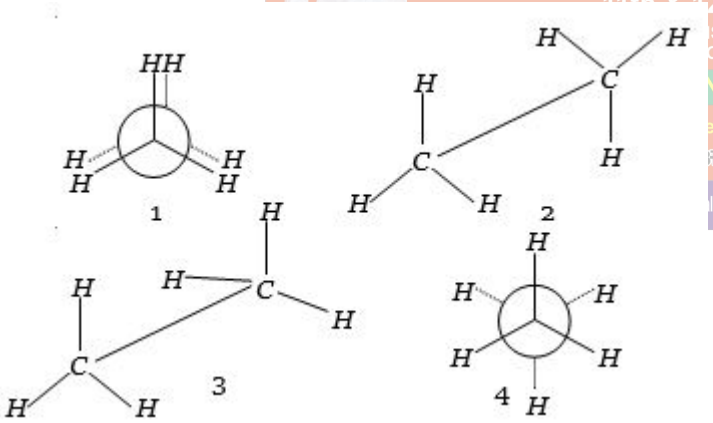
(A) Enantiomers (B) Diastereomers

(C) Meso compounds (D) Chain isomers

Ans. : b

Anti and gauche are non-mirror image and non-superimposable, hence diastereomers

103. Which are the staggered forms of ethane



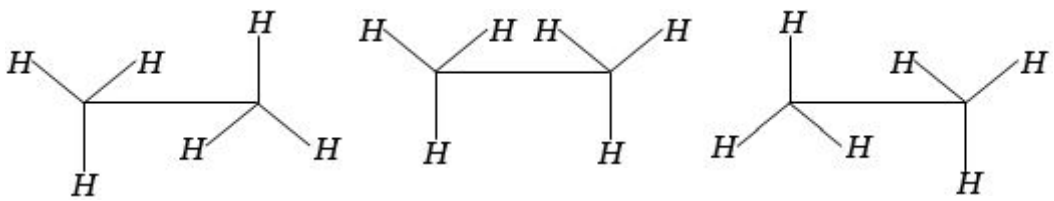
(A) 1 and 4 (B) 3 and 4 (C) 2 and 4 (D) 1 and 3

Ans. : c

(c) 2^{nd} and 4^{th} forms of ethane are staggered.

104. Which one of the following represents eclipsed form of ethane

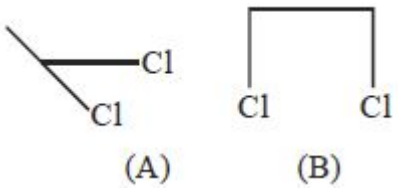
(A) (B) (C) (D) None of these



Ans. : b

(b)This option shows eclipsed form of ethane.

105. (A) and (B) are



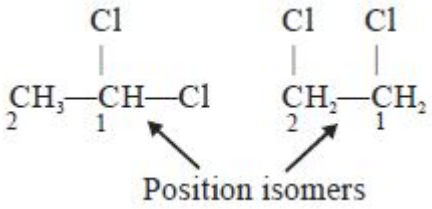
(A) Chain Isomer

(B) Positional Isomer

(C) Metamer

(D) Functional Isomer

Ans. :



106. How many strucural isomers of alcohols with the formula C_4H_9OH are possible if all the carbon are in straight chain ?

(A) 4 (B) 5 (C) 2 (D) 3

Ans. : $\overset{4}{C}H_3-\overset{3}{C}H_2-\overset{2}{C}H_2-\overset{1}{C}H_2-OH$

and $\overset{4}{C}H_3-\overset{3}{C}H_2-\overset{2}{C}H-\overset{1}{C}H_3$ with OH on C-2

107. Number of structural isomers of C_3H_6O

(A) 2 (B) 3 (C) 4 (D) 9

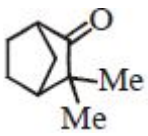
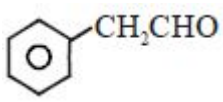
Ans. :

108. No. of structural isomeric alkenes (molecular formula $=C_6H_{12}$) which all give $n-$ hexane on hydrogenation in presence of metal catalyst

(A) 2 (B) 3 (C) 4 (D) 5

Ans. :

109. Which of the following show tautomerism ?

(A) $(CH_3)_3C-CHO$ (B)  (C)  (D) 

Ans. :

110. Which of the following is isomeric with methyl vinyl ether

(A) Allyl alcohal (B) Propanal (C) Acetone (D) All of these

Ans. : $CH_3 - O - CH = CH_2 \Rightarrow C_3H_6O$

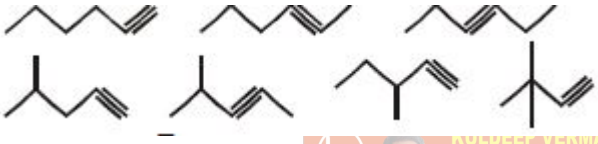
$$CH_3 - CH_2 - \overset{\overset{O}{\|}}{C} - H \Downarrow C_3H_6O \quad , \quad CH_3 - \overset{\overset{O}{\|}}{C} - CH_3 \Downarrow C_3H_6O \quad , \quad CH_2 = CH - CH_2OH \Downarrow C_3H_6O$$

diff. compounds have same $M.F.$ are isomers.

111. The number of structural isomers of alkyne possible for the molecular formula C_6H_{10} are

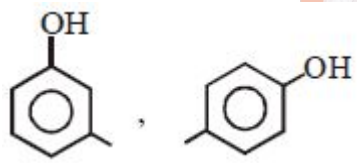
(A) 9 (B) 7 (C) 5 (D) 6

Ans. :

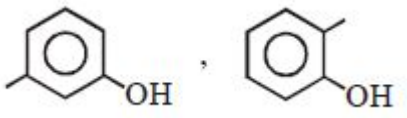


112. Which of the following pairs of compound are not isomers ?

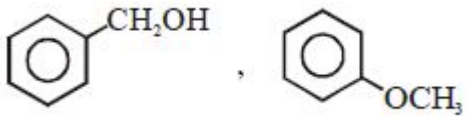
(A)



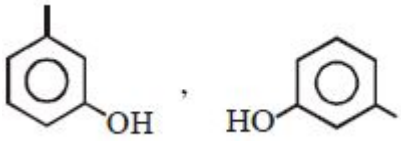
(B)



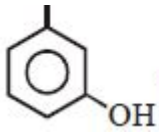
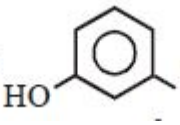
(C)



(D)



Ans. :

 and  are same compounds.

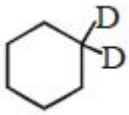
113. The number of possible structural alkynes with molecular formula, C_5H_8 is

(A) 2 (B) 3 (C) 4 (D) 5

Ans. : (1) $C-C-C-C\equiv C$ (2) $C-C-C\equiv C-C$

(3)
$$\begin{array}{l} \quad\quad C \\ \quad\quad | \\ C-C-C\equiv C \end{array}$$

114. How many positional isomer are possible of



(A) 3 (B) 4 (C) 5 (D) 10

Ans. :

115. Number of chain isomers from C_5H_{12}

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

Ans. : C_5H_{12} : $CH_3CH_2CH_2CH_2CH_3$

$CH_3-CH-CH_2-CH_3$ (with CH_3 below) $\quad CH_3-C-CH_3$ (with CH_3 above and below)

2- Methylbutane(iso-pentane), 2,2-Dimethylpropane (neo-pentane)

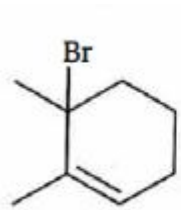
Thus, Isomers of $C_5H_{12} \Rightarrow$

(a) Pentane

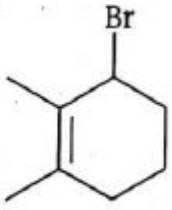
(b) Iso-pentane or 2 -methylbutane

(c) neo-pentane or 2,2 -dimethylpropane

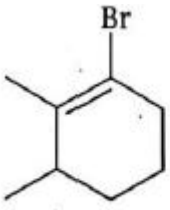
116. What is the sum of positions assigned to bromine while numbering the Parent Chain in the below compounds ?



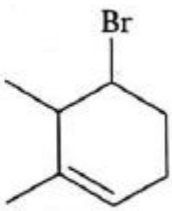
(I)



(II)



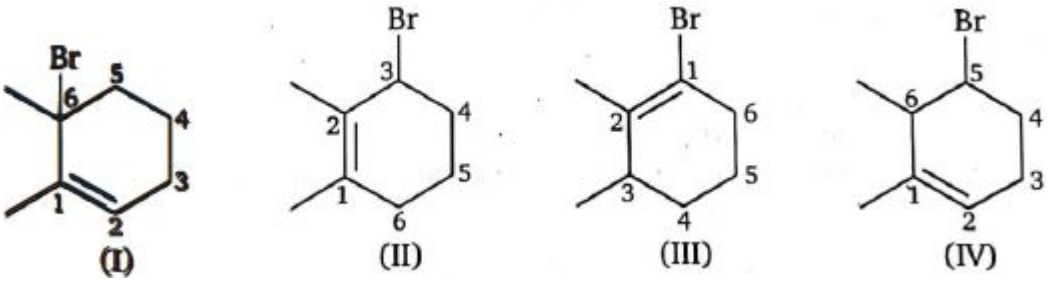
(III)



(IV)

(A) 13 (B) 14 (C) 15 (D) 16

Ans. : $6+3+1+5=15$



117. The total number of isomeric trimethyl benzene is

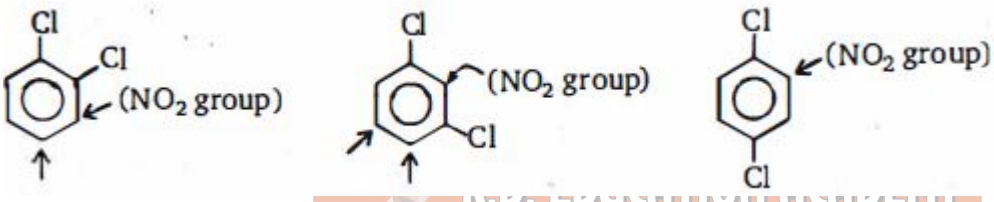
(A) 2 (B) 3 (C) 4 (D) 6

Ans. : (b) 3 $(1,2,3)$ $(1,2,4)$ $(1,3,5)$

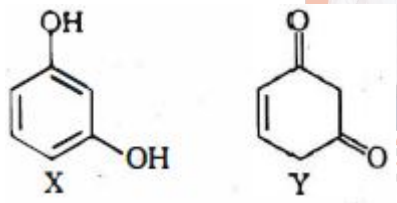
118. The number of possible isomers of dichloronitrobenzene is

(A) 3 (B) 4 (C) 6 (D) 8

Ans. :



119. At normal temperature, X and Y



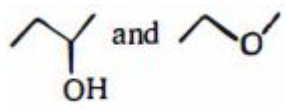
(A) resonance structures (B) tautomers

(C) functional isomers (D) positional isomers

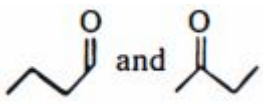
Ans. : Hence, Option " B " is the correct answer.

120. Which of the following pairs of compounds are functional isomers ?

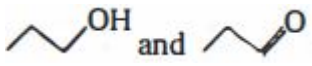
(A)



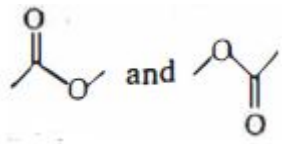
(B)



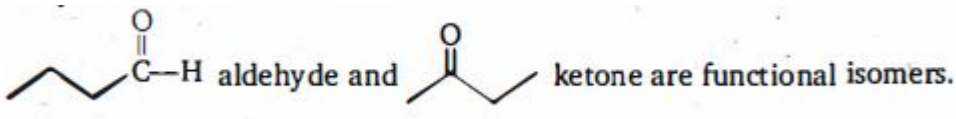
(C)



(D)



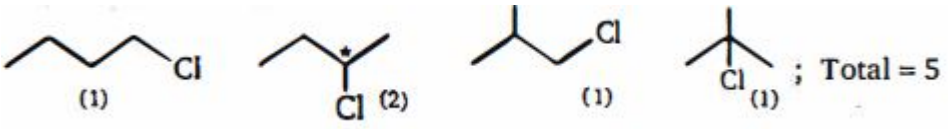
Ans. :



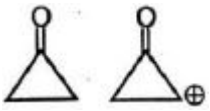
121. The number of all types of isomers of chlorobutane is

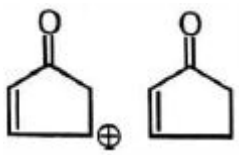
(A) 2 (B) 4 (C) 6 (D) 5

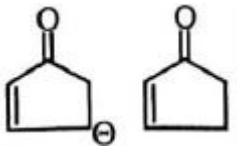
Ans. :



122. Among the given pairs, in which pair second compound has less enol content than first compound?

(A) 

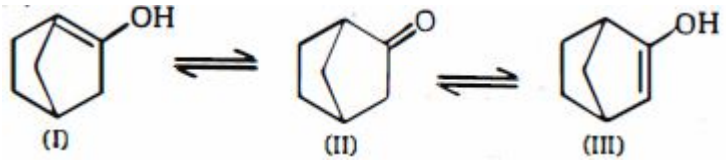
(B) 

(C) 

(D) none of these

Ans. : (c) Enol of first compound is aromatic

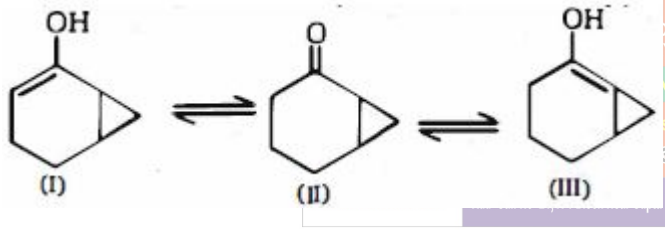
123. Correct stability order of the given tautomers is



(A) $I > II > III$ (B) $III > II > I$ (C) $II > I > III$ (D) $II > III > I$

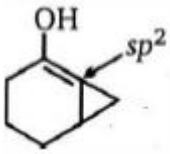
Ans. : $(d)\ 1^{st}$ structure is unstable due to Bredt's rule.

124. Correct stability order of the given tautomers is



(A) $I > II > III$ (B) $III > II > I$ (C) $II > I > III$ (D) $II > III > I$

Ans. : is unstable due to angle strain



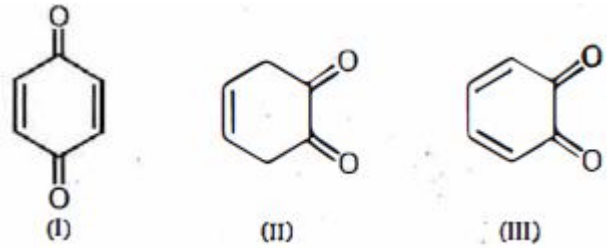
125. $\underset{(I)}{CH_3 - CH = O} \rightleftharpoons \underset{(II)}{CH_2 = CH - OH}$

Between the two tautomers which is more stable ?

(A) I (B) II (C) $I = II$ (D) none of these

Ans. : (a) Higher the bond energy of $> C = O$.

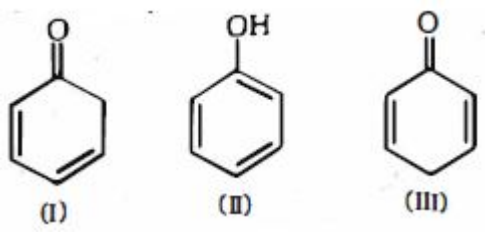
126. Among the given structure which can exhibit tautomerism ?



(A) I only (B) II only (C) III only (D) none of these

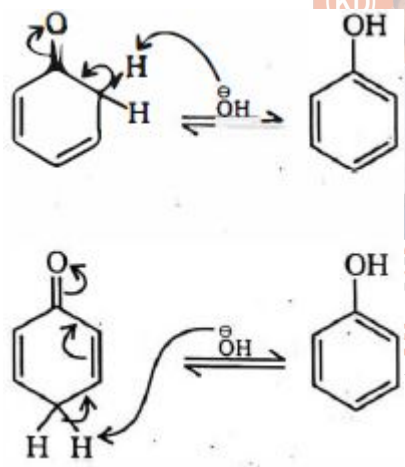
Ans. : $(b)\ \alpha-$ hydrogen attached to sp^3 carbon is present in structure II.

127. The tautorner of II is



(A) I (B) III (C) both I and III (D) none of these

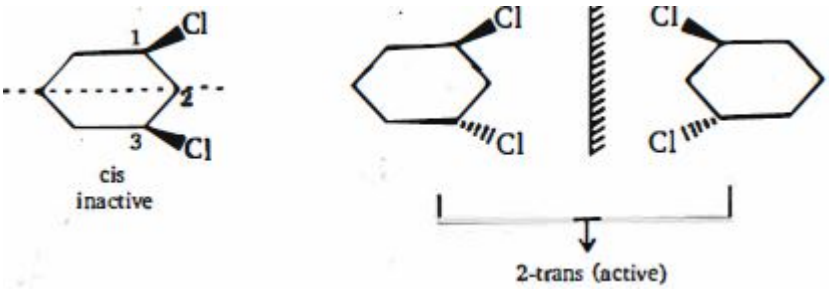
Ans. :



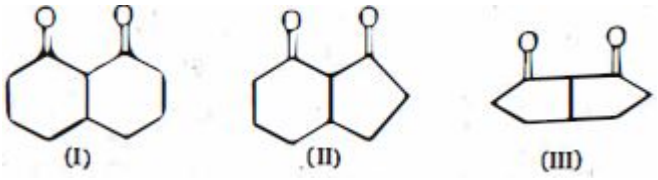
128. Total number of stereoisomers of the $1,3$ -dichlorocyclohexane is

(A) 0 (B) 1 (C) 3 (D) 4

Ans. :

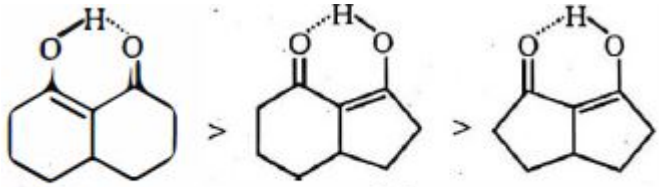


129. The correct decreasing order in the enol 'content of following molecules is



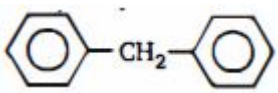
(A) $I > II > III$ (B) $II > I > III$ (C) $III > II > I$ (D) $II > III > I$

Ans. :



Angle strain L $\longrightarrow$ R Increases
So stability of enol decreases.

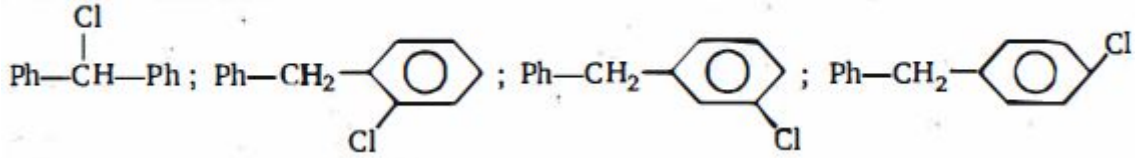
130. The molecular formula of diphenylmethane, is $C_{13}H_{12}$
How many structural isomers are possible when one of the hydrogen is replaced by a chlorine atom ?



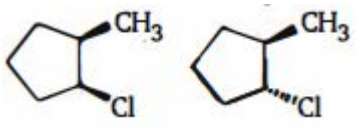
(A) 6 (B) 4 (C) 8 (D) 7

Ans. :

Isomers obtains are



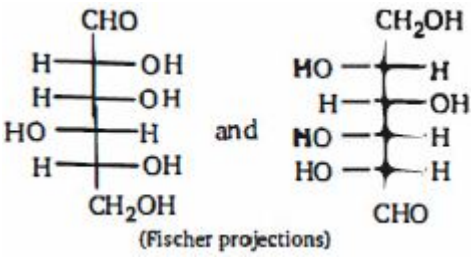
131. The following compounds are identical with respect to



(A) molecular composition (B) boiling point
(C) melting point (D) $IUPAC$ name

Ans. : (a) Both molecule has same molecular formula $C_6H_{11}Cl$ so have same molecular wt. and composition because both have substituents on same atoms.

132. What is the relationship between the molecules in the following pairs ?



(Fischer projections)

(A) enantiomers (B) diastereomers

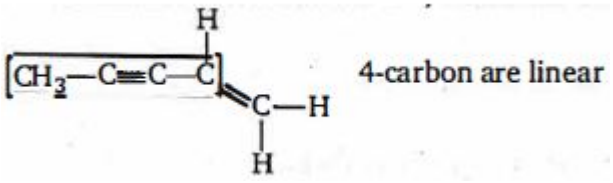
(C) identical (D) structural isomers

Ans. : (c) In Fischer most oxidised end remains always on top so rotation of II^{nd} str. by 180^o. It is clear that I & II are identical.

133. In the molecule $CH_3C \equiv CCH = CH_2$ the maximum number of carbon atoms arranged linearly is

(A) 2 (B) 3 (C) 4 (D) 5

Ans. :



134. No. of structrual isomer of $C_4H_{11}N$

(A) 4 (B) 8 (C) 6 (D) 10

Ans. : 1. Primary Amines:

n-butyl amine

sec-butyl amine including 2 optical isomers

iso-butyl amine

tert-butyl amine

2. Secondary amines

N-methyl n-propyl amine

N-methyl isopropyl amine

N,N-diethyl amine

3. Tertiary amine

N-ethyl N,N-dimethyl amine

135. Which of the following kinds of isomerism can nitroethane exhibit ?

(A) Metamerism (B) Optical acitivity

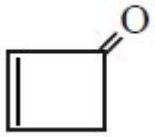
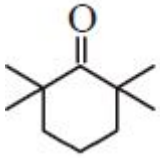
(C) Tautomerism (D) Position isomerism

Ans. : Nitro ethane can exhibit tautomerism.

Nitro ethane and aci-nitro ethane are tautomeric forms with each other.

136. Which of the following compound will not show tautomerism?

(A) (B) (C) (D) All of these

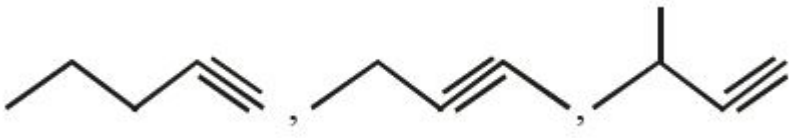




Ans. :

137. How many structure are possible for C_5H_8 with one triple bond ?

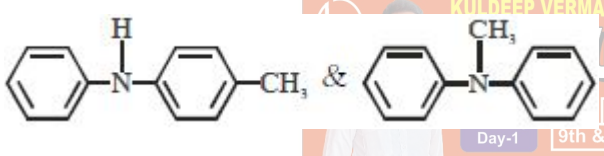
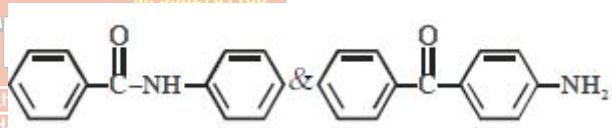
(A) 4 (B) 3 (C) 2 (D) 1

Ans. :

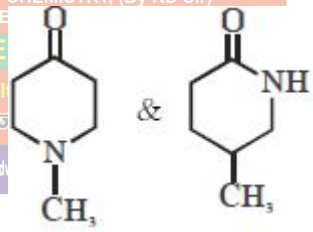


138. Which of the followng pair are metamers

(A) (B)

(C) (D)

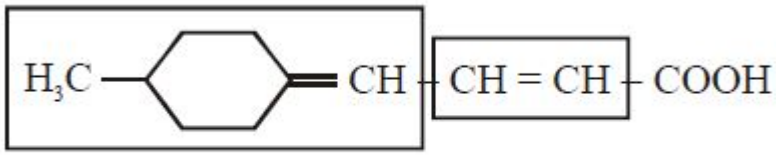



Ans. : Metamers

139. How many isomers are possible for the following molecule ?

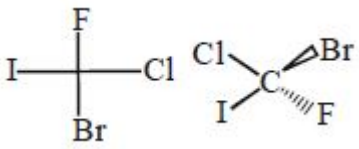
(A) 1 (B) 2 (C) 3 (D) 4

Ans. :



$2 \times 2 = 4$

140. What is relation between following molecules



(A) Enantiomers (B) Diastereomers

(C) Geometrical isomerism (D) Homomers

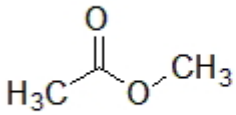
Ans. :

141. Esters are fiunctional isomers of:

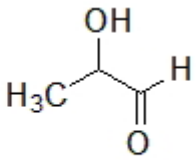
(A) Hydroxy aldehyde (B) Ketone

(C) Diketone (D) Diols

Ans. : Esters are functional isomers of hydroxy aldehydes.

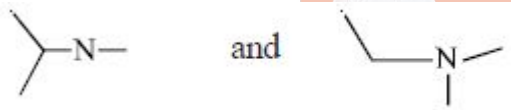


methyl acetate



2-hydroxypropanal

142. Are which type of isomers



(A) Chain (B) Position (C) Metamerism (D) functional

Ans. :

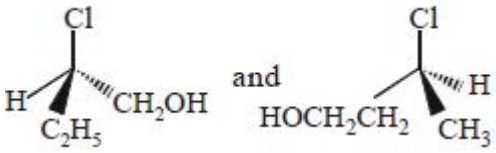
143. How many secondary amine are possible with molecular formula $C_4H_{11}NH_2$

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

Ans. : There are three possible secondary amines possible with the molecular formula $C_4H_{11}N$. These are listed below

1. $N-$methyl $n-$propyl amine
2. $N-$methyl isopropyl amine
3. $N,N-$dimethyl amine

144. Relation between given pair is :



(A) Enantiomers (B) Diastereomers

(C) Homomers (D) Structural isomers

Ans. : Compound I is 2 -chlorobutan $-1-ol$ and compound II is 3 -chlorobutan $-1-ol$. Hence they are positional (Structural) isomers of each-other

145. How many primary amines are possible for the formula $C_4H_{11}N$

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

Ans. : (d) $\underset{(1\text{ - aminobutane})}{CH_3-CH_2-CH_2-CH_2-NH_2}$

$$CH_3-CH_2-\underset{\underset{(2\text{ - aminobutane})}{|}}{\underset{|}{CH}\ \ -CH_3}{NH_2}$$

$$\underset{(2\text{ - Methyl - 2 - aminopropane})}{CH_3-\underset{\underset{NH_2}{|}}{\overset{\overset{CH_3}{|}}{C}}\ -CH_3}$$

$$\underset{(2\text{ - Methyl - 1 - aminopropane})}{\overset{3}{C}H_3-\underset{\underset{CH_3}{|}}{\overset{2}{C}H}\ -\overset{1}{C}H_2-NH_2}$$

146. Which of the following compounds shows tautomerism

(A) $HCHO$ (B) CH_3CN (C) CH_3COCH_3 (D) $HCOOH$

Ans. : (c) Ketones show tautomerism. They form keto and enol form

$$\underset{}{\overset{O}{\overset{\|}{CH_3-C-CH_3}}} \overset{Tautomerism}{\longleftrightarrow} \underset{}{\overset{OH}{\overset{|}{CH_3-C=CH_2}}}$$

147. Which type of isomerism is shown by propanal and propanone

(A) Functional group (B) Metamerism (C) Tautomerism (D) Chain isomerism

Ans. : (a) When two compounds have similar molecular formula but differ in the functional group then the isomerism is called functional group isomerism i.e. CH_3CH_2CHO and $CH_3.\overset{O}{\overset{\|}{C}}CH_3$.

148. $CH_3-O-C_3H_7$ and $C_2H_5-O-C_2H_5$ exhibit which type of isomerism

(A) Metamerism (B) Position (C) Chain (D) Functional

Ans. : Metamerism is one among the five types (Chain isomerism, positional isomerism, functional isomerism, metamerism, and tautomerism)of structural isomerism exhibited by the organic compounds.

They have the same molecular formula and functional group but differ in the alkyl group present on both sides of the functional group. In given compounds, both

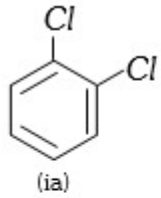
contain the ether functional group, but they have different alkyl groups attached to the oxygen atom. Hence show metamerism.

149. Which of the following compounds will show metamerism

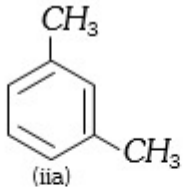
(A) $CH_3COOC_2H_5$ (B) $C_2H_5-S-C_2H_5$ (C) CH_3-O-CH_3 (D) $CH_3-O-C_2H_5$

Ans. : (b) $\underset{Diethyl\ thioether}{C_2H_5-S-C_2H_5}$ and $\underset{\text{Methyl propyl thioether}}{CH_3-S-C_3H_7}$

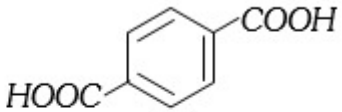
150. Examine the following three pairs of possible isomers Now state whether the pairs represent identical compounds or different isomers



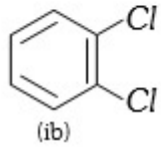
(ia)



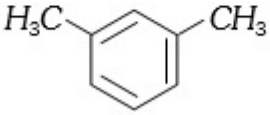
(iia)



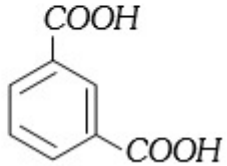
(iiia)



(ib)



(iib)



(iiib)

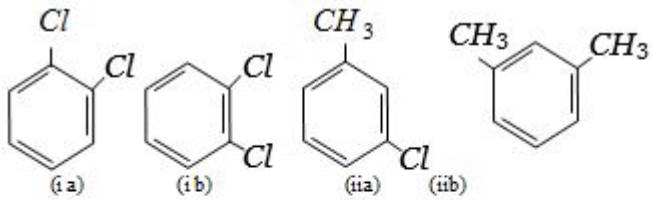
(A) All three pairs represent different compounds

(B) (ia) and (ib) are identical; (iia) and (iib) are identical; and $(iiia)$ and $(iiib)$ are identical

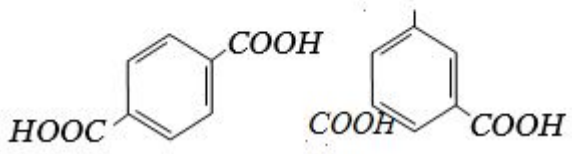
(C) (ia) and (ib) are isomers; (iia) and (iib) are identical; and $(iiia)$ and $(iiib)$ are isomers

(D) (ia) and (ib) are identical; (iia) and (iib) are identical, and $(iiia)$ and $(iiib)$ are isomers

Ans. : (d) (ia) and (ib) Both $1,2-$dichloro benzene. Hence, identical compounds.
(iia) and (iib) Both, $1,3-$dimethyl benzene. Hence, identical compounds.
$(iiia)$ and $(iiib)$ are position isomers.



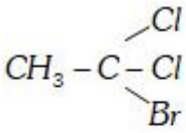
(i a) (i b) (iia) (iib)

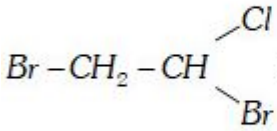


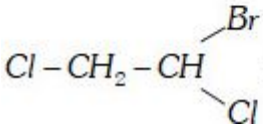
151. The number of possible isomers for compound $C_2H_3Cl_2Br$ is

(A) 2 (B) 3 (C) 4 (D) 5

Ans. : (b) $C_2H_3Cl_2Br$ three isomers are possible


1-bromo-1, 1-dichloroethane


1-bromo-2,2-di-chloroethane

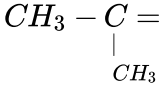

1-bromo-1, 2-dichloroethane

152. The number of possible isomers of butene are

(A) 3 (B) 2 (C) 4 (D) 5

Ans. : (a) $CH_3 = CH - CH_2 - CH_3$;

$CH_3 - CH = CH - CH_3$;

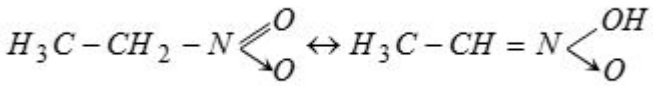


153. Nitroethane can exhibit one of the following kind of isomerism

(A) Metamerism (B) Optical activity

(C) Tautomerism (D) Position isomerism

Ans. : (c) Nitroalkanes exhibit tautomerism. In it, $\alpha - H$ atom is labile and form nitrolic acid.



154. Which of the following statement is wrong

(A) Diethyl ketone and methyl propyl ketone are position isomers

(B) $2-$ chloro pentane and $1-$ chloro pentane are position isomers

(C) $n-$butane and $2-$methyl propane are chain isomers

(D) Acetone and propinaldehyde are functional isomers

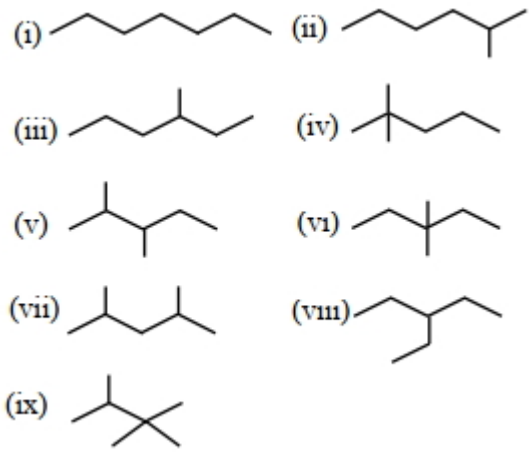
Ans. : d

Metamer $\Rightarrow$ Isomer having same molecular formula, same functional group but different alkyl/aryl groups on either side of functional group.

155. The functional isomer of ethyl alcohol is

(A) CH_3OCH_3 (B) CH_3COCH_3 (C) CH_3COOH (D) CH_3CH_2CHO

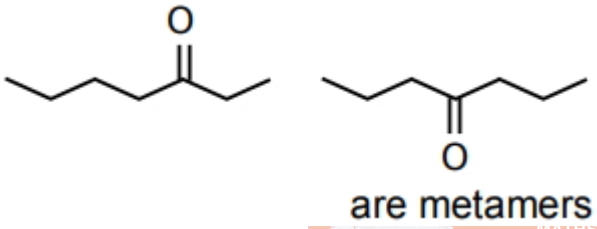
Ans. : a



156. What is the maximum number of open chain structures possible for C_4H_8

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

Ans. : b



157. The number of possible alkynes with molecular formula C_5H_8 is

(A) 2 (B) 3 (C) 4 (D) 5

Ans. : d

$C_4H_{10}O$

This molecular formula is applicable for homologous series ether (-O-) a bivalent functional group and as we know ether with minimum four-C shows metamerism. $CH_3-CH_2-O-CH_2-CH_3$ & $CH_3-O-CH_2-CH_2-CH_3$ are metamers.

158. Only two isomeric monochloro derivatives are possible for

(A) $2-$methyl propane (B) $n-$pentane

(C) Benzene (D) $2,4-$dimethyl pentane

Ans. : d

$C_3H_6O \Rightarrow CH_3-CH_2-CH=O$

$$CH_3-\underset{\underset{O}{||}}{C}-CH_3$$

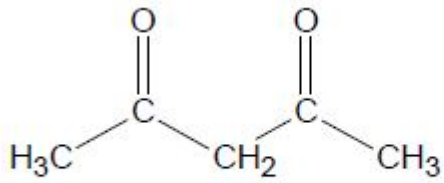
They are functional group isomerism.

159. $C_6H_5C\equiv N$ and $C_6H_5N\equiv C$ exhibit which type of isomerism

(A) Position (B) Functional

(C) Dextro isomerism (D) Metamerism

Ans. : c



Due to presence of active methylene group and stabilization of enol by intramoelcular H bond forming 6 membered ring structure.

160. Functional isomerism is exhibited by the following pair of compounds

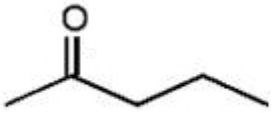
(A) Acetone, propionaldehyde

(B) Diethyl ether, methyl propyl ether

(C) Butane, isobutane

(D) $1-$butene, $2-$butene

Ans. : c



161. Diethyl ether and methyl $n-$propyl ether are

(A) Position isomers (B) Functional isomers

(C) Metamers (D) Chain isomers

Ans. : a

(a) Two isomers $CH_3-\underset{\underset{Cl}{|}}{CH}-CH_3$ and

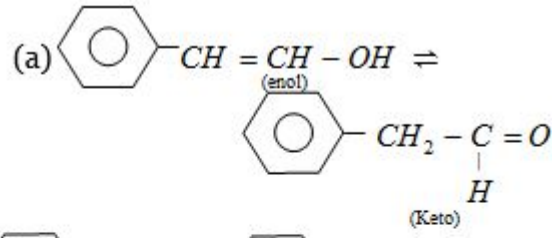
$CH_3-CH_2-CH_2Cl$ are possible for C_3H_7Cl.

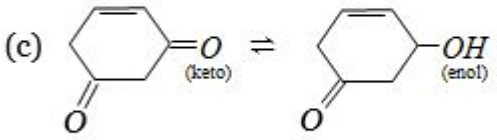
162. The number of possible alcoholic isomers for $C_4H_{10}O$ are

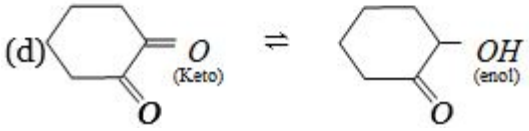
(A) 4 (B) 2 (C) 3 (D) 5

Ans. : d

(a,c,d)

(a) 

(c) 

(d) 

163. An alkane forms isomers if the number at least carbon atom is

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

Ans. : d

(d) Gaseous density of both ethanol and dimethyl ether would be same under identical condition of temperature and pressure while the rest of these three properties vapour pressure, boiling point and heat of vaporization will differ as ethanol has hydrogen bonding where as ether does not.

164. Total number of isomers of a disubstituted benzene compound is

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

Ans. : c

(c) $CH_3-CH_2-CH_2-CH_2-CH_2-OH$

Pentan−1−ol

$CH_3-O-C_3H_7$

$\overset{4}{CH_3}-\overset{3}{CH_2}-\overset{2}{\underset{\underset{CH_3}{|}}{CH}}-\overset{1}{CH_2}-OH$

2−Methyl butan−l−ol

$\overset{3}{CH_3}-\overset{\overset{CH_3}{|}}{\overset{2}{\underset{\underset{CH_3}{|}}{C}}}-\overset{1}{CH_2}-OH$

2,2−Dimethyl propan−l−ol

165. The isomer of diethyl ether is

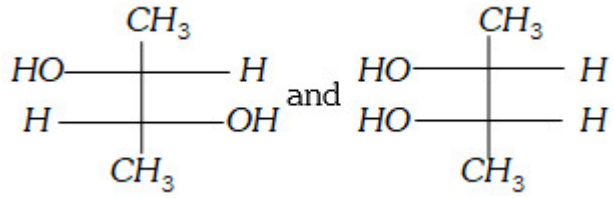
(A) $(CH_3)_2CHOH$ (B) $(CH_3)_3C-OH$ (C) C_3H_7OH (D) $(C_2H_5)_2CHOH$

Ans. : c

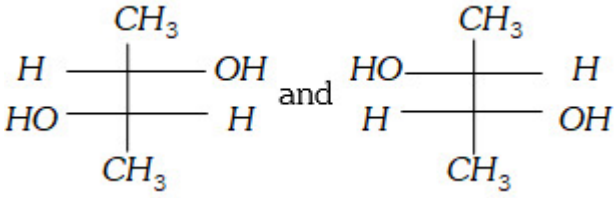
Different compounds with the same molecular / formula are isomers. Isomers always have the same chemical formula. When the chemical formula are different, then the compounds are completely different.

166. Which of the following pairs of compounds are enantiomers

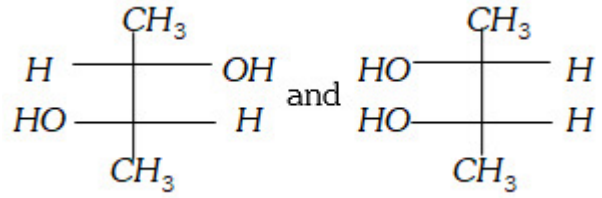
(A)



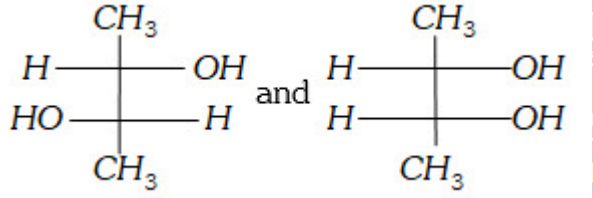
(B)



(C)



(D)



Ans. : b

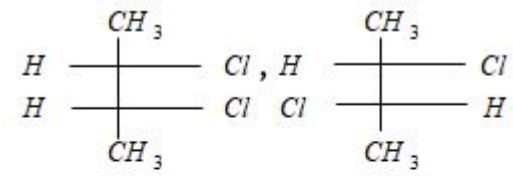
(b) Structures are mirror images of each other which are non super impossible so they are enantiomers.

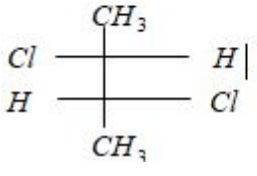
167. Which types of isomerism is shown by $2,3-$ dichlorobutane

(A) Distereo (B) Optical (C) Geometric (D) Structural

Ans. : b

(b)





168. Which of the following will have a meso isomer also

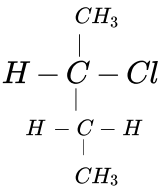
(A) $2,3-$Dichloropentane

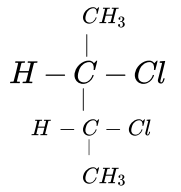
(B) $2,3-$Dichlorobutane

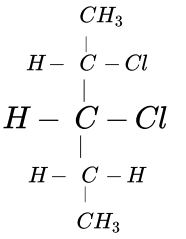
(C) $2-$Chlorobutane

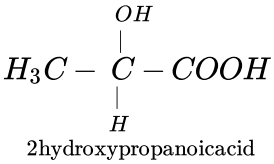
(D) $2-$Hydroxypropanoic acid

Ans. : b

(b) 
2chlorobutane


2,3dichlorobutane


2,3dichloropentane


2hydroxypropanoicacid

169. Racemic mixture is formed by mixing two

(A) Isomeric compounds (B) Chiral compounds

(C) Meso compounds (D) Optical isomers

Ans. : b

(b) Racemic mixture is combination of d and l isomers.

170. 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

Ans. : c

(c) $Cl_2C=CH-CH_2-CH_2-CH_2$. It can't show geometrical isomerism due to unsymmetrical alkene.

171. A similarity between optical and geometrical isomerism is that

(A) Each forms equal number of isomers for a given compound

(B) If in a compound one is present then so is the other

(C) Both are included in stereoisomerism

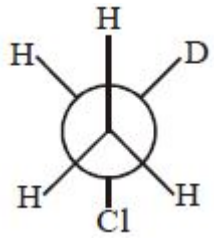
(D) They have no similarity

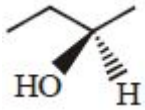
Ans. : c

Optical isomerism and geometrical isomerism both are forms of stereo isomerism.

172. Which of the following show optical isomersim

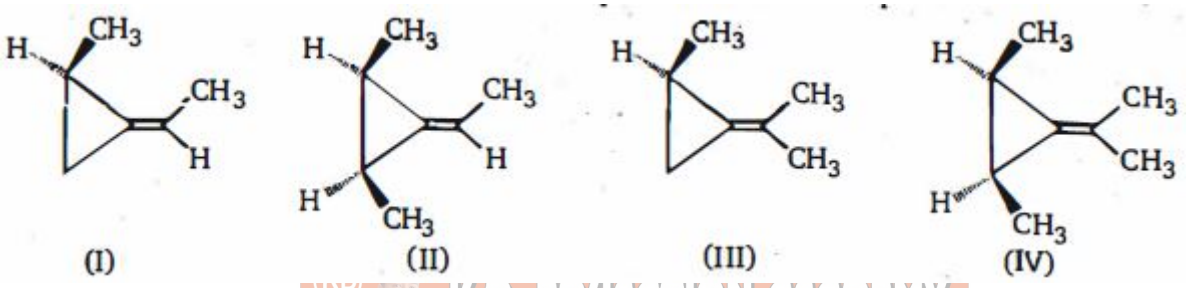
(A) (B) (C) (D) All





Ans. : d

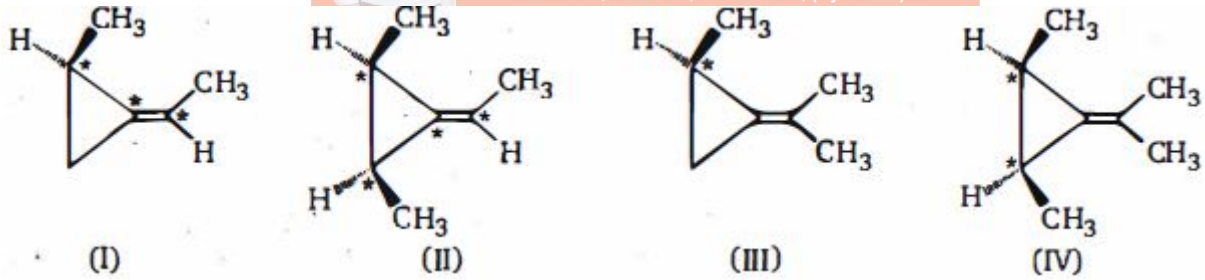
173. Find the sum of all the stereocenters that are present in below compounds



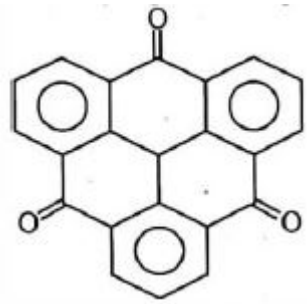
(A) 8 (B) 9 (C) 10 (D) 11

Ans. : c

Stereocenters are marked with asterisck (*)



174. Which of the following is correct for the given compound?



(A) It possess centre of symmetry

(B)

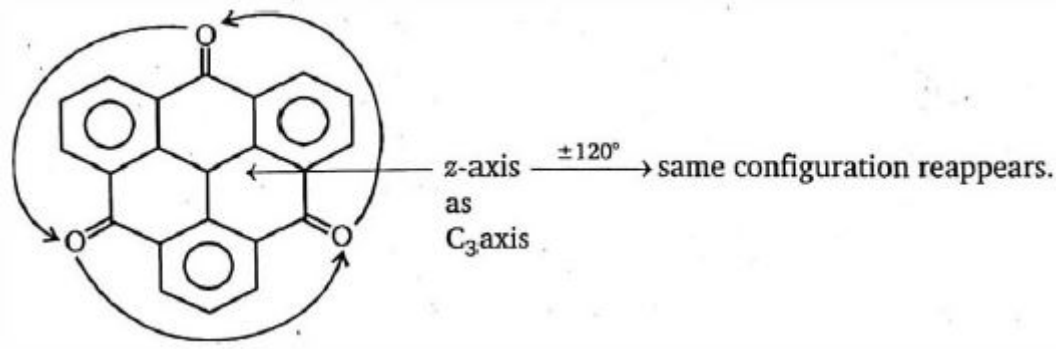
It possess C_4 axis of symmetry

(C) t possess plane of symmetry

(D) Compound is chiral

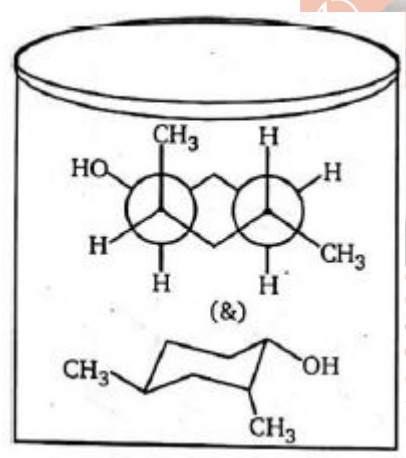
Ans. : c

Molecular plane of symmetry is present in the compound. Centre of symmetry is absent because same group at the same distance does not meet.

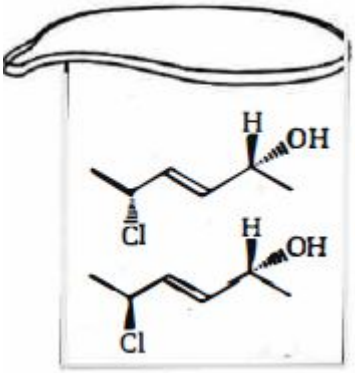


175. Which mixture of structure in each beaker would rotate plane polarized light?

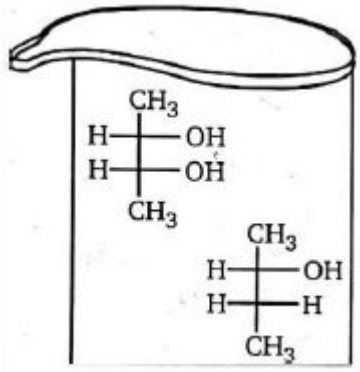
(A)



(B)



(C)



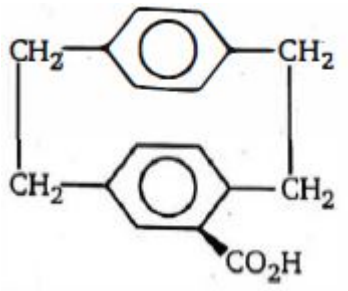
(D) All of these

Ans. : d

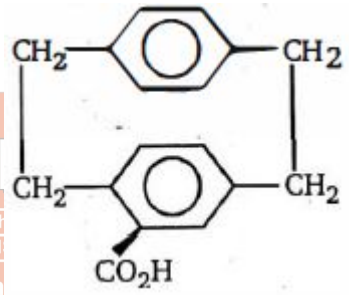
(d) Chiral mixture would rotate plane polarized light

176. Which of the following compound is achiral ?

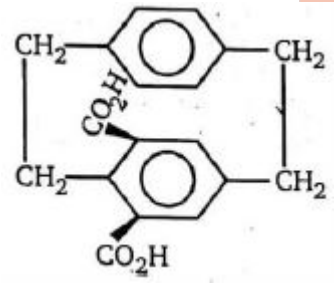
(A)



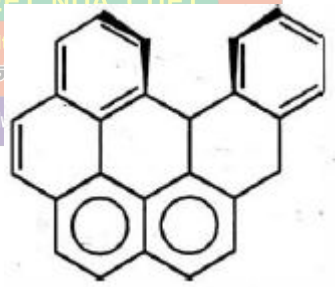
(B)



(C)

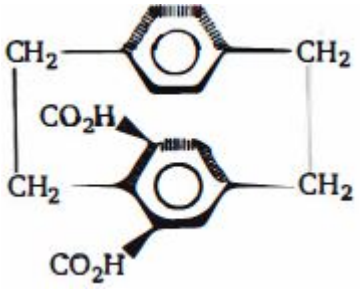


(D)



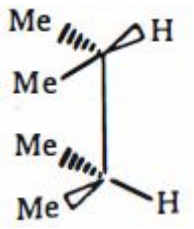
Ans. : c

now, plane passing through square will give $P.O.S$ Plane of symmetry is present.

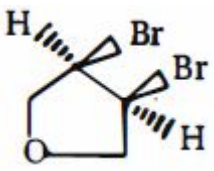


177. Which of the following structure represent meso-compound ?

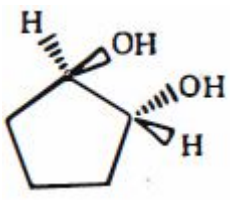
(A)



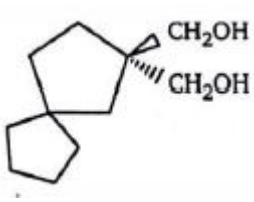
(B)



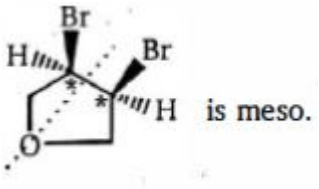
(C)



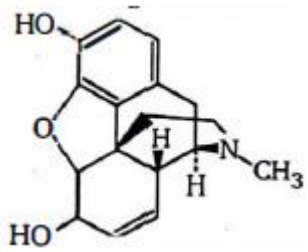
(D)



Ans. : b

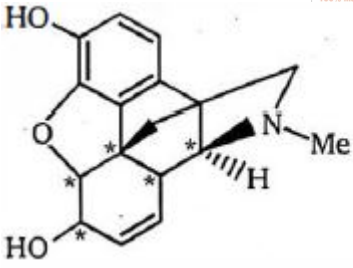


178. How many chiral center (excluding N centres) are there in morphine.?



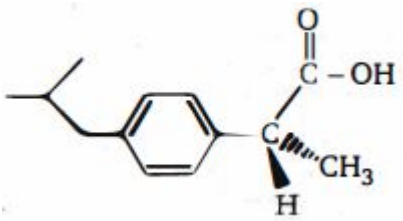
(A) 4 (B) 5 (C) 6 (D) More than 6

Ans. : b

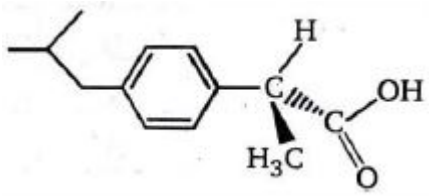


179. The S - enantiomer of ibuprofen is responsible for its pain-relieving properties.Which one of the following structures shown below is (S) -ibuprofen ?

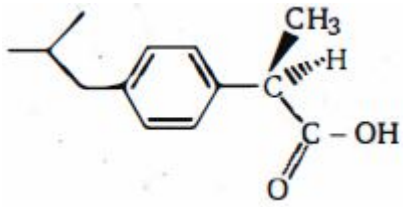
(A)



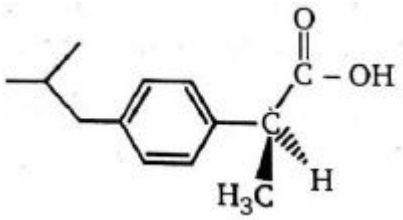
(B)



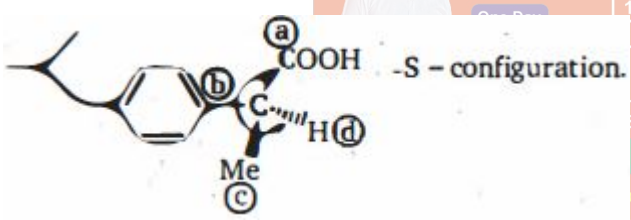
(C)



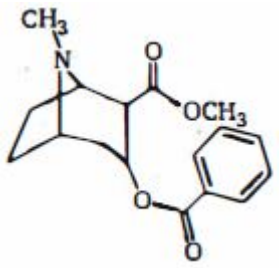
(D)



Ans. : d



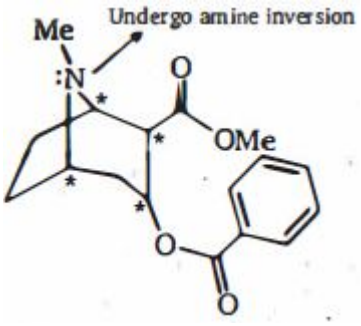
180. The structural formula of cocaine is shown below. How many stereogenic carbon atoms are there in this molecule ?



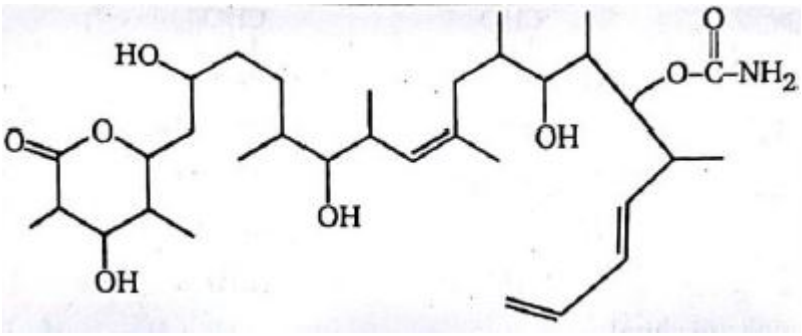
(A) 1 (B) 2 (C) 3 (D) 4

Ans. : d

4 -chiral $'C'$ atoms



181. What is the maximum number of stereoisomers possible for discodermolide ?

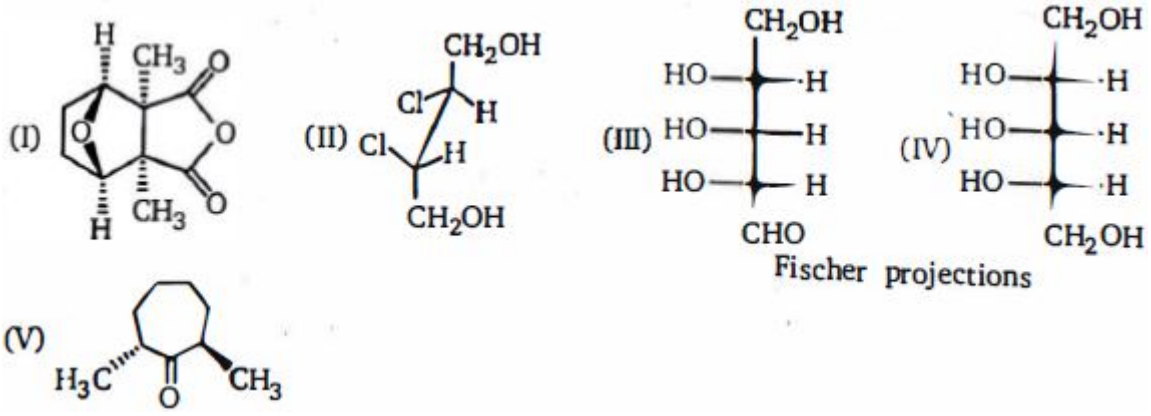


(A) 2^{14} (B) 2^{15} (C) 2^{16} (D) 2^{17}

Ans. : b

$(b)\, n = 15$

182. Which of the structures given' below are chiral ?



(A) I, II, III (B) II, III, V (C) II, III (D) I, II

Ans. : b

(b) I & IV have $P.O.S.$ so are inactive while II, III & V are optically active. ($P.O.S.$ = plane of symmetry.)

183. Which of the following is a chiral ?

(A)

(B)

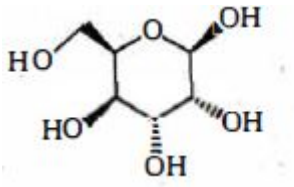
(C)

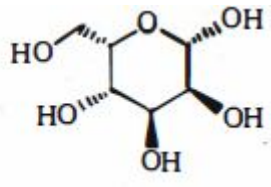
(D) a molecule of 3 -methylheptane

Ans. : a

(a)

184. The following compounds differ in respect of





(A) their chemical and physical properties

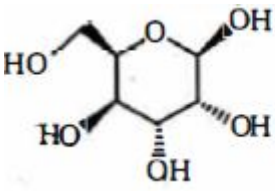
(B) nothing

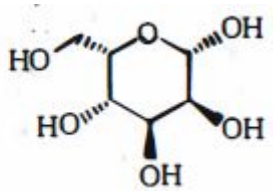
(C) the direction in which they rotate plane of polarized light

(D) their interactions with molecules

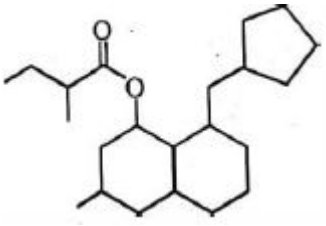
Ans. : c

Above 2 compounds are mirror image of each other and are not superimposable so are enantiomers and behave differently towards $P.P.L.$



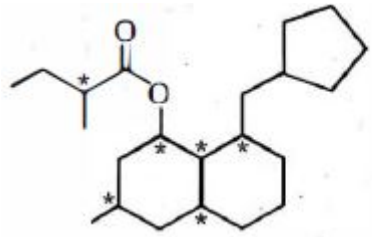


185. How many chiral centers are in the following compound ?



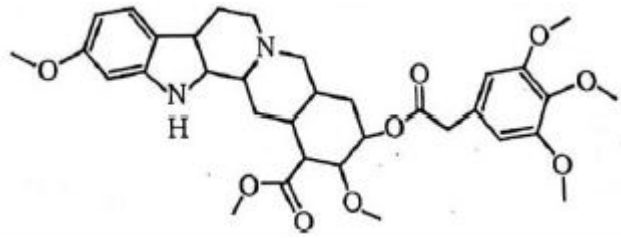
(A) 4 (B) 5 (C) 6 (D) 7

Ans. : c



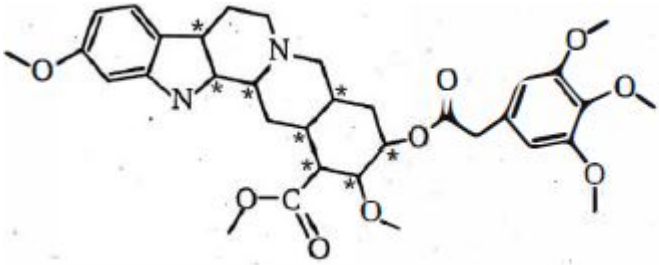
6 Chiral centres

186. How many chiral carbons are there in Reserpine (an antipsychotic drug)?



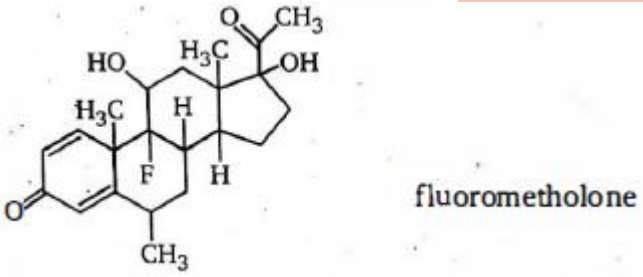
(A) 9 (B) 8 (C) 7 (D) 6

Ans. : b



8 Chiral carbons

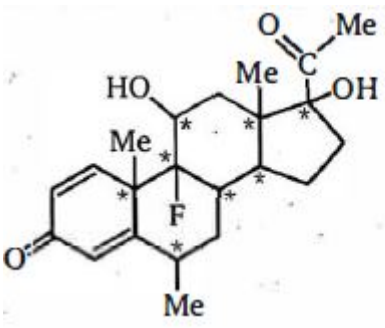
187. The following molecule is fluorometholone a steroidal anti-inflammatory agent. How many stereogenic centers does it contain ?



fluorometholone

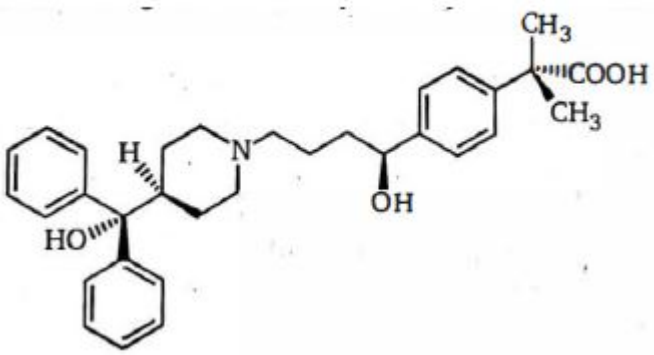
(A) 5 (B) 6 (C) 7 (D) 8

Ans. : d



8 — Chiral centre

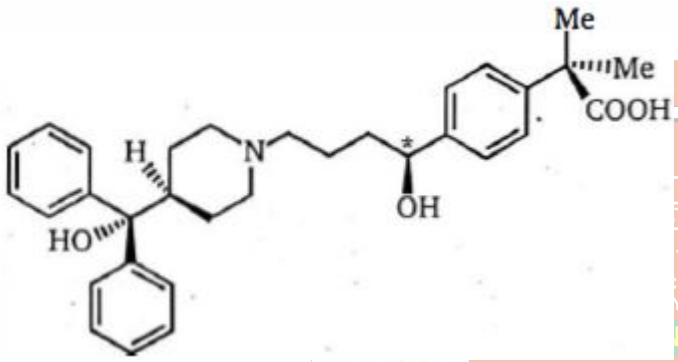
188. Allegra, a common prescription drug with the structure shown below, is given for the treatment of seasonal allergies. How many stereogenic carbon does Allegra possess ?



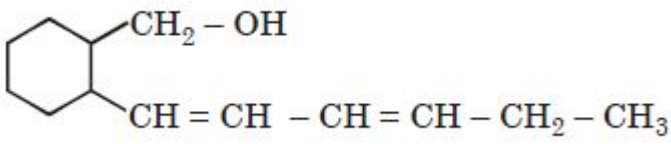
(A) 1 (B) 2 (C) 3 (D) 4

Ans. : a

Only one chiral $'C'$



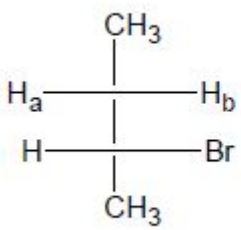
189. Total number of stereo-isomers possible for the following compound is

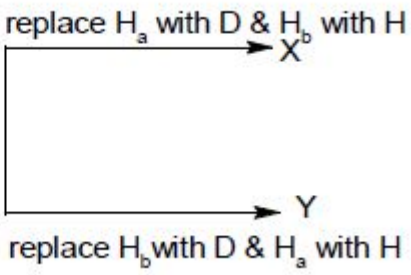


(A) 8 (B) 16 (C) 32 (D) 64

Ans. : b

190. (X) & (Y) are





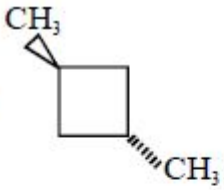
(A) Enantiomers (B) Diastereomers

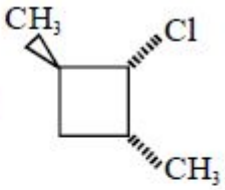
(C) E & Z isomer (D) Constitutional isomer

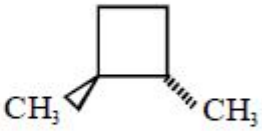
Ans. : b

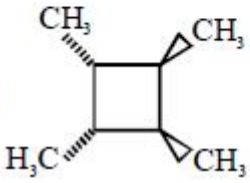
Stereomers are not mirror images

191. Out of the following which are chiral?

(I) 

(II) 

(III) 

(IV) 

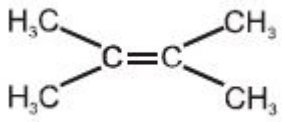
(A) I, II, III (B) I, III, IV (C) II, III (D) II, III, IV

Ans. : c

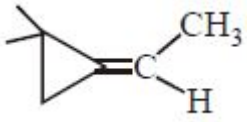
Chiral molecules usually contain at least one carbon atom with four nonidentical substituents. Such a carbon atom is called a chiral center (or stereogenic center). Any molecule that contains a chiral center will be chiral. An asymmetric or chiral carbon atom is a carbon atom that is attached to four different types of atoms or groups of atoms.

192. Which of the following compound can exist in two different stereoisomeric form

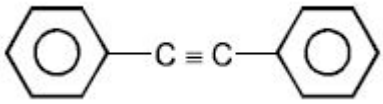
(A)



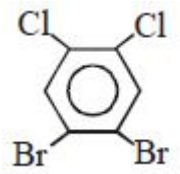
(B)



(C)



(D)



Ans. : b

193. The total number of acylic isomers including the stereoisomers with the molecular formula C_4H_7Cl

(A) 11 (B) 12 (C) 9 (D) 10

Ans. : b

(b) C_4H_7Cl is a monochloro derivative of C_4H_8 which itself exists in three isomeric forms.

(i) $CH_3-CH_2-CH=CH_2$: Its possible mono-chloro derivatives are :

$CH_3-CH_2-CH=CH-Cl$

2 isomers : cis and trans forms

$CH_3-\underset{\underset{Cl}{|}}{\overset{\bullet}{C}}H-CH=CH_2$

optically active (exists in two forms)

$ClCH_2-CH_2-CH=CH_2$ (one form)

$H_3C-CH_2-\underset{\underset{Cl}{|}}{C}=CH_2$ (one form)

(ii) $CH_3-CH=CH-CH_3$: Its possible monochloro derivatives are :

$CH_3-CH=\underset{\underset{Cl}{|}}{C}-CH_3$

Exists in two geometrical forms

$CH_3-CH=CH-CH_2Cl$

Exists in two geometrical forms

(iii) $\begin{matrix}CH_3-C=CH_2\\ \quad\quad|\\ \quad CH_3\end{matrix}$: Its possible monochloro derivatives are

$\begin{matrix}CH_3-C=CH-Cl\\ \quad\quad|\\ \quad CH_3\end{matrix}$

Only one form

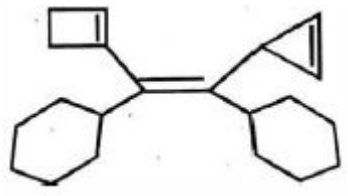
$\begin{matrix}ClCH_2-C=CH_2\\ \quad\quad|\\ \quad CH_3\end{matrix}$

Only one form

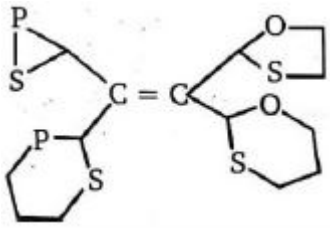
Thus, the total acylic isomers forms of C_4H_7Cl are 12.

194. Which of following is E isomer ?

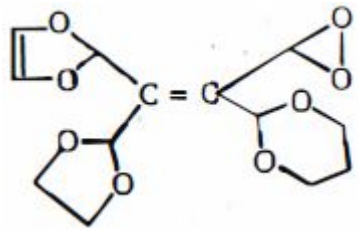
(A)



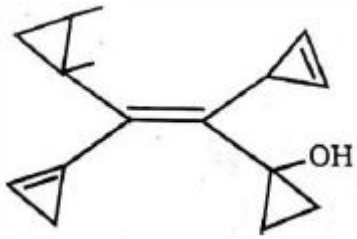
(B)



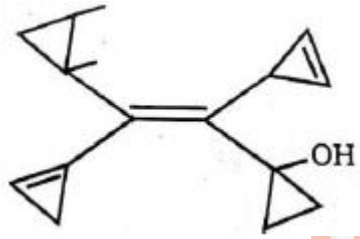
(C)



(D)



Ans. : (D)



195. On Pluto, where everything is frozen astronauts discovered two forms of butane gauche and anti. Assuming that there are no rotations around single bonds, which statement about the two forms is correct ?

(A) They are enantiomers

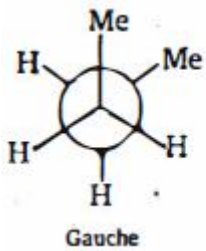
(B) They are diastereoisomers

(C) They are meso compounds

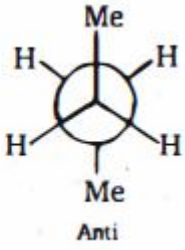
(D) The gauche form has two stereogenic centers, and the anti has only one

Ans. : b

If no rotation then these two are not inter convertible and are diastereoisomer.



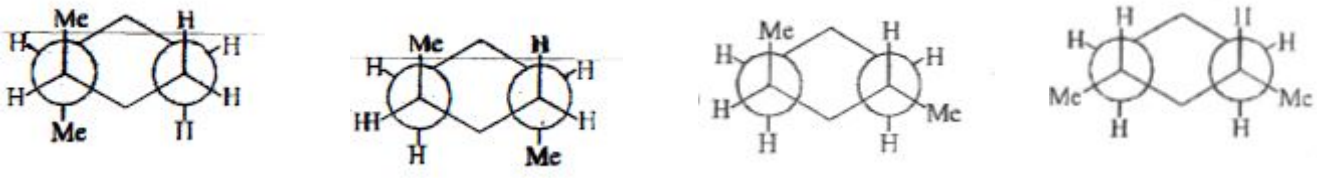
Gauche



Anti

196. Which of the following isomeric structure have lowest energy?

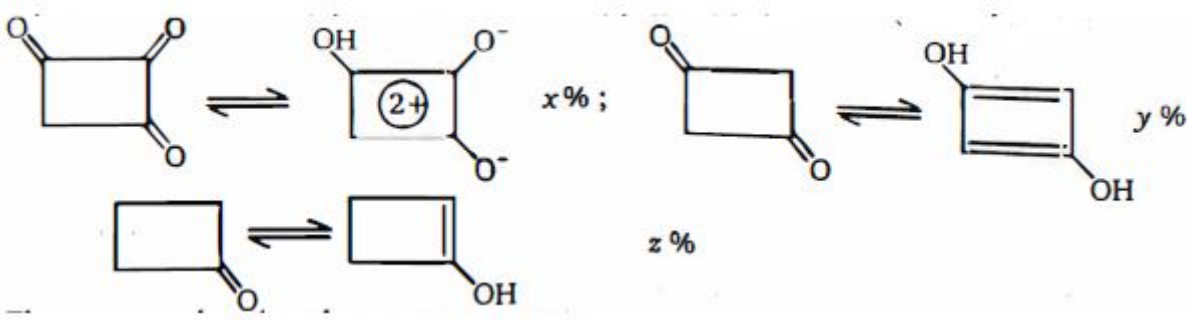
(A) (B) (C) (D)



Ans. : d

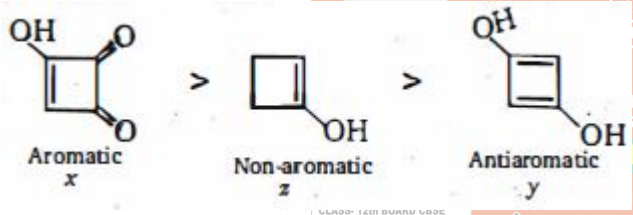
$A \rightarrow 1,2\,aa,\ B \rightarrow 1,4\,aa,\ C \rightarrow 1,3\,ae,\ D \rightarrow 1,3\,ee$

197. The correct order of enol contents x, y, z is



(A) $x > y > z$ (B) $z > y > x$ (C) $y > x > z$ (D) $x > z > y$

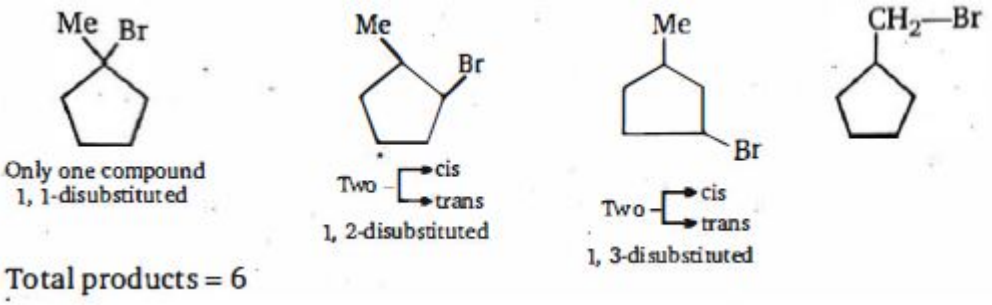
Ans. : Stability order of enol.



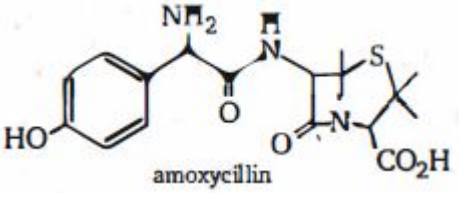
198. How many isomers have the name bromomethylcyclopentane ? (ignoring chirality)

(A) 4 (B) 5 (C) 6 (D) 7

Ans. :



199. How many double bond equivalents does amoxycillin (shown below) possess?

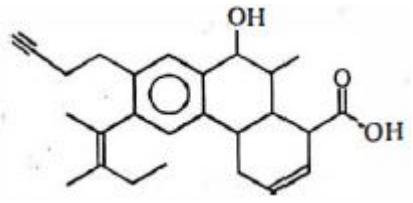


(A) 5 (B) 6 (C) 7 (D) 9

Ans. : (d) Double bond equivalent = Degree of unsaturation

= No. of double bond + no. of rings

200. How many degrees of unsaturation are there the following compound ?



(A) 6 (B) 7 (C) 10 (D) 11

Ans. : (d) Degree of unsaturation $= (C+1) - \left(\frac{H+X-N}{2}\right)$

----- one - day ,day-1 -----