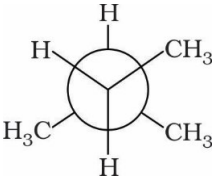
Miscellaneous Exercise Question Bank

1. What compound is represented by the Newman projection shown ?



(A) $CH_3CH_2CH_3$ **(B)** $(CH_3)_2CHCH_2CH_3$

(C) $CH_3CH(CH_3)_2$ **(D)** $CH_3CH_2CH_2CH(CH_3)_2$

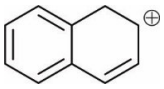
***2.** Which of the following is an electrophile ?

(A) H^+ **(B)** BF_3 **(C)** $^+NO_2$ **(D)** Fe^{3+}

3. Minimum number of carbon needed for an ester to show optical isomerism are :

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

4. Number of resonating structures of the given carbocationare :



(A) 7 **(B)** 8

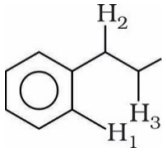
(C) 9 **(D)** 10

5. Which of the following is not a nucleophile ?

(A) $FeBr_3$ **(B)** Br^-

(C) NH_3 **(D)** 

6. Compare the bond strength of the indicated bonds in the given compound :



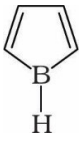
(A) 1 > 3 > 2

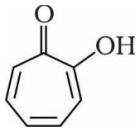
(B) 3 > 1 > 2

(C) 2 > 1 > 3

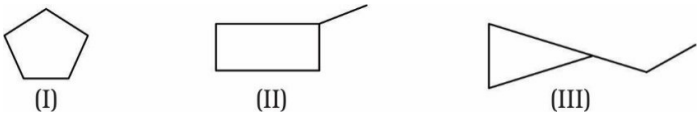
(D) 2 > 3 > 1

7. Which of the following is unstable at room temperature?

(A)  **(B)**  **(C)** 

(D) 

8. Which of the following will have largest heat of combustion?

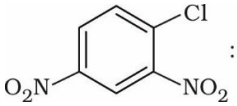


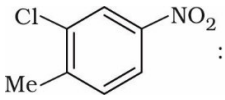
(A) I **(B)** II

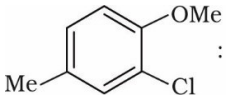
(C) III

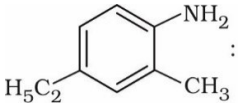
(D) All will have same heat of combustion because DBE = 1 for all.

9. Which of the following is correctly matched ?

(A)  : 4-chloro-1, 3-dinitrobenzene

(B)  : 4-Methyl-5-chloronitrobenzene

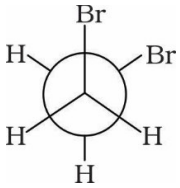
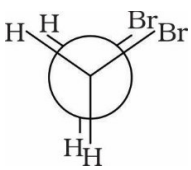
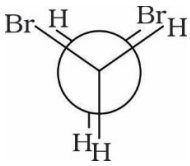
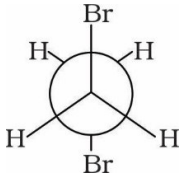
(C)  : 3-chloro-4-Methoxytoluene

(D)  : 4-Ethyl-2-methylaniline

10. Which is an electrophile :

(A) BCl_3 **(B)** CH_3OH **(C)** NH_3 **(D)** CO

11. Rank the following conformations in order of increasing energy :

(I)  **(II)**  **(III)**  **(IV)** 

(A) IV < I < III < II **(B)** III < II < IV < I **(C)** II < III < I < IV **(D)** IV< III < II < I

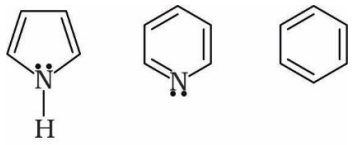
12. Which of these would you expect to have significant resonance energy ?

(A) I

(B) II

(C) III

(D) All of the above


(I) (II) (III)

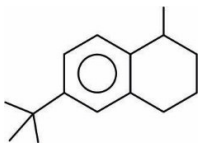
13. Which of the following is an electrophile:

(A) H_2O **(B)** SO_3 **(C)** NH_3 **(D)** ROR

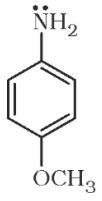
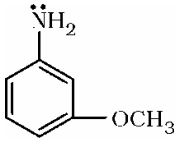
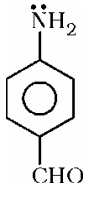
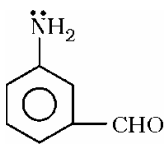
14. Number of α-hydrogen in given compound are :

(A) 2 **(B)** 3

(C) 4 **(D)** 5



15. In which of the following compound C–N bond is strongest?

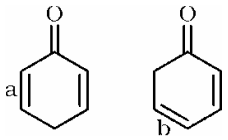
(A)  **(B)**  **(C)**  **(D)** 

16. Which of the following compounds are structural isomers of C_5H_{10} ?

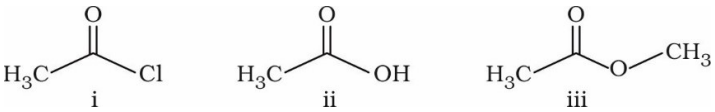
(1) 2-methylbut-2-ene (2) 3-methylbut-1-ene
(3) Pent-1-ene (4) 3-Methyl butane
(A) (1) and (4) only **(B)** (4) and (3) only **(C)** (2) and (4) only **(D)** (1), (2) and (3)

17. Compare the bond lengths of the indicated bonds in the given compound :

(A) a > b
(B) a < b
(C) a = b
(D) Cannot be predicted



18. Choose the correct option for increasing extent of resonance stabilization of following compounds :



(A) i< ii < iii **(B)** i< iii < ii **(C)** ii <i< iii **(D)** ii < iii <i

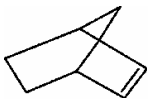
19. Number of stereoisomers in 3-methyl-5-propylcyclohexene are :

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

***20.** Ethers can act as :

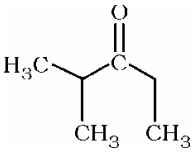
(A) Bronsted acids **(B)** Bronsted bases
(C) Lewis acids **(D)** Lewis bases

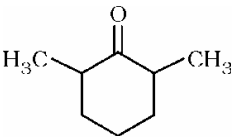
21. Number of hyperconjugating structure in given compound are :

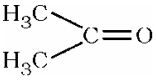


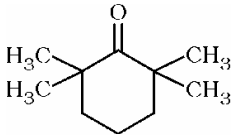
(A) 0 **(B)** 1
(C) 2 **(D)** 3

22. Which of the following compounds cannot exhibit keto-enol tautomerism ?

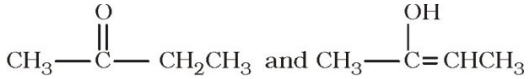
(A) 

(B) 

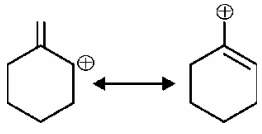
(C) 

(D) 

23. Which of the following are not resonating structures of each other ?

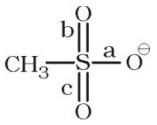
(A) 

(B) 

(C) 

(D) $CH_3CH = CH - \dot{C}H - CH = CH_2$ and $CH_3\dot{C}H - CH = CH - CH = CH_2$

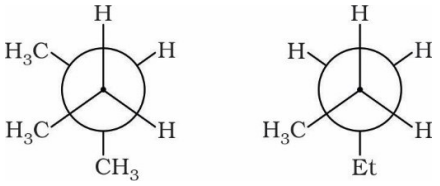
24. Compare the bond lengths of the indicated bonds in the given compound :



(A) a < b = c **(B)** a > b = c

(C) a = b = c **(D)** cannot be compared

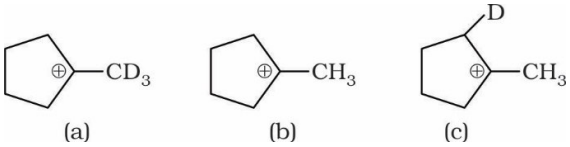
25.



Type of isomerism shown by given pairs is :

(A) Conformational **(B)** Positional **(C)** Chain **(D)** Metamerism

26. Rank the following according to stability (most stable to least stable).



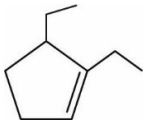
(A) a > b > c **(B)** a > c > b **(C)** c > b > a **(D)** b > c > a

27. Isomers which can be interconverted through rotation around a single bond are :

(A) conformers **(B)** diastereomers

(C) enantiomers **(D)** positional isomers

28. Which of the following is correct IUPAC name of compound given below.



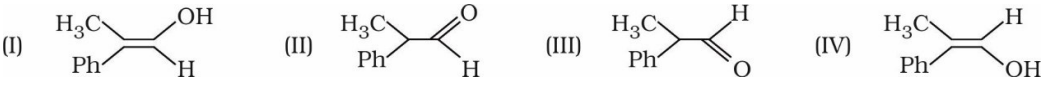
(A) 2, 3-diethylcyclopentene **(B)** 1, 5-diethylcyclopentene

(C) 1, 2-diethylcyclo-2-pentene **(D)** none of these

29. How many isomers are possible for C_7H_{16} ?

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

***30**



Correct relationship between above compounds :

(A) II and III are Geometrical isomers **(B)** I and II are Metamers

(C) III and IV are Tautomers **(D)** I and IV are Geometrical isomers

31. There are a number of definitions for acids and bases. Match the following definitions to the correct theory.

Theory		Definition	
X.	Arrhenius	**I**	Donates or accepts protons
Y.	Bronsted-Lowry	**II**	Donates or accepts a lone pair of electrons
Z.	Lewis	**III**	Donates a proton or a hydroxide

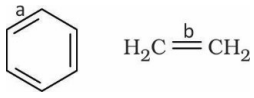
(A) X(I), Y(II), Z(III) **(B)** X(I), Y(III), Z(II) **(C)** X(II), Y(III), Z(I) **(D)** X(III), Y(I), Z(II)

32. Maleic acid and fumaric acid are :

(A) Position isomers **(B)** Geometric isomers

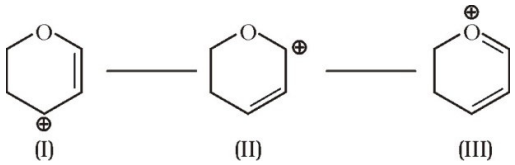
(C) Enantiomers **(D)** Functional isomers

33. Compare the bond lengths of the indicated bonds in the given compound :



(A) a > b **(B)** a < b **(C)** a = b **(D)** cannot be predicted

34.

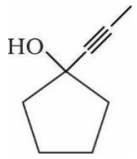
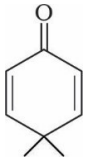
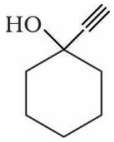
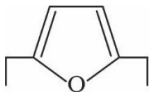


(I) (II) (III)

The most stable canonical structure among the given structure is :

(A) I **(B)** II **(C)** III **(D)** all are equally stable

35. Among the following compounds, which is not a structural isomer of others ?

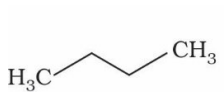
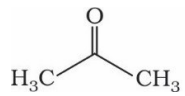
(A)  **(B)**  **(C)**  **(D)** 

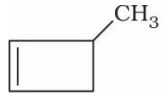
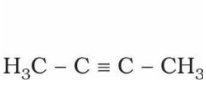
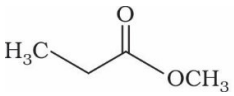
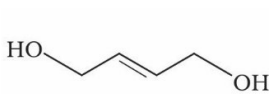
36. Which will be the least stable resonating structure ?

(A) $CH_2 = CH - \overset{\oplus}{C}H - \overset{\ominus}{C}H - \ddot{N}H_2$ **(B)** $\overset{\ominus}{C}H_2 - \overset{\oplus}{C}H - CH = CH - \ddot{N}H_2$

(C) $\overset{\ominus}{C}H_2 - CH = CH - CH = \overset{\oplus}{N}H_2$ **(D)** $CH_2 = CH - \overset{\ominus}{C}H - CH = \overset{\oplus}{N}H_2$

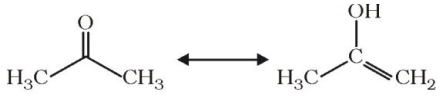
37. Which of the following pairs of molecules are NOT structural isomers ?

(A)  **(B)**  

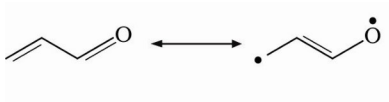
(C)   **(D)**  

38. Which of the following pairs are resonance structures of each other ?

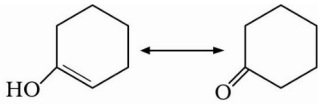
(I)



(II)



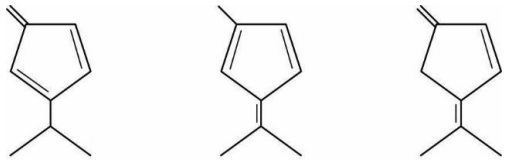
(III)



(IV)

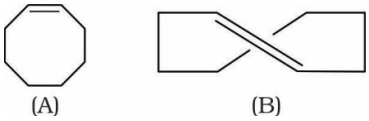
(A) I, II, III **(B)** I, IV **(C)** II, III **(D)** I, III, IV

39. Which of the given compounds is the strongest acid ?



1 2 3

(A) 1 **(B)** 2 **(C)** 3 **(D)** Both 1 & 2

40. 

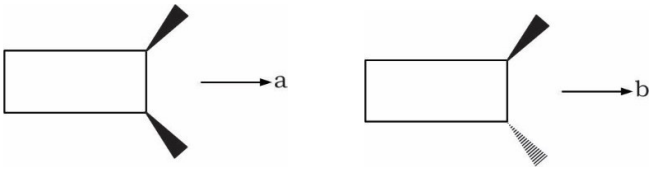
Relationship between (A) and (B) is :

(A) Diastereomers **(B)** Enantiomer **(C)** Identical **(D)** Structural isomer

41. What are the number of structural isomers possible in 1-butene and 1, 3-butadiene if any one H is replaced by D ?

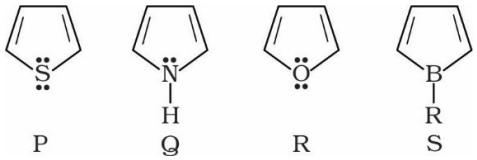
(A) 2, 0 **(B)** 4, 2 **(C)** 2, 4 **(D)** 4, 4

42. a and b are diastereomers of the given compounds. What are the values of a and b respectively :



(A) 1, 1 **(B)** 1, 2 **(C)** 2, 1 **(D)** 2, 2

43. Which compound would you not expect to be aromatic ?



(A) P **(B)** Q **(C)** R **(D)** S

44. Which compound does not contain any conjugated multiple bonds?

(A) 1, 2, 4-pentatriene **(B)** 1, 3-cyclobutadiene
(C) 1, 5-hexadiene **(D)** 3-methyl-2, 4-hexadiene

45. Which annulene would you NOT expect to be aromatic?

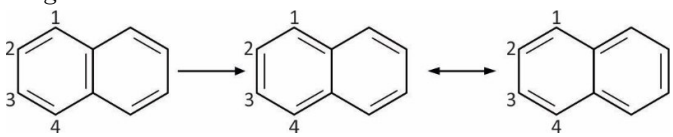
(A) [6]-Annulene **(B)** [14]-Annulene **(C)** [16]-Annulene **(D)** [18]-Annulene

46. Which of the following statements concerning a pair of geometrical isomers are correct?

(1) They have different boiling points and melting points
(2) They have the same relative molecular mass
(3) Their atoms are joined in the same order
(4) They have same dipole moment

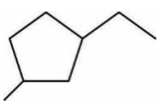
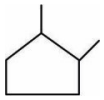
(A) (1),(4) and (2) only **(B)** (1),(4) and (3) only
(C) (2) and (3) only **(D)** (1), (2) and (3) only

47. There are three canonical structures of naphthalene. Examine them and find correct statement among the following :



(A) All C – C bonds are of same length **(B)** $C_1 - C_2$ bond is shorter than $C_2 - C_3$ bond
(C) $C_1 - C_2$ bond is longer than $C_2 - C_3$ bond **(D)** None of the above

48. Which of the cycloalkane is not capable of showing cis-trans isomerism ?

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

49. Two isomeric forms of a saturated hydrocarbon :

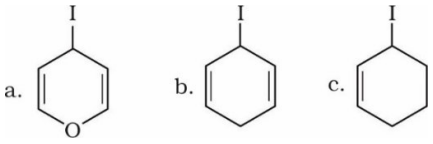
(A) have the same structure **(B)** have different compositions of elements

(C) have the same molecular formula **(D)** all of these are correct

50. In the molecular orbital model of benzene, how many pi-electrons are delocalized about the ring?

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

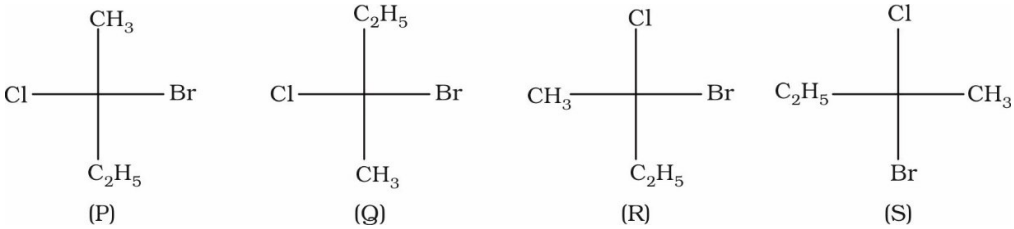
51. Compare the stability of carbocation formed when following iodides react with $AgNO_3$.



(A) a > b > c **(B)** a > c > b

(C) b > c > a **(D)** b > a > c

52. Consider the following structures (P), (Q), (R) and (S) and identify incorrect statement.



(A) Q and R are identical **(B)** P and Q are enantiomers

(C) P and R are enantiomers **(D)** Q and S are enantiomers

53. Which of the following statements can be used to prove that carbon is tetrahedral ?

(A) Methyl bromide does not have constitutional isomers

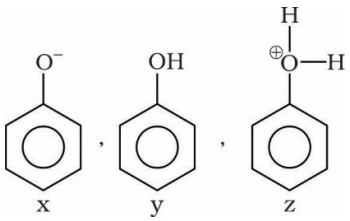
(B) Tetrachloromethane does not have a dipole moment

(C) Dibromomethane does not have configurational isomers

(D) None of these

54. Which member of each of the following pairs of compounds is more readily deprotonated ?

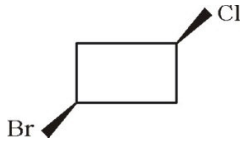
(A)  **(B)**  **(C)**  **(D)** 

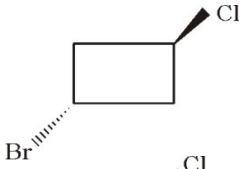
55. 

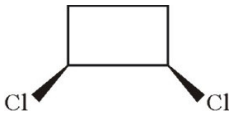
x, y and z denote the number of resonating structures of the given compounds. What is the value of x + y+ z?

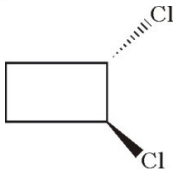
(A) 12 **(B)** 13 **(C)** 10 **(D)** 11

56. Which of the following compounds is optically active ?

(A) 

(B) 

(C) 

(D) 

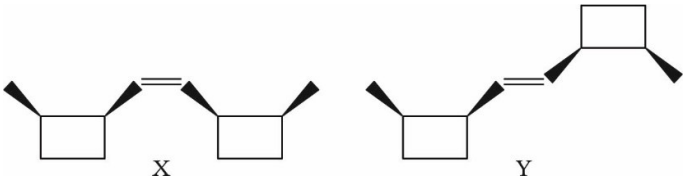
57. An optically active compound A with molecular formula C_8H_{14} undergoes catalytic hydrogenation to give an optically inactive product. Which of the following can be the structure of A ?

(A) 

(B) 

(C) 

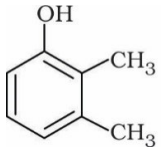
(D) B & C

***58.** 

(A) X is optically active **(B)** X is optically inactive

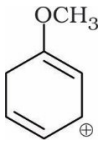
(C) Y is optically active **(D)** Y is optically inactive

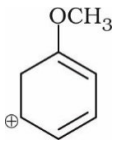
59. Number of positional isomers of given compound with 6 membered aromatic ring are :

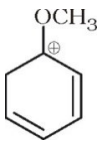

(Xylenol)

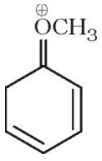
(A) 3 **(B)** 4 **(C)** 5 **(D)** 6

60. Which of the following resonance structure contributes the most to the resonance hybrid ?

(A) 

(B) 

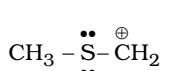
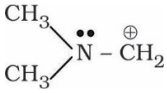
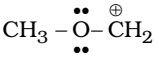
(C) 

(D) 

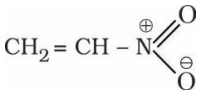
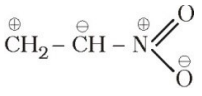
61. Which of the following is the correct expression for maximum number of configurational isomers ? n = number of stereocenters, m = number of stereogenic double bonds

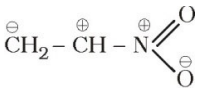
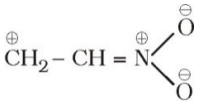
(A) $2^{(n+m)}$ **(B)** $2^{(m+2n)}$ **(C)** $2^{\left(m+\frac{n}{2}\right)}$ **(D)** $2^{\frac{(n+m)}{2}}$

62. Which of the following carbocation would have greatest stability :

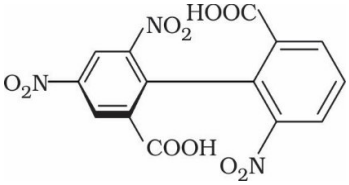
(A)  **(B)**  **(C)**  **(D)** 

63. Most contributing structure in nitroetheneis :

(A)  **(B)** 

(C)  **(D)** 

64. The number of stereoisomers of the given compound which can exist are :



(A) 0 **(B)** 1 **(C)** 2 **(D)** 4

65. Choose the correct statement :

(A) I effect operate in both σ and π bonds **(B)** I effect create net charge in molecule

(C) I effect transfer electron from one carbon to another

(D) I effect create partial charges and it is distance dependent

66. Which one of the following statements is not true ?

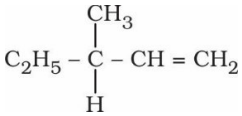
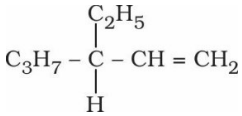
(A) Diastereomers are a pair of stereoisomers that are not mirror images of one another

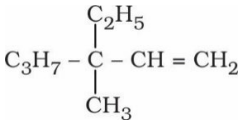
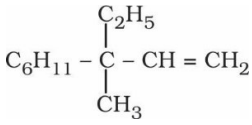
(B) A pair of enantiomeric compounds has identical melting points

(C) Diastereomers do not have equal specific rotations

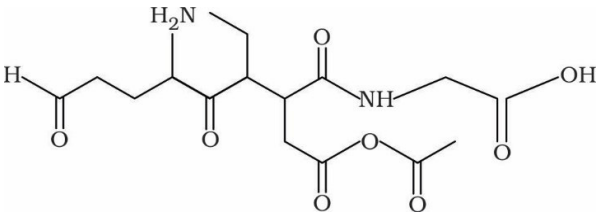
(D) Diastereomers are superimposable mirror images of one another

67. First member of optically active alkene is :

(A)  **(B)** 

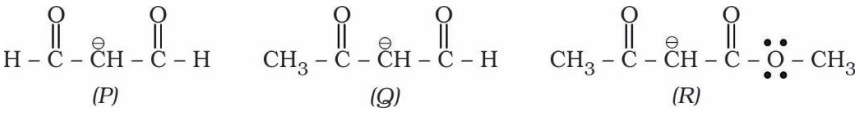
(C)  **(D)** 

68. Number of functional groups present in the following compound is :



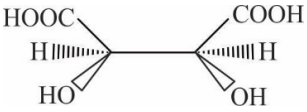
(A) 5 **(B)** 7 **(C)** 6 **(D)** 8

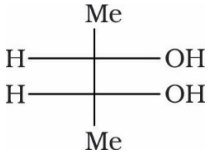
69. Arrange the following anions in decreasing order of stability :

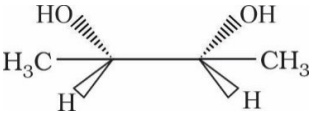


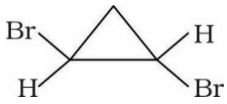
(A) R > Q >P **(B)** Q > R > P **(C)** P > R > Q **(D)** P > Q > R

70. Which of the following will show optical activity ?

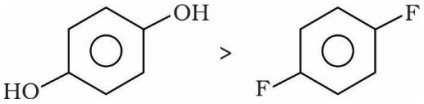
(A) 

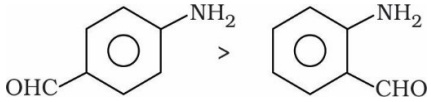
(B) 

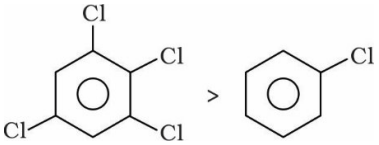
(C) 

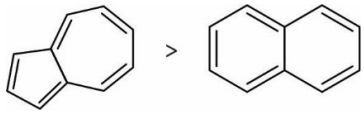
(D) 

***71.** Which of the order of dipole moment is correct ?

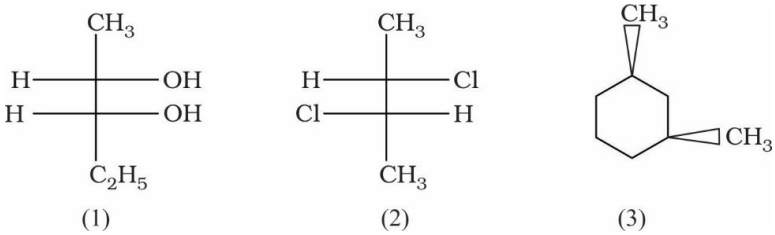
(A) 

(B) 

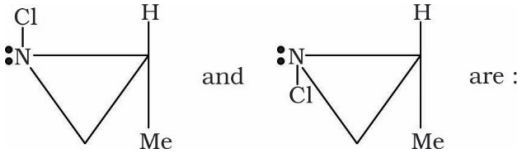
(C) 

(D) 

72. Which of the following compounds are meso forms ?



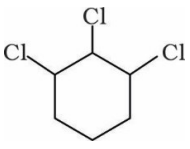
(A) 1 only **(B)** 3 only **(C)** 1 and 2 **(D)** 2 and 3

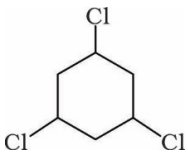
73.  are :

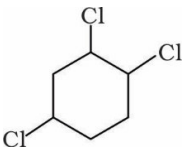
(A) *d* and *l* isomer **(B)** *cis* and *trans* isomer

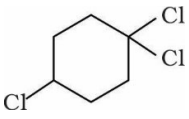
(C) functional isomer **(D)** position isomer

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

(A) 

(B) 

(C) 

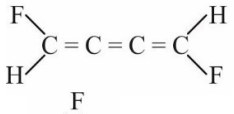
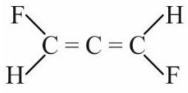
(D) 

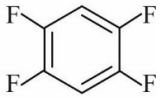
75. If a mixture of 2-bromobutane has enantiomeric excess of 50% of (+)-2-bromobutane, the stereoisomeric composition of the mixture with respect to (+) and (–) enantiomer respectively is :

(A) 75% (+) and 25% (–) **(B)** 70% (+) and 30% (–)

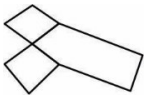
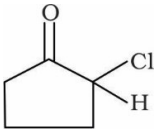
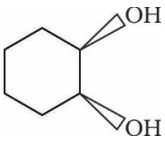
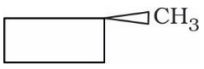
(C) 80% (+) and 20% (–) **(D)** 25% (+) and 75% (–)

76. Which of the following molecules have dipole moment ?

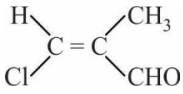
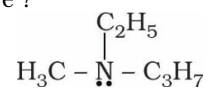
(A)  **(B)** 

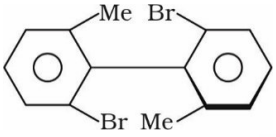
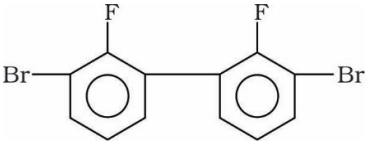
(C)  **(D)** 

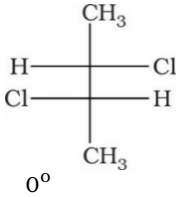
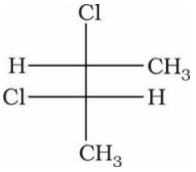
77. Which of the following molecules is expected to rotate plane polarized light ?

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

78. Which of the following compounds will be optically active ?

(A)  **(B)** 

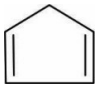
(C)  **(D)** 

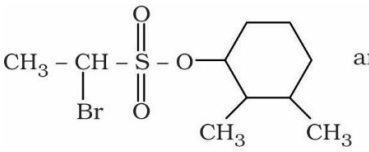
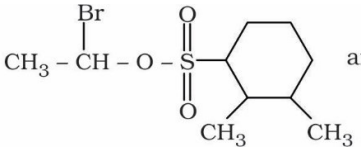
79. If optical rotation produced by  then that produced by  :

(A) -36^o **(B)** 0^o **(C)** $+26^o$ **(D)** Unpredictable

80. Which of the following compounds contains most acidic H ?

(A) $CH_2 = CH_2$ **(B)** $HC \equiv CH$

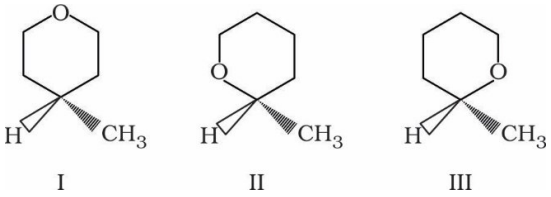
(C)  **(D)** $CH_2 = CH - CH_2 - CH = CH_2$

81.  and  are :

(A) functional group isomers **(B)** metamers

(C) optical isomers **(D)** geometrical isomers

82.

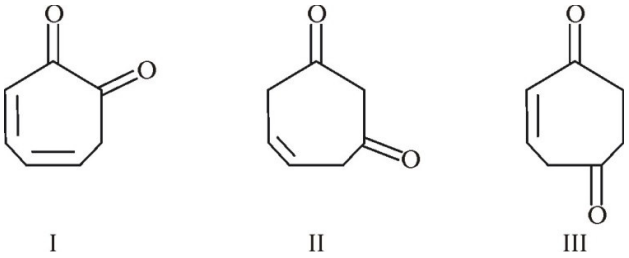


I II III

Which among these are stereoisomers ?

(A) I and II **(B)** I and III **(C)** II and III **(D)** all of these

83.

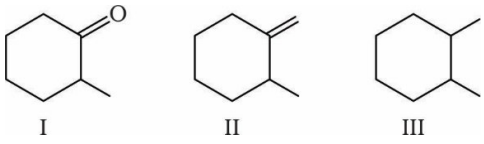


I II III

Among these compounds, the order of enol content should be :

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

84.



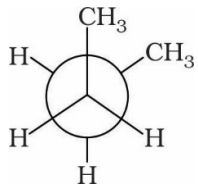
I II III

Which of these compounds will exhibit geometrical isomerism ?

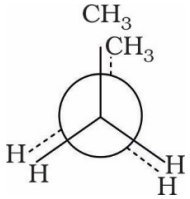
(A) I **(B)** II **(C)** III **(D)** None of these

85. Which of the following conformers of n-butane has torsional strain ?

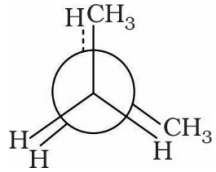
(A)



(B)



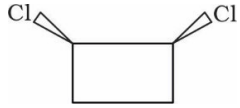
(C)



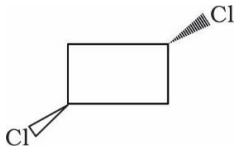
(D) Both (B) and (C)

86. Which of the following compounds does not contain the plane of symmetry ?

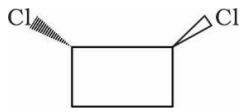
(A)



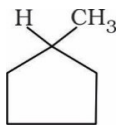
(B)



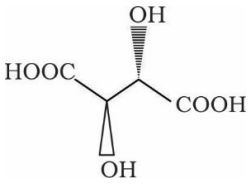
(C)

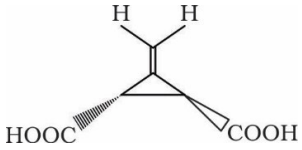


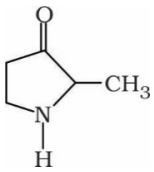
(D)

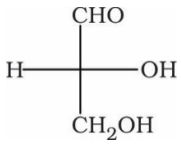


87. Identify the molecule which is meso.

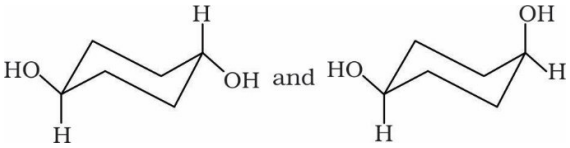
(A) 

(B) 

(C) 

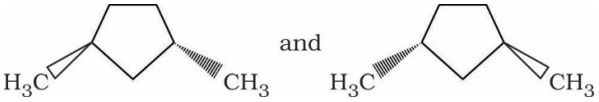
(D) 

88. How are the following two compounds related ?



(A) Enantiomer **(B)** Diastereomer **(C)** Homomer **(D)** Racemic mixture

89. Choose incorrect statement regarding following compounds :



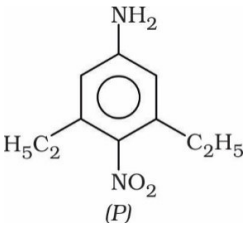
(A) The boiling point of both compounds are same

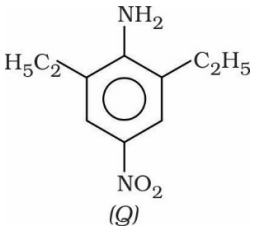
(B) Both are optically active

(C) Equal mixture of both compounds are optically inactive

(D) Both are diastereomers

90. The basic nature of amines is due to lone pair of electron on N atom. But (P) is more basic than (Q) because :


(P)


(Q)

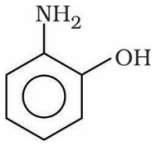
(A) $-NO_2$ in *P* is poor inductive group

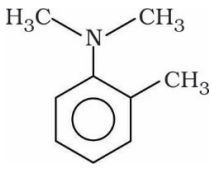
(B) $-NO_2$ in P is stronger inductive group

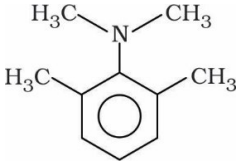
(C) $-NO_2$ in P is stronger –M group

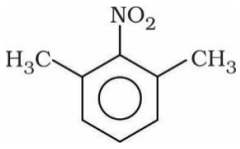
(D) $-NO_2$ in P is weaker –M group

91. Steric inhibition of resonance is not applicable in :

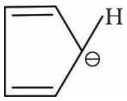
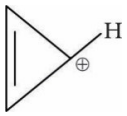
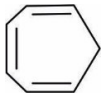
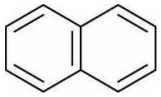
(A) 

(B) 

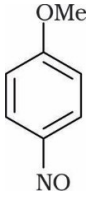
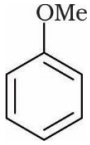
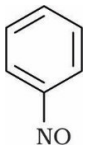
(C) 

(D) 

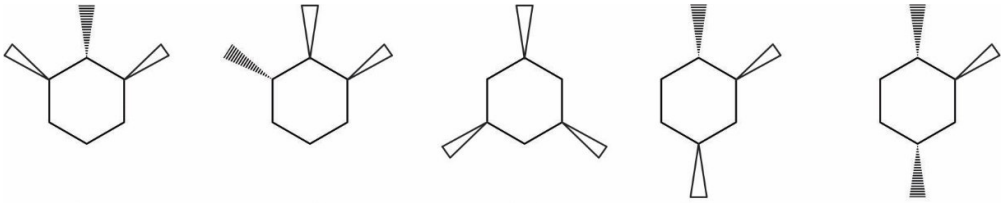
92. Which one of the following compounds is not aromatic ?

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

93. Which of the following compounds will exhibit tautomerism ?

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

94. Arrange the following trimethyl cyclohexane in increasing order of their heat of combustion :

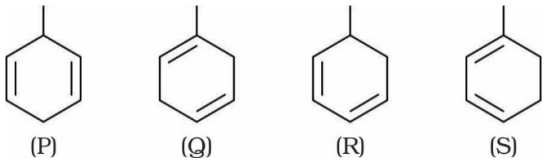


(P) (Q) (R) (S) (T)

(A) P < Q < R < S < T **(B)** S < P < R < Q < T

(C) R < Q < P < S < T **(D)** T < S < R < P < Q

95. Arrange the following in decreasing order of heat of hydrogenation :



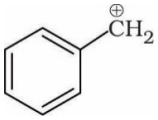
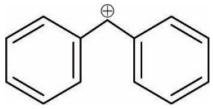
(P) (Q) (R) (S)

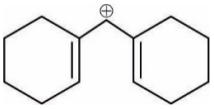
(A) P > Q > R > S **(B)** S > R > Q > P **(C)** Q > P > S > R **(D)** R > Q > P > S

96. Which of the following has higher dipole moment ?

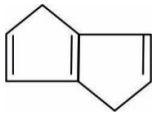
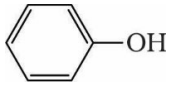
(A)  **(B)**  **(C)**  **(D)** 

97. Hyperconjugation occurs in :

(A)  **(B)** 

(C)  **(D)** None of these

***98.** Which of the following will not react with Na metal ?

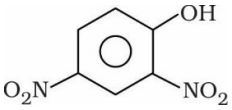
(A)  **(B)**  **(C)**  **(D)** 

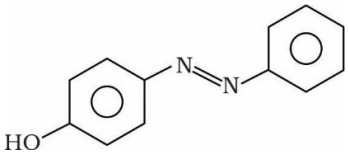
***99.** Which of the following fails to produce Prussian blue colouration in Lassaigne's test for detection of nitrogen ?

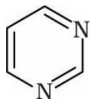
(A) Methyl hydrazine (CH_3NHNH_2) **(B)** Hydrazoic acid (HN_3)

(C) Semicarbazide ($NH_2NHCONH_2$) **(D)** All

***100.** In which of the following compounds, nitrogen is estimated by Duma's method ?

(A) 

(B) 

(C) 

(D)