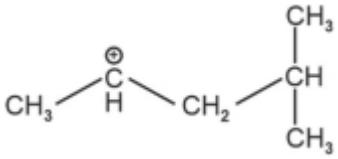
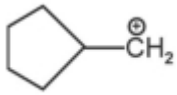
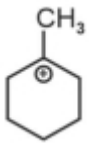
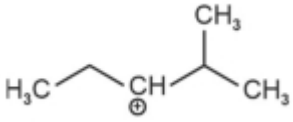
*** Chemistry** **[640]**

1. The most stable carbocation among the following is :

(A) 

(B) 

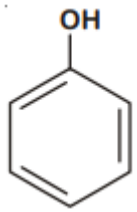
(C) 

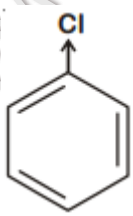
(D) 

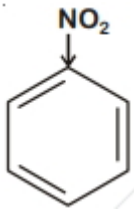
2. The major product formed in dehydrohalogenation reaction of $2-$Bromo pentane is Pent$-2-$ene. This product formation is based on ?

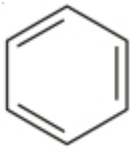
(A) Saytzeffs Rule (B) Hund's Rule (C) Hofmann Rule (D) Huckel's Rule

3. Which of the following compound is most reactive in electrophilic aromatic substitution?

(A) 

(B) 

(C) 

(D) 

4. The compound that is most difficult to protonate is

(A) $H-O-H$ (B) H_3C-O-H (C) $H_3C-O-CH_3$ (D) $Ph-O-H$

5. The most stable carbocation, among the following is

(A) $(CH_3)_3C-\overset{\oplus}{C}H-CH_3$

(B) $CH_3-CH_2-\overset{\oplus}{C}H-CH_2-CH_3$

(C) $CH_3-\overset{\oplus}{C}H-CH_2-CH_2-CH_3$

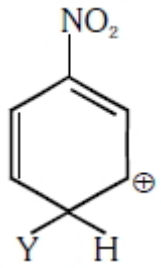
(D) $CH_3-CH_2-\overset{\oplus}{C}H_2$

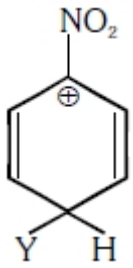
6. Which of the following is correct with respect to $-I$ effect of the substituents ? ($R =$ alkyl)

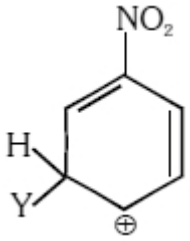
(A) $-NH_2 < -OR < -F$ (B) $-NR_2 < -OR < -F$

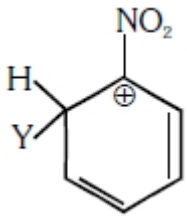
(C) $-NH_2 > -OR > -F$ (D) $-NR_2 > -OR > -F$

7. Which of the following carbocations is expected to be most stable ?

(A) 

(B) 

(C) 

(D) 

8. The correct statement regarding electrophile is

(A) electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from another electrophile

(B) electrophiles are generally neutral species and can form a bond by accepting a pair of electrons from a nucleophile

(C) electrophile can be either neutral or positively charged species and can form aIIbond by accepting a pair of electrons from a nucleophile

(D) electrophile is a negatively charged species and can form a bond by accepting a pair of

9. Which of the following statements is not correct for a nucleophile?

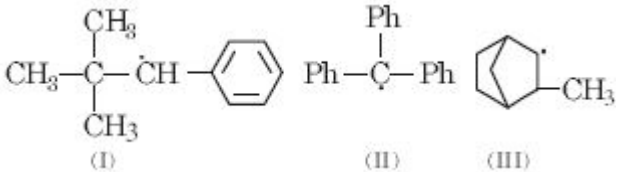
(A) Ammonia is a nucleophile.

(B) Nucleophiles attack low e^- density sites.

(C) Nucleophiles are not electron seeking.

(D) Nucleophile is a Lewis acid.

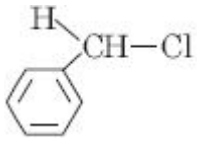
10. Consider the following compounds :
Hyperconjugation occurs in



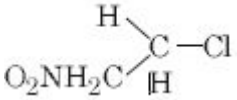
(A) III only (B) I and III (C) I only (D) II only.

11. In which of the following compounds, the $C-Cl$ bond ionisation shall give most stable carbonium ion?

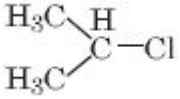
(A)



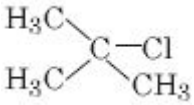
(B)



(C)



(D)



12. Arrange the following in increasing order of stability

1. $(CH_3)_2 - \overset{+}{C} - CH_2 - CH_3$

2. $(CH_3)_3 - \overset{+}{C}$

3. $(CH_3)_2 - |\overset{+}{C}H|$

4. $CH_3 - \overset{+}{C}H_2$

5. $\overset{+}{C}H_3$

(A) $5 < 4 < 3 < 1 < 2$ (B) $4 < 5 < 3 < 1 < 2$

(C) $1 < 5 < 4 < 3 < 2$ (D) $5 < 4 < 3 < 2 < 1$

13. Homolytic fission of the following alkanes forms free radicals
$CH_3 - CH_3, CH_3 - CH_2 - CH_3, (CH_3)_2CH - CH_3,$
$CH_3 - CH_2 - CH(CH_3)_2.$
Increasing order of stability of the radicals is

(A) $(CH_3)_2\dot{C} - CH_2CH_3 < CH_3 - \dot{C}H - CH_3 < CH_3 - \dot{C}H_2 < (CH_3)_3\dot{C}$

(B) $CH_3 - \dot{C}H_2 < CH_3 - \dot{C}HH - CH_3 < (CH_3)_2\dot{C} - CH_2 - CH_3 < (CH_3)_3\dot{C}$

(C) $CH_3 - \dot{C}H_2 < CH_3 - \dot{C}H - CH_3 < (CH_3)_3\dot{C} < (CH_3)_2\dot{C} - CH_2CH_3$

(D) $(CH_3)_3\dot{C} < (CH_3)_2\dot{C} - CH_2CH_3 < CH_3 - \dot{C}H - CH_3 < CH_3 - \dot{C}H_2$

14. Which of the following compounds are not arranged in order of decreasing reactivity towards electrophilic substitution

(A) Fluoro benzene > chloro benzene > bromo benzene

(B) Phenol > $n-$propyl benzene > benzoic acid

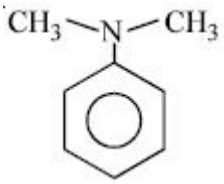
(C) Chloro toluene > para-nitro toluene > $2-$chloro$-4-$nitro toluene

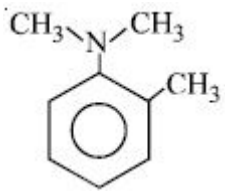
(D) Benzoic acid > phenol > $n-$propyl benzene

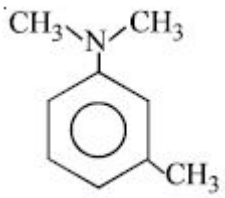
15. Number of σ and π bonds present in $1-$butene$-3-$yne respectively are

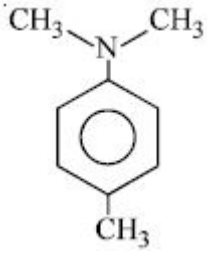
(A) $7\sigma, 3\pi$ (B) $5\sigma, 2\pi$ (C) $8\sigma, 3\pi$ (D) $6\sigma, 2\pi$

16. Which of the following is strongest base.

(A) 

(B) 

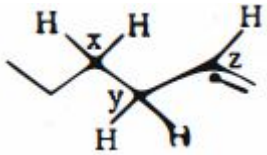
(C) 

(D) 

17. In carbyl amine reaction, electrophile is

(A) Nitrene (B) Carbene (C) Carbanion (D) Carbocation

18. Arrange the $(C-H)$ bonds x, y and z in decreasing order of their bond dissociation energies in homolysis.

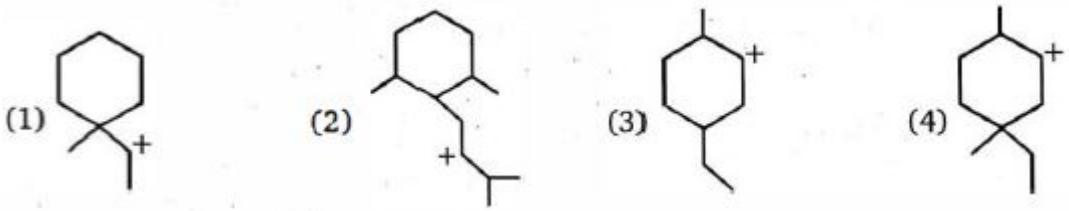


(A) $y > x > z$ (B) $z > x > y$ (C) $z > y > x$ (D) $y > z > x$

19. How many carbon-hydrogen bond orbitals are available for overlap with the vacant p -orbital in ethyl carbocation ?

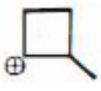
(A) 0 (B) 3 (C) 5 (D) 6

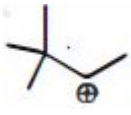
20. Which of the following will rearrange ?

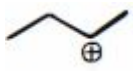


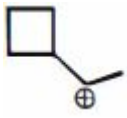
(A) 1 (B) 1 and 3 (C) All (D) $1, 2, 4$

21. Which of the following is most likely to undergo a favorable hydride shift?

(A) 

(B) 

(C) 

(D) 

22. Which of the following carbocation is most stable

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

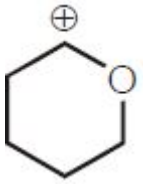
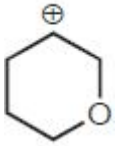
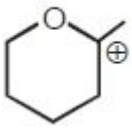
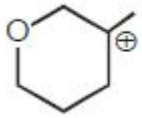



23. How many propenyl radical is possible from propene

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

24. Most stable carbocation among following is

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

25. Which has zero dipole moment

(A) cis$-2-$butene (B) trans$-2-$butene

(C) $1-$butene (D) $2-$methyl$-1-$propene

26. Dipole moment is shown by

(A) $1,4-$dichloro benzene

(B) Cis$-1,2-$dichloro ethane

(C) Trans$-1,2-$dichloro, $2-$pentene

(D) Trans$-1,2-$dichloro ether

27. Aromatic properties of benzene are proved by

(A) Aromatic sextet theory

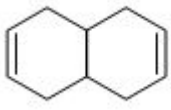
(B) Resonance theory

(C) Molecular orbital theory

(D) All of these

28. Which of the following will show aromatic behaviour

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




29. The compound, which gives the most stable carbonium on dehydrogenation

(A) $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2OH$

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

(C) $CH_3 - CH_2 - CH_2 - CH_2OH$

(D) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_3$

30. The $+I$ effect of alkyl groups is in the order

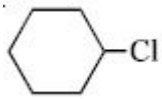
(A) $2^\circ > 3^\circ > 1^\circ$ (B) $1^\circ > 2^\circ > 3^\circ$ (C) $3^\circ > 2^\circ > 1^\circ$ (D) None of these

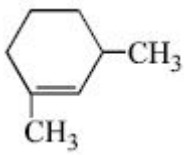
31. The only $o,p-$ directing group which is deactivating in nature is

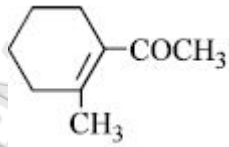
(A) $-NH_2$ (B) $-OH$

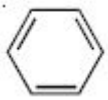
(C) $-X$ (halogens) (D) $-R$ (alkyl groups)

32. In which of the following molecule all the effect namely inductive, mesomeric $\&$ hyperconjugation operate

(A) 

(B) 

(C) 

(D) 

33. The resonance energy of following heterocycles is in the order

(A) pyrole $>$ furan $>$ pyridine

(B) furan $>$ pyrole $>$ pyridine

(C) pyridine $>$ pyrole $>$ furan

(D) pyridine $>$ furan $>$ pyrole

34. Which of the following is the strongest $o,p-$ directing group?

(A) OH (B) Cl (C) Br (D) C_6H_5

35. In a reaction of C_6H_5Y, the major product $(> 60\%)$ is $m-$ isomer, so the group Y is :

(A) $-COOH$ (B) $-Cl$ (C) $-OH$ (D) $-NH_2$

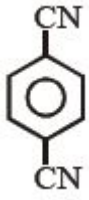
36. Which of the following can show $+M$ or $+R$ effect

(A) $-COCH_3$ (B) $-CH_3$ (C) $-NH_2$ (D) $-COOH$

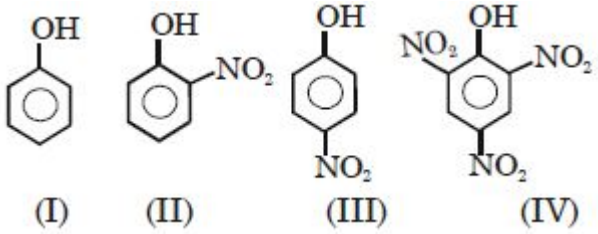
37. Which of the following is polar?

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





38. Correct order of K_a value for given compound



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

(A) $IV > II > III > I$ (B) $III > IV > II > I$

(C) $IV > III > II > I$ (D) $IV > III > I > II$

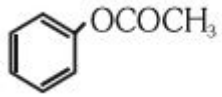
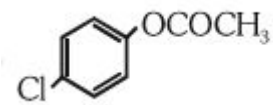
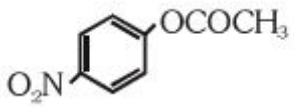
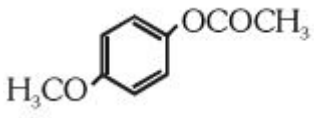
39. Arrange the following compound in order of their acidic strength :-

$(i)\, CF_3SO_3H \quad (ii)\, C_6H_5COOH \quad (iii)\, C_6H_5OH$

(A) $i > ii > iii$ (B) $iii > ii > i$ (C) $iii > i > ii$ (D) $i > iii > ii$

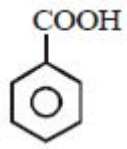
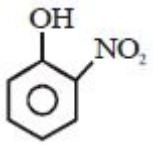
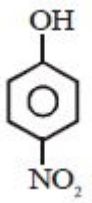
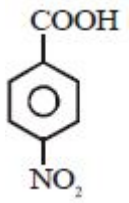
40. Which one of the following esters gets hydrolysed most easily under alkaline conditions?

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

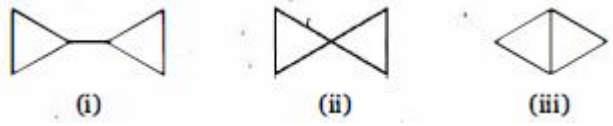





41. Which of the following is most acidic

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

42. Correct order of the heats of combustion of above compounds is

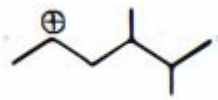


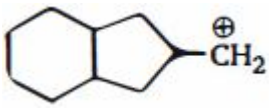
(i) (ii) (iii)

(A) $(i) > (ii) > (iii)$ (B) $(i) > (iii) > (ii)$ (C) $(ii) > (i) > (iii)$ (D) $(ii) > (iii) > (i)$

43. Most stable carbocation among the following is

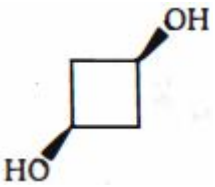
(A) 

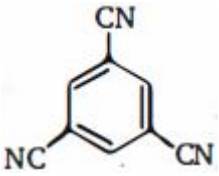
(B) 

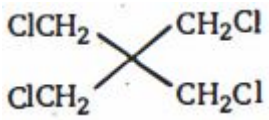
(C) 

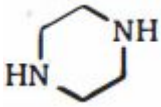
(D) $^{\oplus}CH_3$

44. Which one of the following compounds has non zero dipole moment?

(A) 

(B) 

(C) 

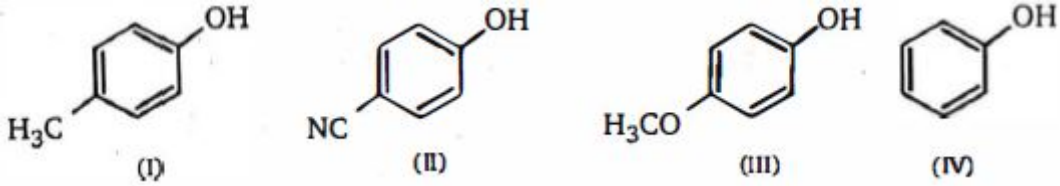
(D) 

45. $H-C\equiv C\overset{a}{-}C\equiv C\overset{b}{-}CH_3$

Compare the bond lengths a and b

(A) $a=b$ (B) $a>b$ (C) $b>a$ (D) $a>>>b$

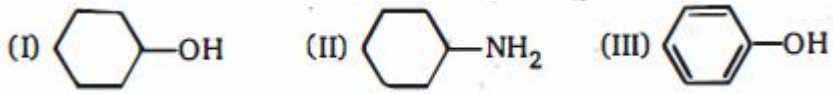
46. Increasing order of acidic strength of given compounds is



(A) $III<I<IV<II$ (B) $II<I<IV<III$

(C) $I<III<IV<II$ (D) $I<III<II<IV$

47. Rank in the order of increasing acidity



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

48. Heat of combustion of two isomer x and y are $17\,kJ/mol$ and $12\,kJ/mol$ respectively. From this information it may be concluded that

(A) isomer x is $5\,kJ/mol$ more stable

(B) isomer y is $5\,kJ/mol$ less stable

(C) isomer y has $5\,kJ/mol$ more potential energy

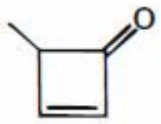
(D) isomer x is $5\,kJ/mol$ less stable

49. Decreasing order of acid strengths is

$\underset{(A)}{Ph-OH}$, $\underset{(B)}{Ph-CH_2-OH}$, $\underset{(C)}{Ph-CO_2H}$, $\underset{(D)}{Ph-CH_2-\overset{\oplus}{N}H_3}$

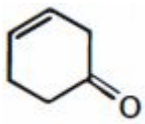
(A) $B>A>C>D$ (B) $C>A>B>D$ (C) $C>A>D>B$ (D) $C>B>A>D$

50. Dipole moment of which ketone is maximum ?

(A) 

(B) 

(C) 

(D) 

51. Correct order of basic strengths of given amines is

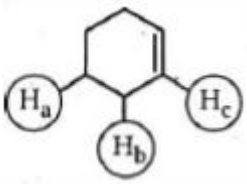
(A) $\underset{2^o}{Me_2NH} > \underset{1^o}{MeNH_2} > \underset{3^o}{Me_3N} > NH_3$ (Protic solvent)

(B) $\underset{2^o}{Et_2NH} > \underset{3^o}{Et_3H} > \underset{1^o}{EtNH_2} > NH_3$ (Protic solvent)

(C) $Me_3N > Me_2NH > Me - NH_2 > NH_3$ (Gas phase)

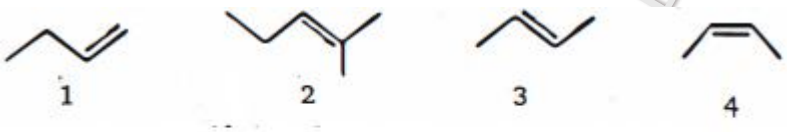
(D) All are correct

52. Rank the hydrogen atoms $(H_a, H_b, H_c,)$ in the following molecules according to their acidic strengths



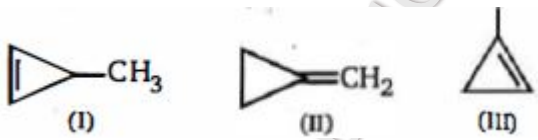
(A) $a > b > c$ (B) $b > a > c$ (C) $b > c > a$ (D) $a > c > b$

53. Rank the following alkenes in order of decreasing heats of hydrogenation largest first)



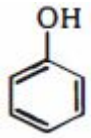
(A) $2 > 3 > 4 > 1$ (B) $2 > 4 > 3 > 1$ (C) $1 > 3 > 4 > 2$ (D) $1 > 4 > 3 > 2$

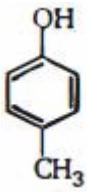
54. Which of the following orders is correct for heat of hydrogenation of these compounds ?

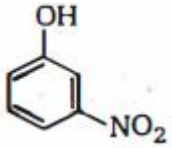


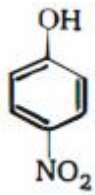
(A) $I > III > II$ (B) $III > II > I$ (C) $III > I > II$ (D) $II > I > III$

55. Most acidic is

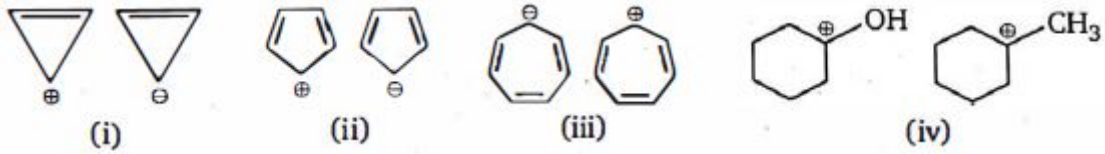
(A) 

(B) 

(C) 

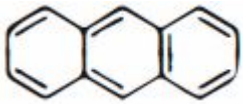
(D) 

56. In which pair second ion is more stable than first?



(A) (i) and (ii) (B) (ii) and (iii) (C) (ii) and (iv) (D) (iii) and (iv)

57. How many resonance structures are there for anthracene ?



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

58. Which of the following molecules have non-zero dipole moments ?

(I) gauche conformation of $1,2$ -dibromoethane

(II) anti conformation of $1,2$ -dibromoethane

(III) trans- $1,4$ -dibromocyclohexane

(IV) cis- $1,4$ -dibromocyclohexane

(V) tetrabromomethane

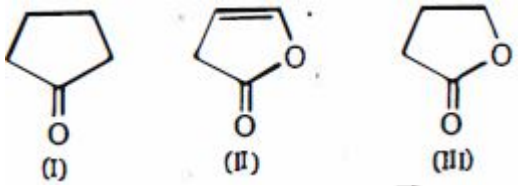
(VI) $1,1$ -dibromocyclohexane

(A) I and II (B) I and IV (C) II and V (D) I, IV and VI

59. Maximum enol content is in

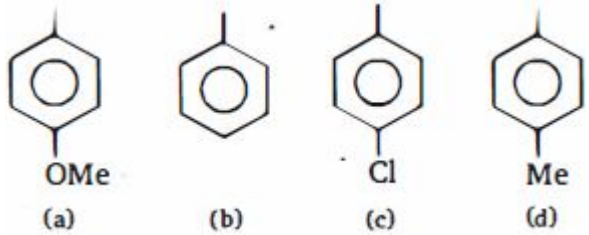
(A) (B) (C) (D)

60. Among the given compounds, the correct order of enol content is



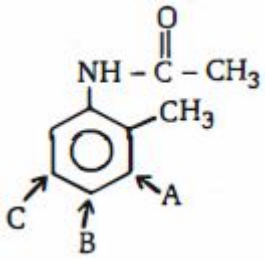
(A) $I > II > III$ (B) $III > II > I$ (C) $II > I > III$ (D) $II > III > I$

61. Migratory aptitude of the following in decreasing order is



(A) $a > c > b > d$ (B) $a > d > b > c$ (C) $a > d > c > b$ (D) $b > c > a > b$

62. Identify the position where electrophilic aromatic substitution (EAS) is most favourable.



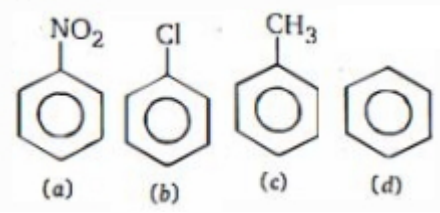
(A) A

(B) B

(C) C

(D) A અને C

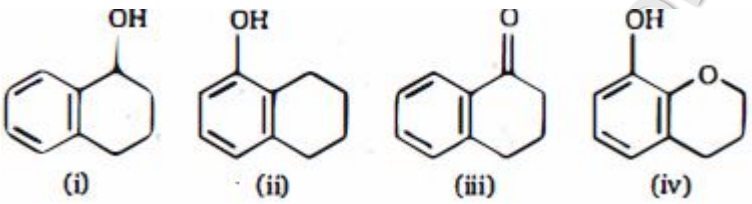
63. Correct order of rate of EAS (electrophilic aromatic substitution) is



(A) $c > b > a > d$ (B) $c > d > a > b$

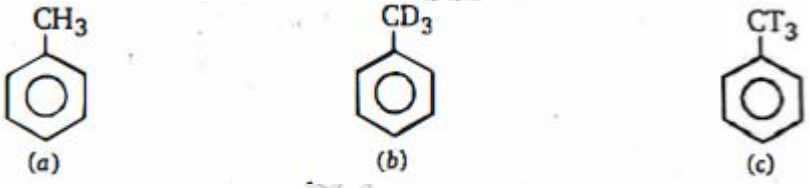
(C) $a > b > c > d$ (D) $c > d > b > a$

64. Increasing order of rate of reaction with $Br_2/AlCl_3$ is



(A) $iii < i < ii < iv$ (B) $iv < ii < i < iii$ (C) $ii < iv < iii < i$ (D) $iv < ii < iii < i$

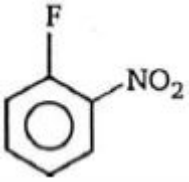
65. Arrange the following in decreasing order of reactivity towards EAS (electrophilic aromatic substitution)



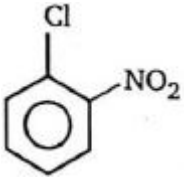
(A) $a > b > c$ (B) $c > b > a$ (C) $a > c > b$ (D) $c > a > b$

66. Which of the following $2-$ halo nitrobenzene is most reactive towards nucleophilic aromatic substitution ?

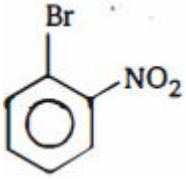
(A)



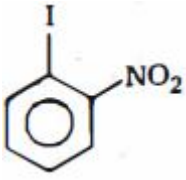
(B)



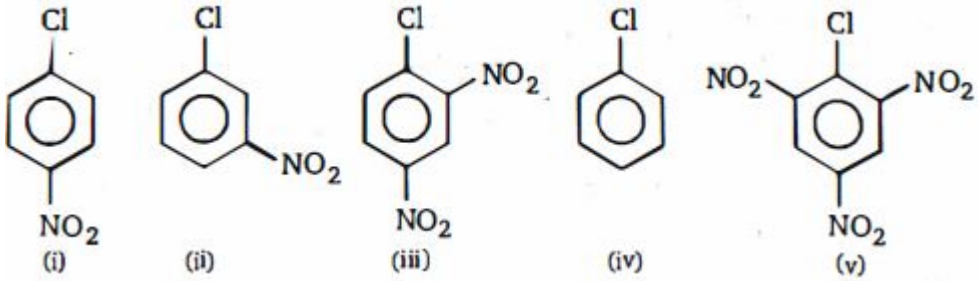
(C)



(D)



67. Arrange in their decreasing order of rate in SNAr



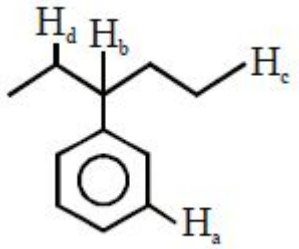
(A) $i > ii > iv > iii > v$

(B) $ii > i > iii > v > iv$

(C) $v > iii > i > ii > iv$

(D) $v > iii > ii > i > iv$

68. Correct order of case of replacement of hydrogen atom by chlorine atom in following compound by photochlorination

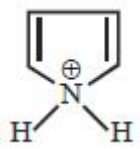


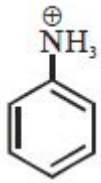
(A) $H_a > H_b > H_c > H_d$ (B) $H_b > H_d > H_a > H_c$

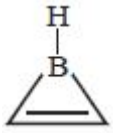
(C) $H_b > H_d > H_c > H_a$ (D) $H_d > H_b > H_c > H_a$

69. In which of the molecule $\pi-$ electrons are not delocalized ?

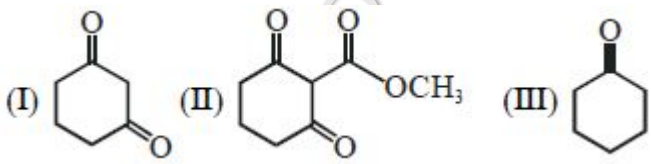
(A) (B) (C) $H_2C = C = CH_2$ (D)







70. Arrange the following in increasing order of their acidic strength



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

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

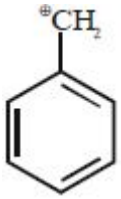
71. The effect that makes $2,3-$ dimethyl $-2-$ butene more stable than $2-$ butene is

(A) Resonance (B) Hyperconjugation

(C) Steric effect (D) Inductive effect

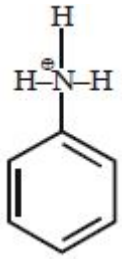
72. Which of the following compounds $+ve$ charge is not show resonance ?

(A)



(B) $CH_2 = CH - CH = CH - \overset{\oplus}{C}H_2$

(C)



(D)

73. Arrange the following according to the increasing order of stability :- Propene (I), cis but $-2-$ ene (II), trans-but $-2-$ ene (III), $2,3-$ dimethylbut $-2-$ ene (IV), ethene (V)

(A) $V < IV < III < II < I$ (B) $V < I < II < III < IV$

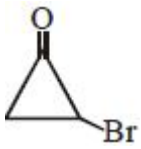
(C) $V < IV < III < I < I$ (D) $IV < III < II < I < V$

74. Which carbonyl compound has maximum dipole moment

(A)

(B)

(C)

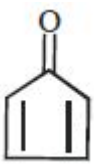


(D)

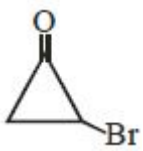
75. Which carbonyl compound has maximum dipole moment

(A)

(B)



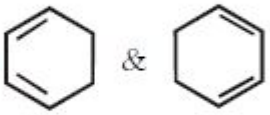
(C)



(D)

76. Which of the following pair of structure does not represent resonating structure

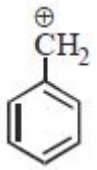
(A) 

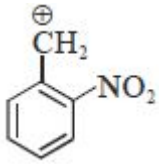
(B) 

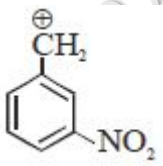
(C) 

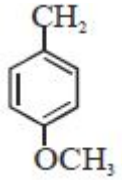
(A) (A) and (B) (B) (B) and (C) (C) (A) and (C) (D) $(A),(B)$ and (C)

77. Which of the following carbocation is least stable

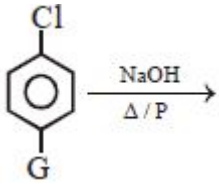
(A) 

(B) 

(C) 

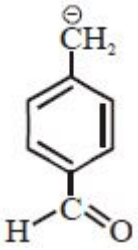
(D) 

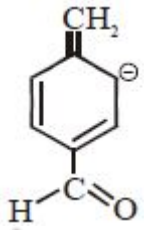
78. Rate of reaction is maximum if G is

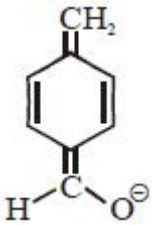


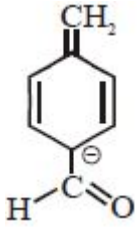
(A) $-OCH_3$ (B) $-CH_3$ (C) $-NO_2$ (D) $-H$

79. The most stable resonating structure is

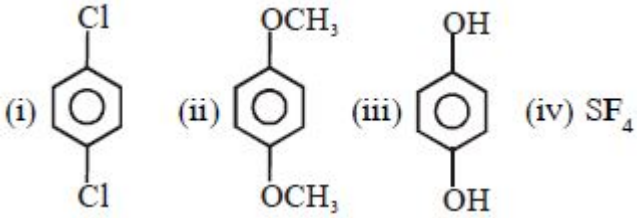
(A) 

(B) 

(C) 

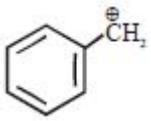
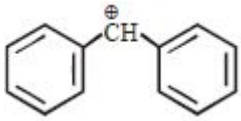
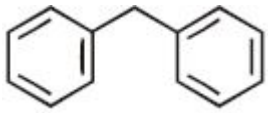
(D) 

80. In which of the following dipole moment of species are non zero



(A) i, ii, iii (B) Only iv (C) ii, iii and iv (D) All

81. Which of the following has hyperconjugation effect

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

82. Which of the following orders of relative strength of acid is correct

(A) $CH_3COOH > HCN > HOH > C_2H_5OH$

(B) $CH_3COOH < HCN < HOH < C_2H_5OH$

(C) $CH_3COOH > HCN < HOH < C_2H_5OH$

(D) $CH_3COOH < HCN < HOH > C_2H_5OH$

83. Which type of the overlap of orbitals involves in hyperconjugation ?

(A) $\pi - \pi$ (B) $\sigma - \pi$ (C) $\sigma - \sigma$ (D) $p - p$

84. The correct order of acidic strength is

(A) Chloroacetic acid $>$ Fluoroacetic acid $>$ Phenol $>$ Ethanol

(B) Ethanol $>$ Phenol $>$ Chloroacetic acid $>$ Fluoroacetic acid

(C) Fluoroacetic acid $>$ Chloroacetic acid $>$ phenol $>$ Ethanol

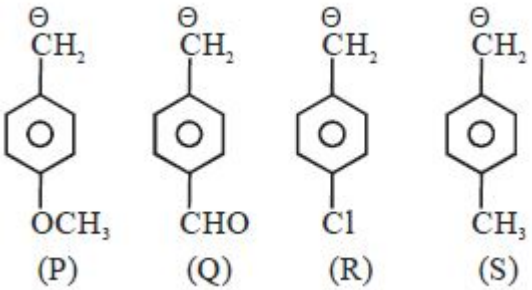
(D) Fluoroacetic acid $>$ Chloroacetic acid $>$ Ethanol $>$ Phenol

85. Decreasing$(-I)$ power of given groups is

$(A) - CN \ (B) - NO_2 \ (C) - NH_2 \ (D) - F$

(A) $B > A > D > C$ (B) $B > C > D > A$ (C) $C > B > D > A$ (D) $C > B > A > D$

86. The decreasing order of stability of following anions is



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

87. Dehydrohalogenation of an alkyl halide is a/an

(A) Nucleophilic substitution reaction

(B) Elimination reaction

(C) Both nucleophilic substitution and elimination reaction

(D) Rearrangement

88. Which of the following applies in the reaction,

$CH_3CHBrCH_2CH_3 \xrightarrow{alc.\ KOH}$

$(i)\ CH_3CH = CHCH_3$ (major product)

(ii) $CH_2 = CHCH_2CH_3$ (minor product)

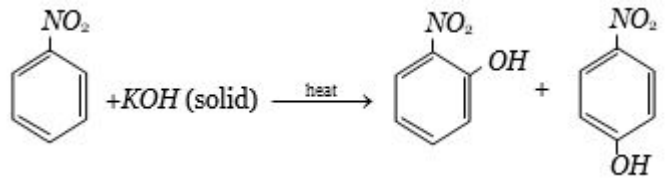
(A) Markovnikov's rule

(B) Saytzeff's rule

(C) Kharasch effect

(D) Hofmann's rule

89. The following reaction is



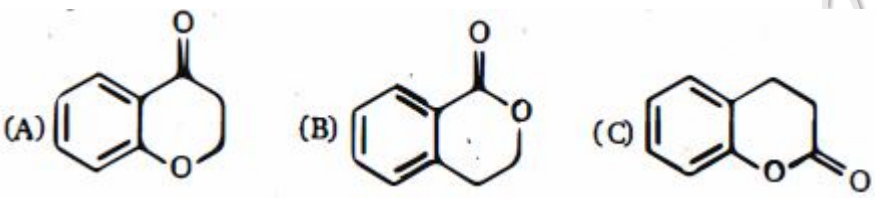
(A) Nucleophilic substitution

(B) Electrophilic substitution

(C) Free radical substitution

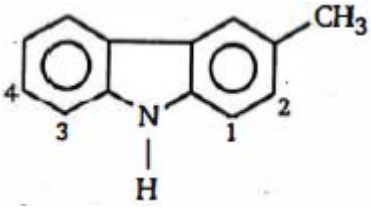
(D) None of these

90. Rank in order of increasing rate of reaction towards EAS with bromine in the presence of $FeBr_3$



(A) $B < A < C$ (B) $B < C < A$ (C) $A < B < C$ (D) $A < C < B$

91. Identify the position where $E.A.S.$ can take place



(A) 1

(B) 2

(C) 3

(D) 4

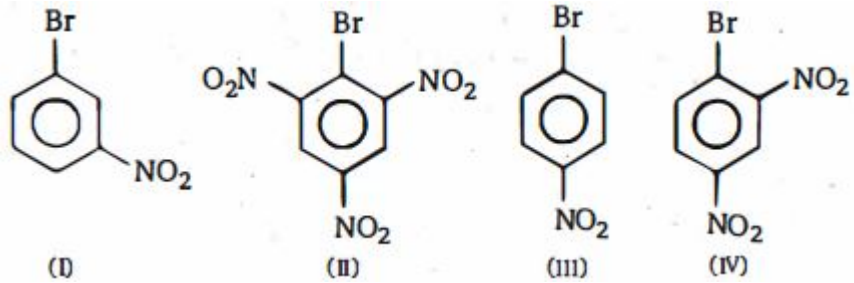
92. Decreasing order of rate of electrophilic aromatic substitution is

(A) $a > b > c > d$ (B) $a > c > b > d$ (C) $b > a > c > d$ (D) $b > c > a > d$

93. Which of the following substitution of benzene is ortho-para in electrophilic substitution and ortho-para in nucleophilic substitution ?

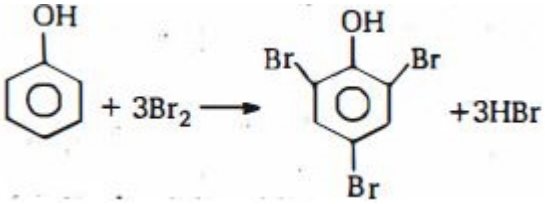
(A) $-NO_2$ (B) $-NO$ (C) $-SO_3H$ (D) $-SO_2Me$

94. The decreasing order of reactivity of given compound towards nucleophilic substitution with aqueous $NaOH$ is



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

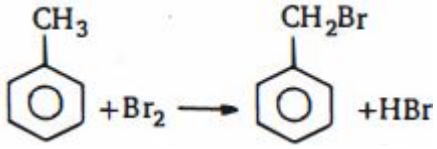
95. .



(A) Nucleophilic addition (B) Nucleophilic substitution

(C) Electrophilic addition (D) Electrophilic substitution

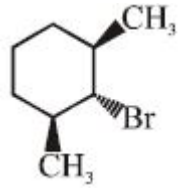
96. .



(A) Nucleophilic addition (B) Nucleophilic substitution

(C) Electrophilic addition (D) Free radical substitution

97. Why is the alkyl halide below not capable of undergoing an E_2 reaction upon treatment with sodium ethoxide



(A) Br^- is too poor leaving group

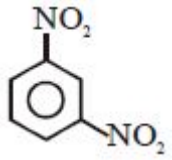
(B) To much angle strain would be present in the alkene product

(C) Sodium ethoxide is a poor base to use in E_2 reaction.

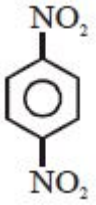
(D) The $C-H$ and $C-Br$ bond which need to break cannot achieve an anti periplanar orientation.

98. Most reactive compound in following toward electrophilic substitution reaction is

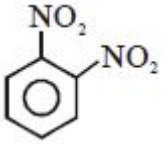
(A)



(B)

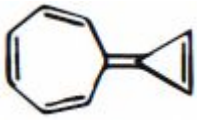


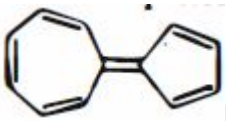
(C)



(D) All are equally reactive

99. Which of the following molecules is expected to have the greatest resonance stabilization ?

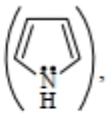
(A) 

(B) 

(C) 

(D) 

100.

Correct order of basic strength of Pyrrole  ,

Pyridine  and Piperidine  is:

(A) Piperidine $>$ Pyridine $>$ Pyrrole

(B) Pyrrole $>$ Pyridine $>$ Piperidine

(C) Pyridine $>$ Piperidine $>$ Pyrrole

(D) Pyrrole $>$ Piperidine $>$ Pyridine

101. Match List I with List II

List I (Amines)	List II (pK_b)
A Aniline	I 3.25
B Ethanamine	II 3.00
C $N-$Ethylethanamine	III 9.38

D $N,N-$Diethylethanamine	IV 3.29

Choose the correct answer from the options given below :-

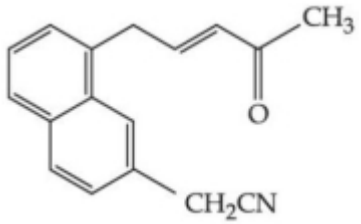
(A) $A-I,B-IV,C-II,D-III$

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

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

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

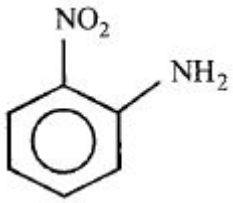
102. Number of electrophilic centre in the given compound is …… .



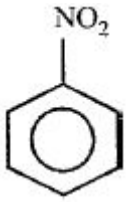
(A) 1 (B) 2 (C) 6 (D) 3

103. Which compound exhibits maximum dipole moment among the following ?

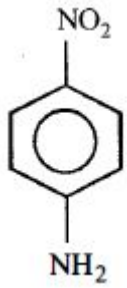
(A)



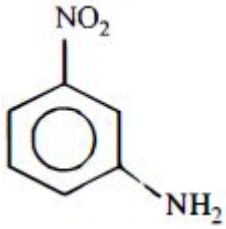
(B)



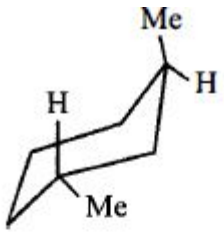
(C)

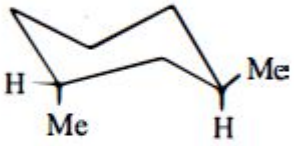


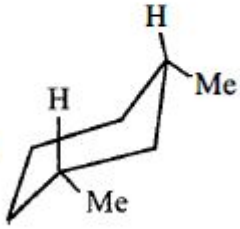
(D)

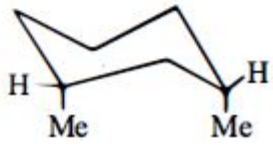


104. Arrange in the correct order of stability (decreasing order) for the following molecules

(I) 

(II) 

(III) 

(IV) 

(A) $(I) > (II) > (III) > (IV)$

(B) $(IV) > (III) > (II) \approx (I)$

(C) $(I) > (II) \approx (III) > (IV)$

(D) $(III) > (I) \approx (II) > (IV)$

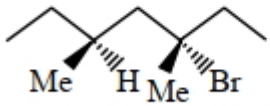
105. Match the reactions in List-I with the features of their products in List-II and choose the correct option.

List-I

(P) (-)-1-Bromo-2-ethylpentane (single enantiomer) $\xrightarrow[S_N2 \text{ reaction}]{\text{aq. NaOH}}$

(Q) (-)-2-Bromopentane (single enantiomer) $\xrightarrow[S_N2 \text{ reaction}]{\text{aq. NaOH}}$

(R) (-)-3-Bromo-3-methylhexane (single enantiomer) $\xrightarrow[S_N1 \text{ reaction}]{\text{aq. NaOH}}$

(S) 

(Single enantiomer) $\xrightarrow[S_N1 \text{ reaction}]{\text{aq. NaOH}}$

List-II

(1) Inversion of configuration

(2) Retention of configuration

(3) Mixture of enantiomers

(4) Mixture of structural isomers

(5) Mixture of diastereomers

(A) $\mathrm{P} \rightarrow 1; \mathrm{Q} \rightarrow 2; \mathrm{R} \rightarrow 5; \mathrm{S} \rightarrow 3$

(B) $\mathrm{P} \rightarrow 2; \mathrm{Q} \rightarrow 1; \mathrm{R} \rightarrow 3; \mathrm{S} \rightarrow 5$

(C) $\mathrm{P} \rightarrow 1; \mathrm{Q} \rightarrow 2; \mathrm{R} \rightarrow 5; \mathrm{S} \rightarrow 4$

(D) $\mathrm{P} \rightarrow 2; \mathrm{Q} \rightarrow 4; \mathrm{R} \rightarrow 3; \mathrm{S} \rightarrow 5$

106. Hyperconjugation involves overlap of the following orbitals

(A) $\sigma - \sigma$ (B) $\sigma - \mathrm{p}$ (C) $\mathrm{p} - \mathrm{p}$ (D) $\pi - \pi$

107. Which of the following resonating structures of $1-$methoxy$-1,3-$butadiene is least stable

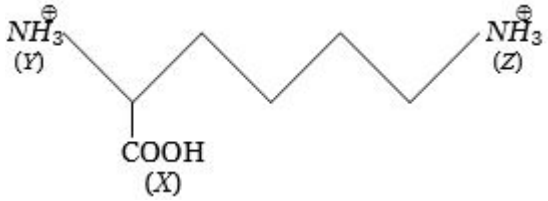
(A) $\overset{\ominus}{C}H_2 - CH = CH - CH = \overset{\oplus}{O} - CH_3$

(B) $CH_2 = CH_2 - \overset{\ominus}{C}H - CH = \overset{\oplus}{O} - CH_3$

(C) $CH_3 - CH_2 - \overset{\ominus}{C}H - CH = \overset{\oplus}{O} - CH_3$

(D) $CH_2 = CH - \overset{\ominus}{C}H - \overset{\oplus}{C}H - O - CH_3$

108. In the compound given below The correct order of the acidity of the positions (X), (Y) and (Z) is



(A) $(Z) > (X) > (Y)$ (B) $(X) > (Y) > (Z)$ (C) $(X) > (Z) > (Y)$ (D) $(Y) > (X) > (Z)$

109. A solution of $D(+)\ -2-$chloro$-2-$phenylethane in toluene racemises slowly in the presence of small amount of $SbCl_5$, due to the formation of

(A) Carbanion (B) Carbene (C) Free radical (D) Carbocation

110. In carbonium ion the carbon bearing the positive charge in the

(A) sp^2- hybridized state (B) sp^3d- hybridized state

(C) sp- hybridized state

(D) sp^3- hybridized state

111. The shape of carbonium is

(A) Planar (B) Pyramidal (C) Linear (D) None of these

112. Which of the following is a polar compound

(A) C_2H_6 (B) CCl_4 (C) HCl (D) CH_4

113. All bonds in benzene are equal due to

(A) Tautomerism (B) Inductive effect (C) Resonance (D) Isomerism

114. $'C - C'$ bond length in benzene lies between single and double bond. The reason is

(A) Resonance (B) Isomerism (C) Metamerism (D) Inductive effect

115. Which of the following has strongest $+I$ effect?

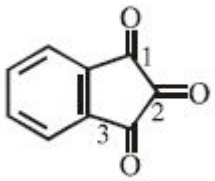
(A) $-\overset{\Theta}{O}$ (B) $-CH_2 - CH_3$ (C) $-CH_3$ (D) $-CD_3$

116. The solvent which neither accepts proton nor donates proton is called

(A) Amphoteric (B) Neutral

(C) Aprotic (D) Amphiprotic

117. Which carbonyl group is most reactive for NAR ?



(A) 1

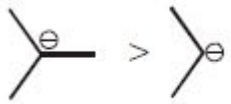
(B) 2

(C) 3

(D) All have same reactivity

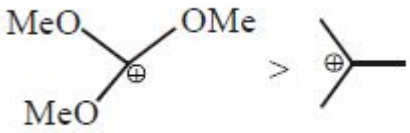
118. Identify correct stability order ?

(A)

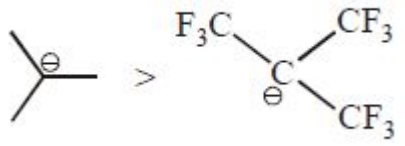


(B)

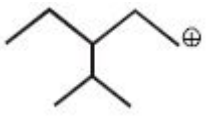
(C)



(D)

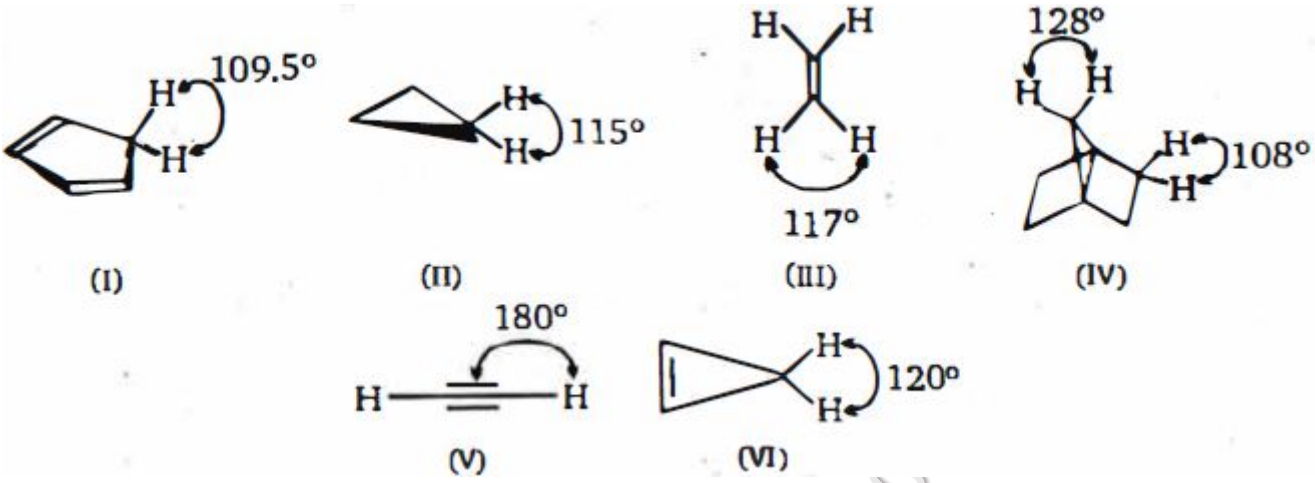


119. How many $1,2-$ shift takes place in following carbocation.



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

120. Selected bond angles for six hydrocarbons are shown below. Arrange these hydrocarbons according to their pK_a values, from the lowest to the highest



(A) $V < I < VI < II < III < IV$

(B) $IV < I < II < III < V < VI$

(C) $II < IV < I < VI < V < III$

(D) $I < V < IV < III < II < VI$

121. Dichloro carbene form by chloroform and alc. KOH, which reaction involve this carbene

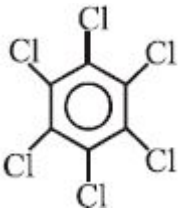
(A) Schmidt reaction

(B) Reimer-tiemann reaction

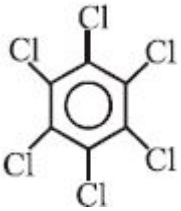
(C) Carbyl amine reaction

(D) (B) and (C) both

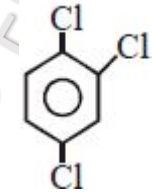
122. Which has maximum dipole moment ?



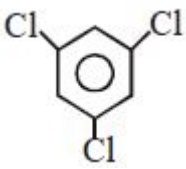
(A)



(B)

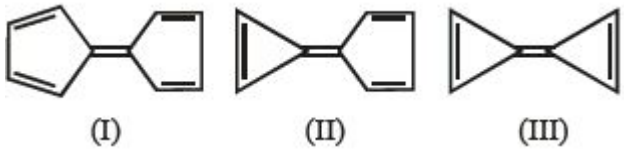


(C)



(D)

123. Consider the following compounds Which compound possesses highest dipole moment ?

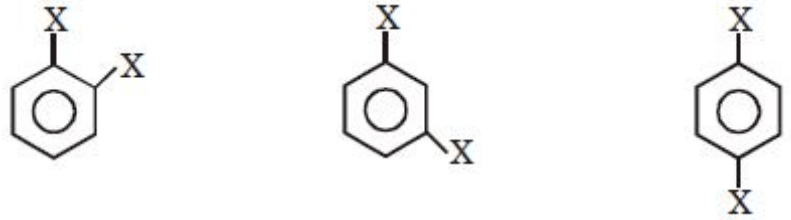


(I) (II) (III)

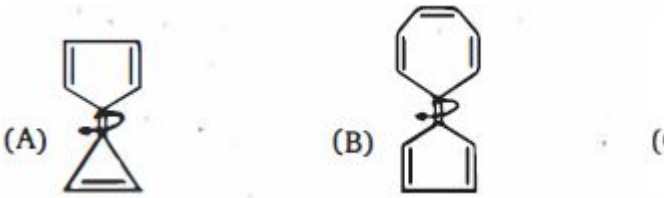
(A) I (B) II (C) Both I and II (D) III

124. Which molecule has maximum dipole moment (μ) ? { where $X = -NO_2$}

(A) (B) (C) (D) All has same $'\mu'$



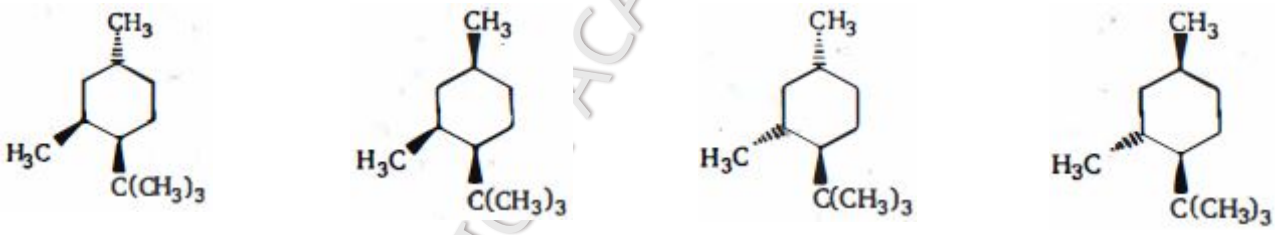
125. Compare carbon-carbon bond rotation across A, B, and C



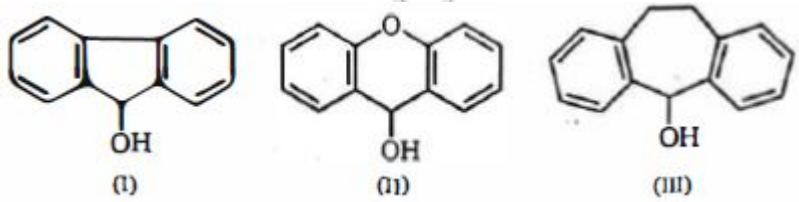
(A) $A > B > C$ (B) $A > C > B$ (C) $B > A > C$ (D) $B > C > A$

126. Which one of the following has the smallest heat of combustion ?

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



127. Arrange the following alcohols in decreasing order of the ease of ionization under acidic conditions.



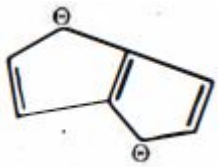
(I) (II) (III)

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

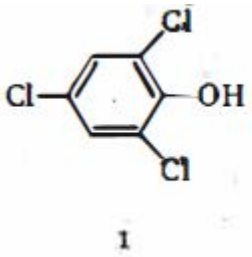
128. Which of the following is most polar?

(A)

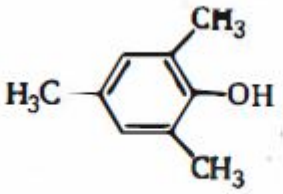
(B) (C) (D)



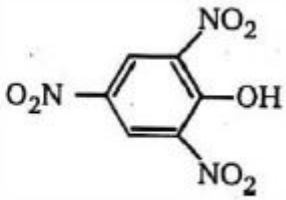
129. Rank the following compounds in order of increasing acidity (weakest acid first).



1



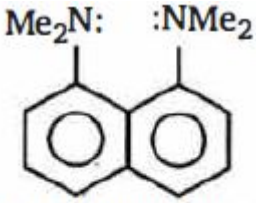
2



3

(A) $2 < 3 < 1$ (B) $3 < 1 < 2$ (C) $1 < 2 < 3$ (D) $2 < 1 < 3$

130. Its basic strength is 10^{10} more than I -dimethyl amino naphthalene. Reason for high basic strength is



1, 8-Bis (dimethylamino) naphthalene is after referred so as (Proton sponge)

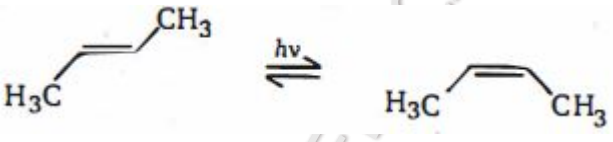
(A) resonance

(B) steric inhibitation of resonance

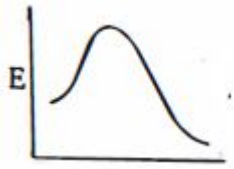
(C) ortho effect

(D) hyperconjugation

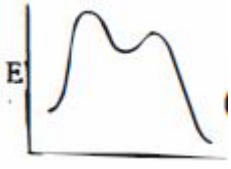
131. Which energy diagram best represents the given reaction ?



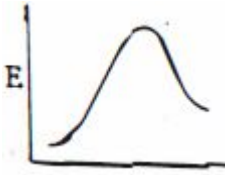
(A)



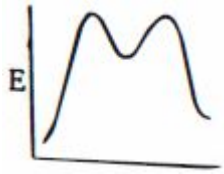
(B)



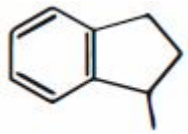
(C)

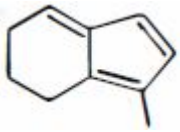


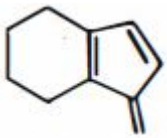
(D)

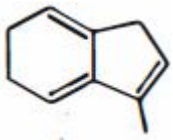


132. Which of the following isomeric hydrocarbons is most acidic ?

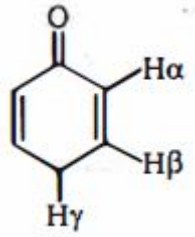
(A) 

(B) 

(C) 

(D) 

133. In the enolization of the given molecule, the H -atom involved is



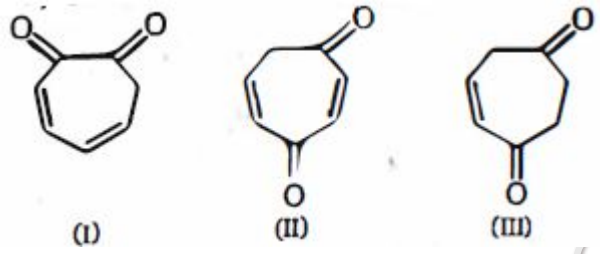
(A) $\alpha - H$

(B) $\beta - H$

(C) $\gamma - H$

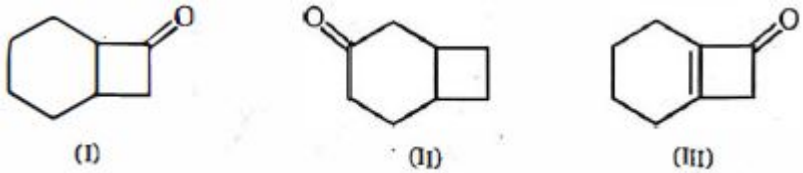
(D) cannot be enolized

134. Among the given compounds, the correct order of enol content is



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

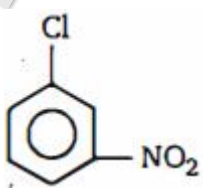
135. Among the given compounds, the correct order of enol content is

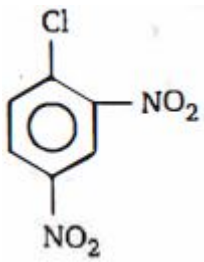


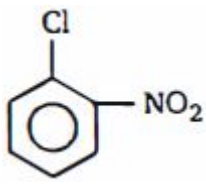
(A) $I > II > III$ (B) $III > II > I$ (C) $III > I > II$ (D) $II > I > III$

136. Which one of the following compounds is most reactive for ArS_{N^2} reaction ?

(A) 

(B) 

(C) 

(D) 

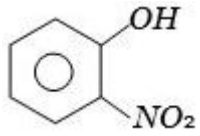
137. Most acidic hydrogen is present in

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

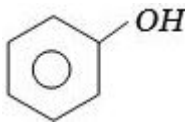
138. Which one of the following compounds is most acidic

(A) $Cl-CH_2-CH_2-OH$

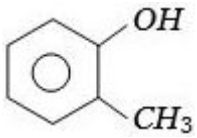
(B)



(C)



(D)



139. Which of the following is not an electrophile

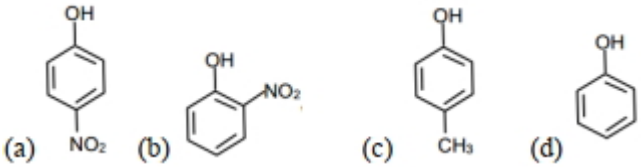
(A) NO_2 (B) Na^+ (C) H^+ (D) BF_3

140. Which one of the following orders is correct regarding the inductive effect of the substituents

(A) $-NR_2 < -OR > -F$ (B) $-NR_2 > -OR > -F$

(C) $-NR_2 < -OR < -F$ (D) $-NR_2 > -OR < -F$

141. Order of acidic nature



(A) $a > c > d > b$ (B) $a > b > d > c$ (C) $a > b > c > d$ (D) $d > c > b > a$

142. Which of the following are intermediates in Sandmeyer reaction ?

$(i)\ C_6H_5N^+ \equiv NCl^-$ $(ii)\ C_6H_5N^+ \equiv N$

$(iii)\ \dot{C}_6H_5$ $(iv)\ C_6H_5Cl$

(A) (ii) and (iii) (B) (i) and (iv) (C) (ii) and (iv) (D) (i) and (ii)

143. Among the following the strongest nucleophile is

(A) C_2H_5SH (B) CH_3COO^- (C) CH_3NH_2 (D) $NCCH_2^-$

144. The dipole moment is the highest for

(A) Trans$-2-$butene

(B) $1,3-$Dimethylbenzene

(C) Acetophenone

(D) Ethanol

145. $C-C$ bond length in benzene is.....$\overset{o}{A}$

(A) 1.39

(B) 1.54

(C) 1.34

(D) Different in different bonds

146. Dipole moment is shown by

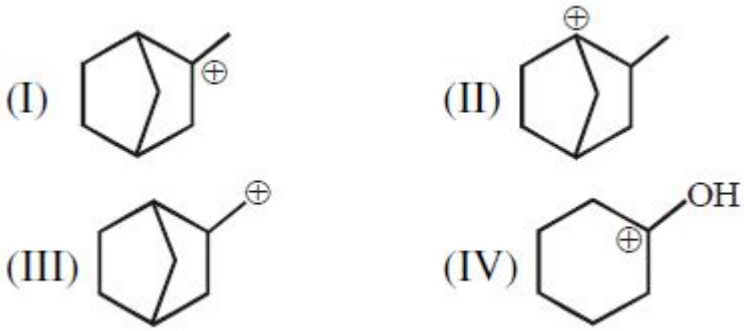
(A) $1,2-$ dichlorobenzene

(B) trans $2,3-$ dichloro $-2-$ butene

(C) $1,4-$ chlorobenzene

(D) trans $-1,2-$ dinitroethene

147. Find out correct stability order in the following carbocations



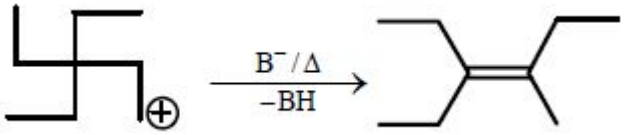
(A) $IV > I > III > II$

(B) $IV > III > I > II$

(C) $I > IV > III > II$

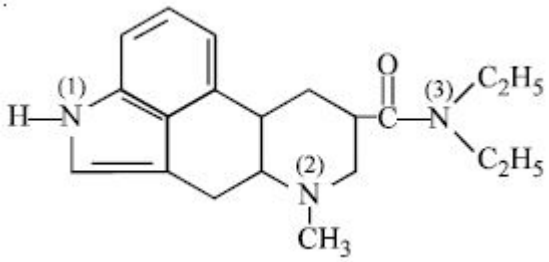
(D) $I > III > IV > II$

148. Find out the number of $1-2$-shifts during the conversion of



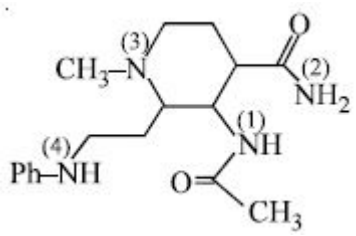
(A) 2 (B) 3 (C) 4 (D) 5

149. Correct order of basicity of various nitrogen in LSD is



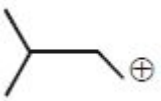
(A) $1 > 2 > 3$ (B) $2 > 1 > 3$ (C) $2 > 3 > 1$ (D) $3 > 2 > 1$

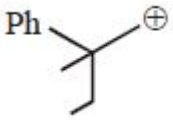
150. Correct order of basicity is

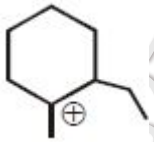


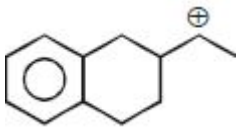
(A) $3 > 1 > 2 > 4$ (B) $3 < 1 < 2 < 4$ (C) $3 < 4 < 1 < 2$ (D) $3 > 4 > 1 > 2$

151. Which of the following Carbocation will not undergo rearrangement

(A) 

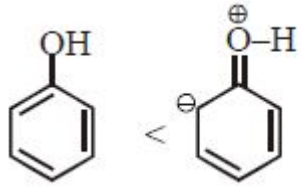
(B) 

(C) 

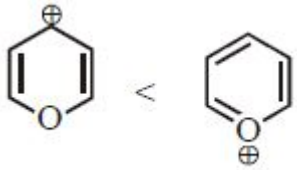
(D) 

152. Identify correct stability order of resonating structures ?

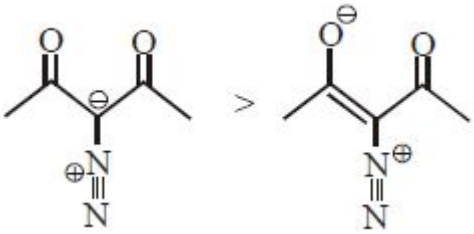
(A)



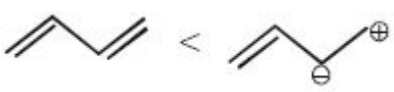
(B)



(C)



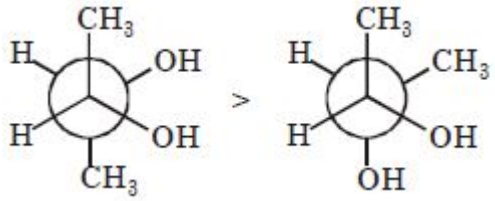
(D)



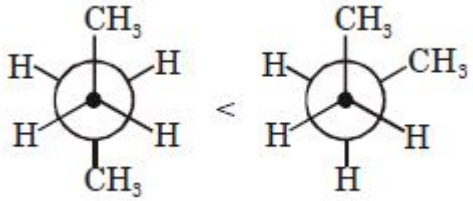
153. Correct stability order is :

(A) $CH_3SO_3^- > CH_3CO_2^- > CH_3CH_2^- > CH_3O^-$

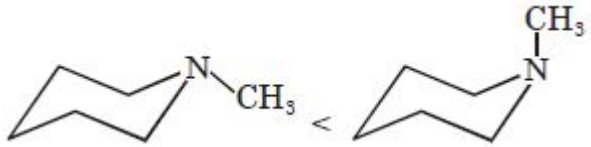
(B)



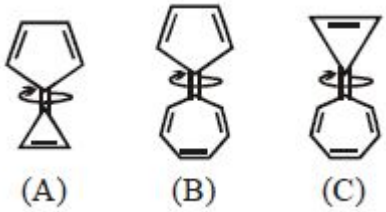
(C)



(D)



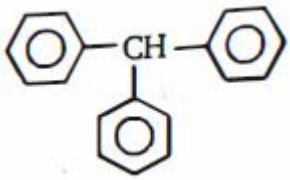
154. Compare carbon-carbon bond rotation energy across A, B and C



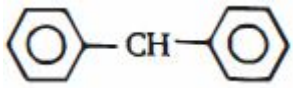
(A) $A > B > C$ (B) $A > C > B$ (C) $B > A > C$ (D) $B > C > A$

155. Which of the following has lowest pK_a value ?

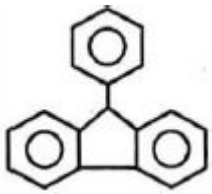
(A)



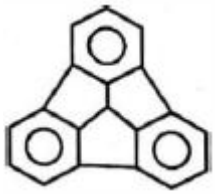
(B)



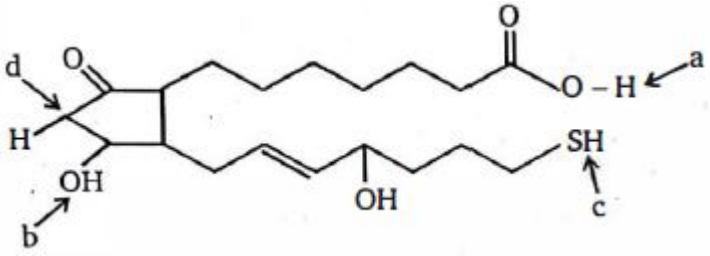
(C)



(D)

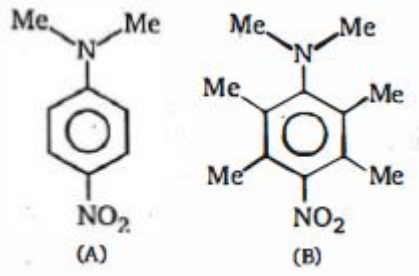


156. Identify most acidic hydrogen in given compound.



(A) a (B) b (C) c (D) d

157. Dipole moments of given compound will be



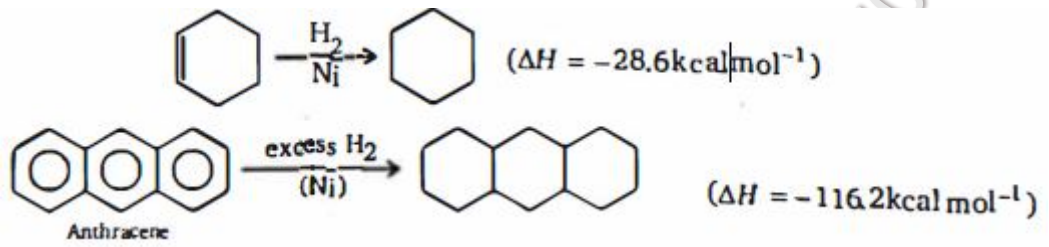
(A) $(A) = 6.87\,D, (B) = 4.11\,D$

(B) $(A) = 4.11\,D, (B) = 6.87\,D$

(C) $(A) = 4.11\,D, (B) = 4.11\,D$

(D) $(A) = 6.87\,D, (B) = 6.87\,D$

158. Use the following data to answer the question below.
Calculate the resonance energy of anthracene.....$kcal/mol$



(A) 84

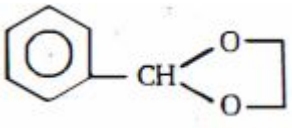
(B) 100

(C) 110

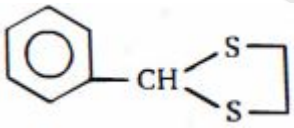
(D) 116

159. Which of the following compounds has most acidic hydrogen ?

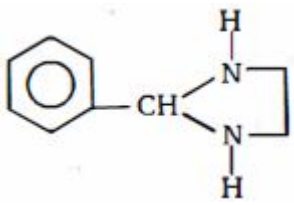
(A)



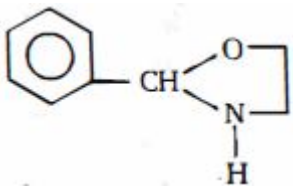
(B)



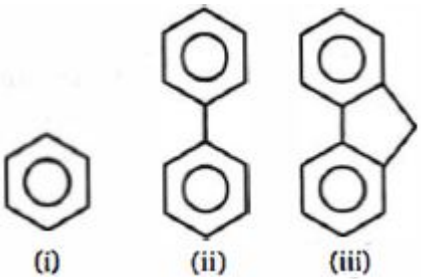
(C)



(D)



160. Arrange in their decreasing order of rate of electrophilic aromatic substitution



(A) $i > ii > iii$

(B) $iii > ii > i$

(C) $iii > i > ii$

(D) $i > iii > ii$

----- "Start where you are, use what you have, do what you can." -----