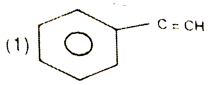
CHEMISTRY

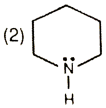
RESONANCE ENGLISH

GENERAL ORGANIC CHEMISTRY-I

EXERCISE-1

1. Show the direction of inductive effect in following compounds

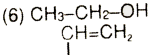
(1) 

(2) 

(3) $CH_3–CH=CH_2$

(4) $CH_3–CH_2–CH_2–Li$

(5) $CH_3–CH_2–CH_2–MgBr$

(6) 

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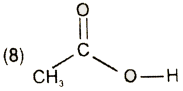
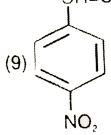
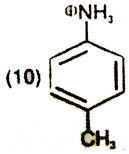
(8) 

(9) 

(10) 

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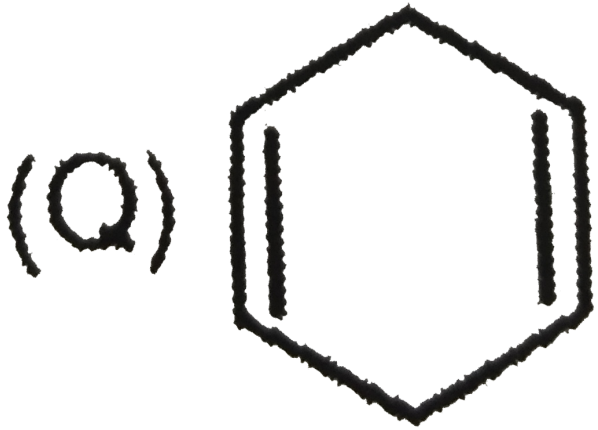
2. Which of the following compounds have delocalized electrons?

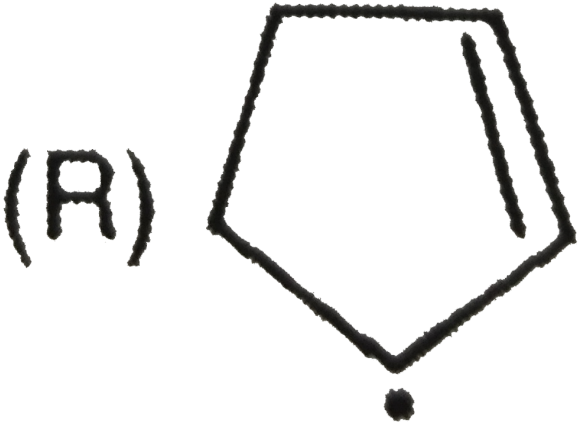
(P) $CH_2 = Ch\overset{O}{\overset{||}{C}}CH_3$ (Q)

(Q)



(R)

(R)



(S)

$CH_3CH_2NHCH = CHCH_3$

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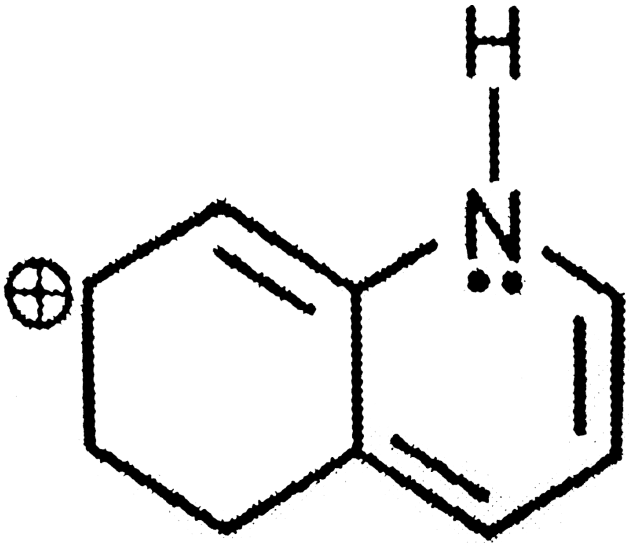
3. Number of π electrons in resonance in the following structure is.



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4. In the following sets of resonating structure, lable the major and minor contributors towards resonance hybrid.

$$(P)CH_3 - \underset{(I)}{\overset{\ominus}{C}H} - C \equiv N \leftrightarrow CH_3CH = \underset{(II)}{C} = \ddot{N}:^{\ominus} \qquad (Q)CH_3 - \overset{\ominus}{C}$$

$$(R)CH_3 - CH_2 - \underset{(I)}{\overset{\oplus}{C}}\underset{NH_2}{|} - NH_2 \leftrightarrow CH_3 - CH_2 - \underset{(II)}{\underset{NH_2}{\underset{|}{C}}} = \overset{\oplus}{N}H_2 \qquad (S)CH$$

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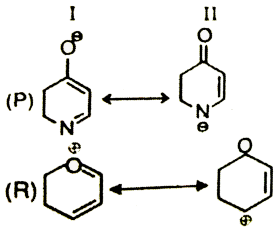
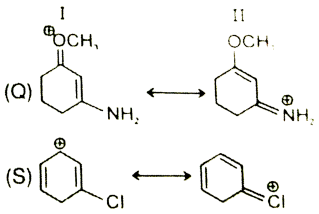
5. Write the stability order of following resonating structures :





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6. Arrange the following groups in the increasing order of $+M$:

(i) $-ICl,\ -F,\ -Br$ (ii) $-NH_2,\ -OH,\ -O^{\Theta}$

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7. Arrange the following groups in the increasing order of $-M$:

(i) $-NO_2,\ -COOR,\ -CHO,\ -CN,\ -COR$

(ii) $-\overset{O}{\overset{||}{C}}-F,\ -\overset{O}{\overset{||}{C}}-NH_2,\ -\overset{O}{\overset{||}{C}}-O^-$

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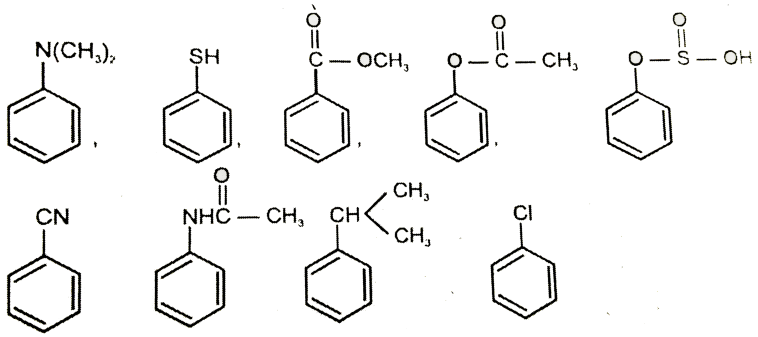
8. Which of the following groups (attached with benzene ring) show $+M$ effect ?



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9. Compare the SIR effect between orthochloro benzoic acid, orthobromobenzoic acid and orthoiodo benzoic acid.

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10. Define hyperconjugation by taking an example of propene.

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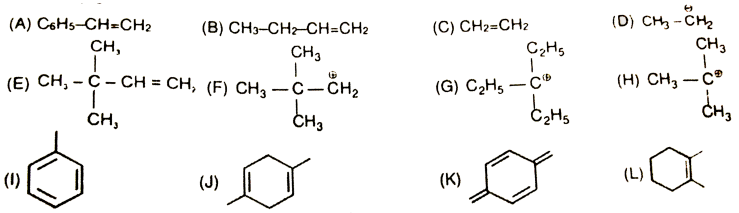
11. In which molecules or ions hyperconjugation effect is observed and write the number of hyperconjugable hydrogen atoms.



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12. What is meant by aromaticity ?

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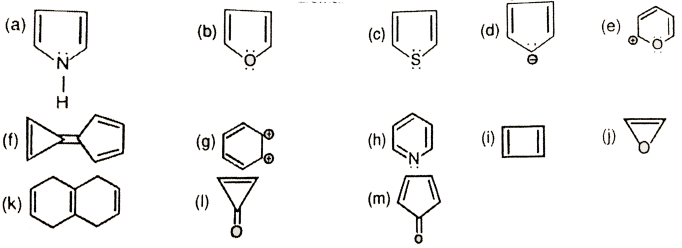
13. Calssify the following as aromatic, antiaromatic and nonaromatic compounds.



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14. Why cyclooctatetraene is nonplanar.

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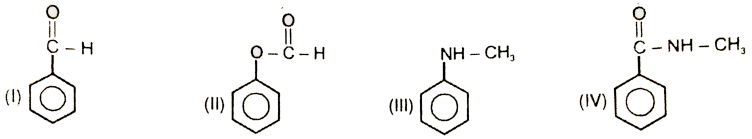
15. The correct decreasing order of electron density in aromatic ring of following compounds is :



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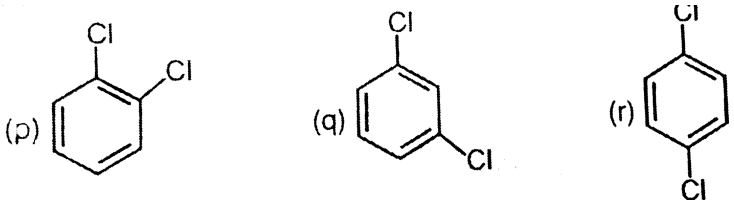
16. Correct dipole moment order is



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EXERCISE-1 PART-II

1. Inductive effect involves

A. Delocalisation of σ-electrons

B. Partical displacement of σ-electrons

C. Delocalisation of $s\pi$-electrons

D. Displacement of lone pair electrons.

Answer: B

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2. Select correct statement about I effect ?

A. I effect transfers electrons from one carbon atom to another.

B. I effect is the polarisation of σ bond electrons

C. I effect creates net charge in the molecule.

D. I effect is distance independent.

Answer: B

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3. Which of the following group shows $+I-$ effect :

A. $-Br$

B. $-COOH$

C. $-OR$

D. $-COO^-$

Answer: D

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4. Which of the following has the maximum resistance?

A. $(CH_3)_2CH-$

B. $(CH_3)_3C-$

C. CH_3CH_2-

D. CH_3CH_2-

Answer: B

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5. Decreasing -I effect of given group is :

(i) $-CN$, (ii) $-NO_2$

(iii) $-NH_2$, (iv) $-F$

A. $iii > ii > i > iv$

B. $ii > iii > iv > i$

C. $iii > ii > iv > i$

D. $ii > i > iv > iii$

Answer: D

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6. Which of the following is the strongest $-I$ group :

A. $-\overset{+}{N}(CH_3)_3$

B. $-\overset{+}{N}H_3$

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

D. $-F$

Answer: A

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7. Resonance is delocalisation of :

A. π electrons

B. σ electrons

C. $\sigma - \pi$ electrons

D. None

Answer: A

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8. Resonance involves :

A. Delocalization of π-electrons along a conjugated system.

B. Delocalization of lone pair along a conjugated system.

C. Delocalization of negative charge along a conjugated system.

D. All are correct.

Answer: D

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9. During delocalization, which statement is INCORRECT :

A. Net charge remains same

B. Number of paired electrons ramains same

C. Number of unpaired electrons remain same

D. Energy of resonating structures always remains same

Answer: D

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10. Resonance structure of a molecule should not have

A. higher energy than their hybrid structure.

B. identical arrangement of atoms.

C. the same number of paired electrons.

D. always equal contribution to the resonance hybrid.

Answer: D

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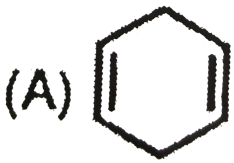
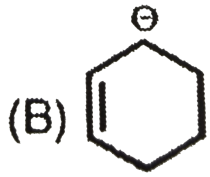
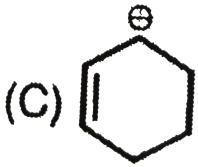
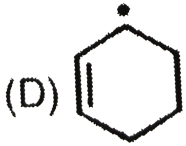
11. Which of the following species exists:

A.



B. 

C. 

D. 

Answer: A

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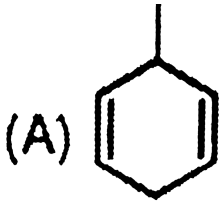
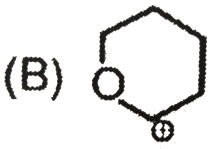
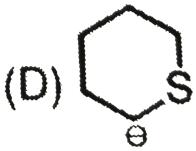
12. Resonance is not possible in

A. 

B. 

C. $CH_2 = CH - Cl$

D. 

Answer: A

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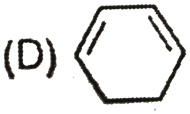
13. Which does not have conjugate system?

A. $CH_2 = CHCl$

B. $CH_2 = CHCHO$

C. $CH_3CH = CH_2$

D. 

Answer: C

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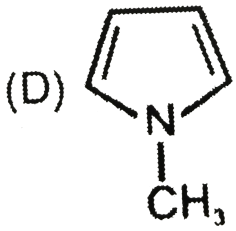
14. The compound which is not resonance stabilised

A. $CH_2 = CH - Cl$

B. (B) 

C. $CH_2 = CH - CH_2Cl$

D. (D) 

Answer: C

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15. Which of the following pairs represents resonating structures ?

A. $\overset{\ominus}{C}H_2 - \underset{\underset{|}{H}}{\overset{\oplus}{N}} = O$

B. $CH_2 = \underset{\underset{|}{H}}{N} = O$

C. $CH_2 = \underset{\underset{|}{H}}{\overset{\oplus}{N}} - O^{\ominus}$

D. None of these

Answer: B

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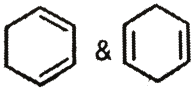
16. Which of the following pairs represents resonating structures ?

A. (A)  &

B. $CH_2 = CH - \overset{\ominus}{O} \& \overset{\ominus}{C}H_2 - CH = O$

C. $CH_2 = CH - O - CH_3 \& \overset{\ominus}{C}H_2 - CH = \overset{\oplus}{O} - CH_3$

D. $CH_3 - \overset{\oplus}{C} = O \& CH_3 - C = \overset{\oplus}{O}$

Answer: A

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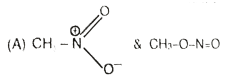
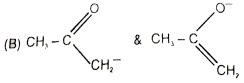
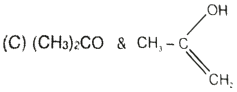
17. Which of the following pairs represents resonating structures ?

A. 

B. 

C. 

D. $CH_3 - CH = CH - CH_3 \& CH_3 - CH_2 - CH = CH_2$

Answer: B

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18. Which of the following pairs represents resonating structures ?

A. $H-C=\overset{\oplus}{N}-\overset{\Theta}{\underset{\cdot\cdot}{\underset{\cdot\cdot}{O}}}:$ and $H-\underset{\cdot\cdot}{\underset{\cdot\cdot}{O}}-C\equiv N:$

B. $H-\overset{\oplus}{\underset{\cdot\cdot}{\underset{\cdot\cdot}{O}}}=C=\overset{\Theta}{\underset{\cdot\cdot}{\underset{\cdot\cdot}{N}}}:$ and $H-\underset{\cdot\cdot}{\underset{\cdot\cdot}{O}}-C\equiv N:$

C. $H-C=\overset{\oplus}{N}-\overset{\Theta}{\underset{\cdot\cdot}{\underset{\cdot\cdot}{O}}}:$ and $H-\overset{O}{\overset{||}{C}}-\underset{\cdot\cdot}{\underset{\cdot\cdot}{N}}:$

D. $H-\underset{\cdot\cdot}{\underset{\cdot\cdot}{O}}-C\equiv\overset{\Theta}{N}$ and $H-\underset{\cdot\cdot}{\underset{\cdot\cdot}{N}}=C=\underset{\cdot\cdot}{\underset{\cdot\cdot}{O}}:$

Answer: B

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19. Resonance is not possible in

A. $CH_2=C=CH_2$

B. $CH_2=C=CH^{\Theta}$

C. $CH_2=C=CH^{\oplus}$

D. $CH_2=C=CH^{\cdot}$

Answer: A

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20. Which of the following is least stable ?

A. $NH_2 - \overset{\overset{O}{||}}{C} - O - CH_3$

B. $\overset{\oplus}{N}H_2 = \overset{\overset{\cdot^{\Theta}\,O}{|}}{C} - OCH_3$

C. $NH_2 - \underset{\oplus}{\overset{\overset{O^{\Theta}}{|}}{C}} - OCH_3$

D. $NH_2 - \underset{\oplus}{\overset{\overset{O^{\Theta}}{|}}{C}} = \underset{\oplus}{O} - CH_3$

Answer: C

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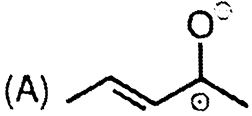
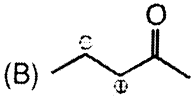
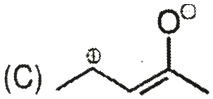
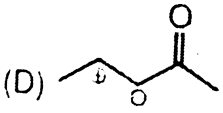
21. Which of the following resonating structure is the least contributing structure ?`

A. 

B. 

C. 

D. 

Answer: B

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22. HNCO (isocyanic acid) has following resonating structures :

$$\underset{\text{I}}{H-N=C=O} \leftrightarrow \underset{\text{II}}{H-\overset{\ominus}{N}-C\equiv O^{\oplus}} \leftrightarrow \underset{\text{III}}{H-\overset{\oplus}{N}\equiv C-O^{\ominus}}$$

A. $I > III > II$

B. $I > II > III$

C. $II > III > I$

D. $II > I > III$

Answer: A

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23. Arrange the following resonating structures in order of increasing stability

$\underset{(I)}{CH_2 = \overset{+}{N} = \overset{-}{N}}$ $\underset{(II)}{H_2\overset{+}{C} = N = \overset{-}{N}}$ $\underset{(III)}{H_2\overset{-}{C} - \overset{+}{N} \equiv N}$ $\underset{(IV)}{H_2\overset{-}{C} - N = \overset{+}{N}}$

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

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

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

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

Answer: D

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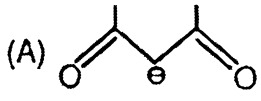
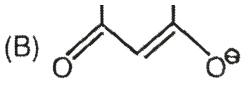
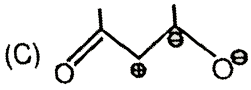
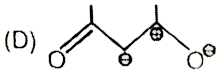
24. The most stable resonating structure is

A. 

B. 

C. 

D. 

Answer: B

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25. Which of the following groups exerts $+m$ effect when attached with benzene ring?

A. $-CN$

B. $-O-NO$

C. $-CCl_3$

D. $-CHO$

Answer: B

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26. Which of the following groups exerts $+m$ effect when attached with benzene ring?

A. $-CMe_3$

B. $-O-\overset{\overset{O}{||}}{\underset{\underset{O}{||}}{S}}-O-R$

C. $-NH-\overset{\overset{O}{||}}{C}-CH_3$

D. $-\overset{\overset{O}{||}}{\underset{\underset{O}{||}}{S}}-O-R$

Answer: D

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27. Which of the following group show $+M$ and $-l$ effect?

A. $-\underset{\underset{O}{||}}{C}-F$

B. $-\underset{\underset{O}{||}}{C}-OR$

C. $-O^{\Theta}$

D. $-OH$

Answer: D

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28. Which of the following group shown $+m > -I$ effect?

A. $-F$

B. $-O-\overset{\overset{O}{||}}{C}-R$

C. $-\underset{\underset{O}{||}}{C}-R$

D. $-COOH$

Answer: B

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29. Which of the following group show $-m$ and $-I$ effect?

A. $-NO_2$

B. $-NH_2$

C. $-OH$

D. $-F$

Answer: A

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30. $+I$ effect is shown by

A. $-\ddot{\underset{\cdot\cdot}{O}}H$

B. $-\ddot{N}HCH_3$

C. $-O^{\Theta}$

D. $-C(CH_3)_3$

Answer: C

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31. Weakest acid is:

A. $-OCH_3$

B. $-F$

C. $-I$

D. $-N(CH_3)_2$

Answer: C

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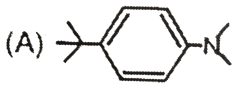
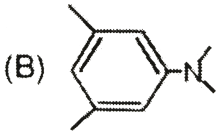
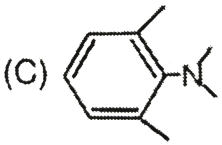
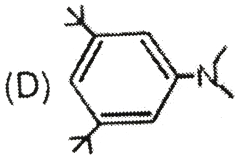
32. Maximum extent of steric inhibition of resonance can be expected in

A. 

B. 

C. 

D. 

Answer: C

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33. Hyperconjugation involves overlap of which of the following orbitals?

A. p - and π-orbitals

B. 2π-orbitals

C. d- and π- orbital

D. σ-and p-orbitals

Answer: D

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34. Which of the following cannot exhibit hypercojugation -

A. $CH_3\dot{C}H_2$

B. $(CH_3)_2\overset{+}{C}H$

C. $CH_3CH = CH_2$

D. $(CH_3)_3C - \overset{+}{C} - CH_2$

Answer: D

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35. Which of the following will give maximum number of isomers?

A. $CH_2 = CH_2$

B. $CH_3 - CH = CH_2$

C. $CH_3 - CH_2 - CH = CH_2$

D. $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH = CH_2$

Answer: B

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36. Which one of the following has inductive, mesomeric and hyperconjugation effect ?

A. CH_3Cl

B. $CH_3 - CH = CH_2$

C. $CH_3CH = CH - \underset{\underset{O}{||}}{C} - CH_3$

D. $CH_2 = CH - CH = CH_2$

Answer: C

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37. Which of the following group has the maximum hyperconjugation effect ?

A. CH3-

B. CH3CH2-

C. (CH3)2CH-

D. (CH3)3C-

Answer: A

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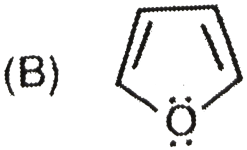
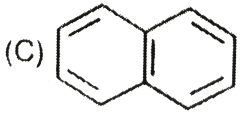
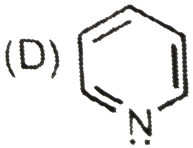
38. Which of the following is aromatic hydrocarbon ?

A. 

B. 

C. 

D. 

Answer: C

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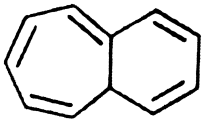
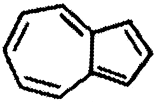
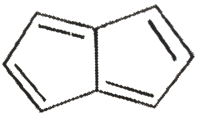
39. Identify the aromatic amino acid from the given option.

A. (A) 

B. (B) 

C. (C) 

D. (D) 

Answer: B

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40. Alkanes burn with a smoky flame.

A. They have a ring structure of carbon atoms.

B. They have a relatively high percentage of hydrogen.

C. They resist reaction with oxygen of air.

D. They have a relatively high percentage of carbon.

Answer: D

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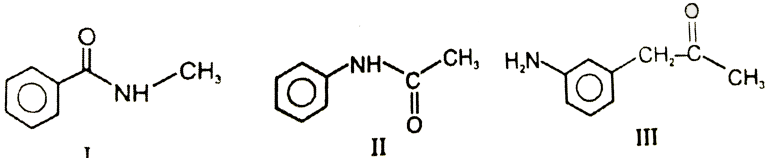
41. The decreasing order of electron density on the ring is :



A. $III > II > I$

B. $II > III > I$

C. $I > III > II$

D. $III > I > II$

Answer: A

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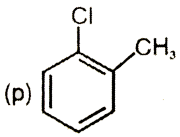
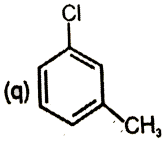
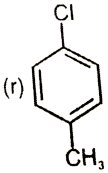
42. Correct dipole moment order is







A. $p > q > r$

B. $r > q > p$

C. $q > r > p$

D. $p > r > q$

Answer: B

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43. Arrange following compounds in decreasing order of their dipole moment.

$CH_3 - \underset{\text{I}}{CH_2} - NO_2$ $CH_3 - \underset{\text{II}}{CH_2} - NH_2$ $CH_3 - \underset{\text{III}}{CH_2} - F$

$CH_3 - \underset{\text{IV}}{CH_2} - C \equiv N$

A. $IV > III > I > II$

B. $IV > I > III > II$

C. $I > III > IV > II$

D. $I > IV > III > II$

Answer: D

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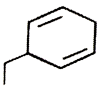
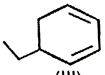
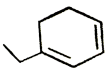
44. The stability order of alkene in following compounds is :


(I)


(II)


(III)


(IV)

A. $I < II < III < IV$

B. $II < I < III < IV$

C. $II < III < I < IV$

D. $II < IV < I < III$

Answer: A

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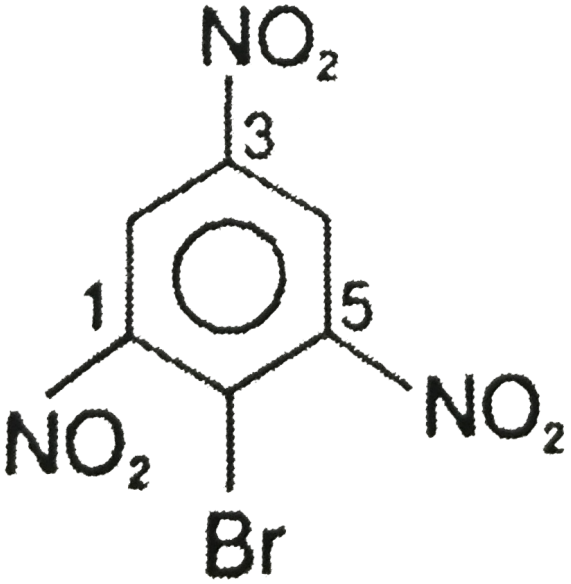
45. Select the correct statement about this compound.



A. All three $C - N$ bond length are same.

B. $C_1 - N$ and $C_3 - N$ bonds length are same but shorter than $C_5 - N$ bond length.

C. $C_1 - N$ and $C_5 - N$ bonds length are same but longer than $C_3 - N$ bond length.

D. $C_1 - N$ and $C_3 - N$ bonds length are different but both are longer than $C_5 - N$ bond length.

Answer: C

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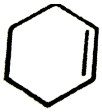
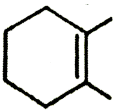
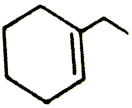
46. Arrange the satbility of following :



I



II



III

A. $I < II < III$

B. $II < I < III$

C. $I < III < II$

D. $II < III < I$

Answer: C

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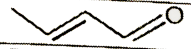
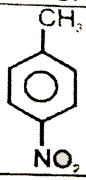
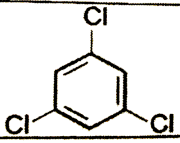
EXERCISE-1 PART-III (MATCH THE COLUMN)

1. Match the following :

	Coulmn–I (Compounds)		Coulmn–II (Characteristics)
(A)		(p)	Mesomeric effect / resonance
(B)	$Ph–CH=CH–CH_3$	(q)	Inductive effect.
(C)		(r)	Hyperconjugative effect
(D)		(s)	Nonpolar
		(t)	Polar

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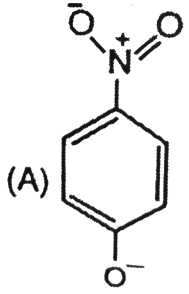
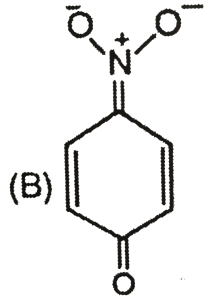
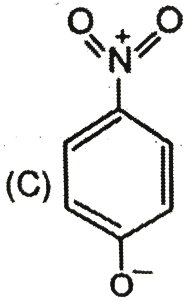
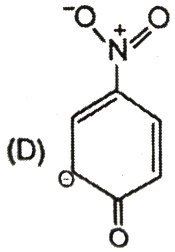
EXERCISE-2 PART-I

1. The most unlikely representation of resonance structures of p-nitrophenoxide ion is :

A. 

B. 

C. 

D. 

Answer: C

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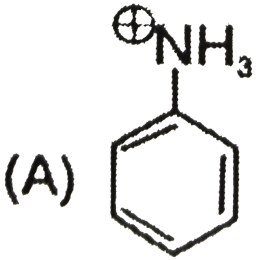
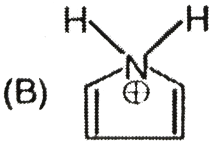
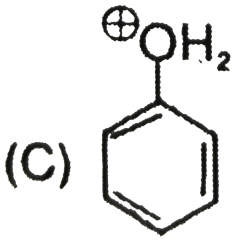
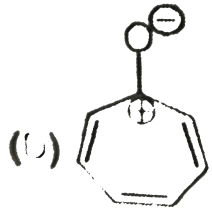
2. In which of the following carbocations, delocalisation of positive charge is possible :

A. 

B. 

C. 

D. 

Answer: D

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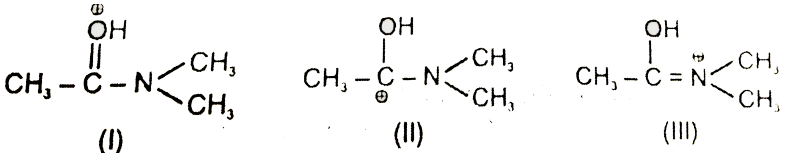
3. Decreasing order of potential energy of the following cations is :



(I) (II) (III)

A. $II > I > III$

B. $I > II > III$

C. $III > II > I$

D. $III > II > I$

Answer: A

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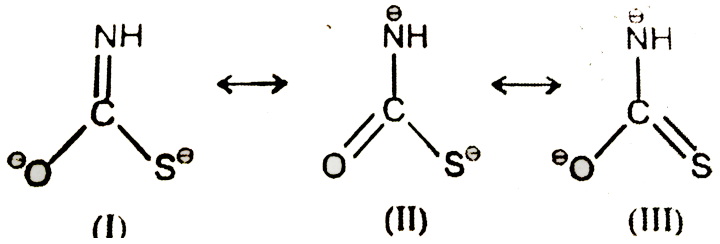
4. Stability order of the following species ?



(I) (II) (III)

A. $I > II > III$

B. $III > I > II$

C. $III > II > I$

D. $I > III > II$

Answer: A

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5. In which of the following element $+1$ oxidation state is more stable :

A. $\overset{\ominus}{C}H_2 - CH = O \leftarrow \rightarrow CH_2 = CH - O^{\ominus}$

B. $\overset{\oplus}{C}H_2 - O - CH_3 \leftarrow \rightarrow CH_2 = \overset{\oplus}{O} - CH_3$

C. $CH_2 = CH - NH_2 \leftarrow \rightarrow \overset{\ominus}{C}H_2 - CH = \overset{\oplus}{N}H_2$

D. $\overset{\oplus}{O} - CH = CH_2 \leftarrow \rightarrow O = CH - \overset{\oplus}{C}H_2$

Answer: C

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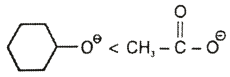
6. Which of the following is correct order of stability:

A. $CH_3 - \overset{O}{\overset{|}{C}}H - CH = CH_2 > CH_3 - \overset{O^-}{\overset{|}{C}} = CH - CH_3$

B. (B)  $< CH_3 - \overset{O}{\overset{\|}{C}} - O^{\ominus}$

C. $CH_2 = CH - \overset{\oplus}{C}H_2 > CH_3 - CH_2 - \overset{\oplus}{C}H_2$

D. $CH_2 = CH - CH = CH - \dot{C}H_2 > \dot{C}H_2 - CH_2 - CH = CH_2$

Answer: A

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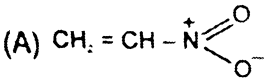
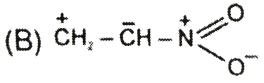
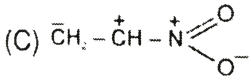
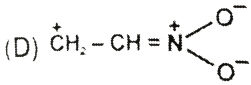
7. Least contributing resonating structure of nitroethene is :

A. (A) 

B. (B) 

C. (C) 

D. (D) 

Answer: C

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8. Which of the following statement is correct ?

A. In the dianion , all the $C-C$ bonds are of same length but $C-O$ bonds are of different length

B. In the dianion, all $C-C$ bonds are of same length and also all $C-O$ bonds are of same lengths

C. In the dianion, all $C-C$ bond lengths are not of same length

D. None of the above

Answer: B

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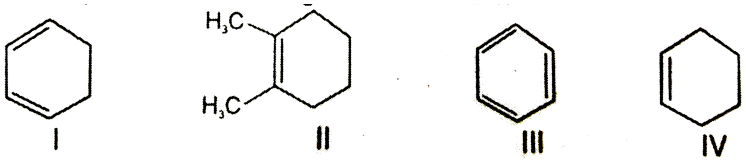
9. The decreasing order of bond length of $C=C$ bond in the following compounds is :



A. $II > I > IV > III$

B. $III > I > II > IV$

C. $IV > II > I > III$

D. $IV > I > II > III$

Answer: B

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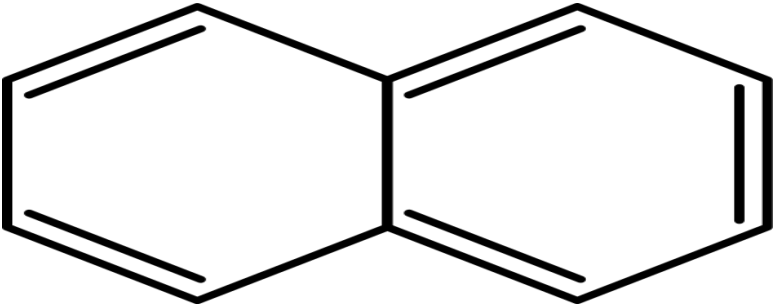
10. Which of the following is correct about the following compound



A. All the $C - C$ bond length are same

B. $C_1 - C_2$ bond length is shorter than $C_2 - C_3$ bond length

C. $C_1 - C_2$ bond length is greater than $C_2 - C_3$ bond length

D. All the $C-C$ bond length are equal to $C-C$ bond length of benzene

Answer: B

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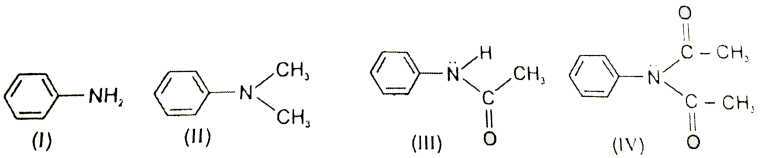
11. The correct order of $+M$ effect of 'N' containing functional group on benzene ring, amongst the given compound is



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

A. $I > II > IV > III$

B. $II > I > III > IV$

C. $I > II > III > IV$

D. $I > II > III > IV$

Answer: C

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12. In which case the σ bond pair and π bond pair of electrons both are attracted in the same direction (towards same atom):

A. $H_2C = CH - Cl$

B. $CH_3 - CH_2 - NH_2$

C. $H_2C = CH - CH = O$

D. $H_2C = CH - OCH_3$

Answer: C

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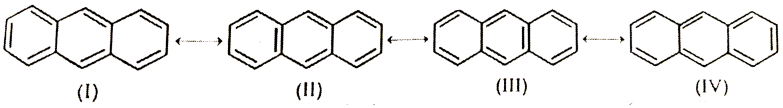
13. The correct stability order of given resonating structures



A. $I > II > III > IV$

B. $IV > III > II > I$

C. $I = II = III = IV$

D. $II = III > I = IV$

Answer: D

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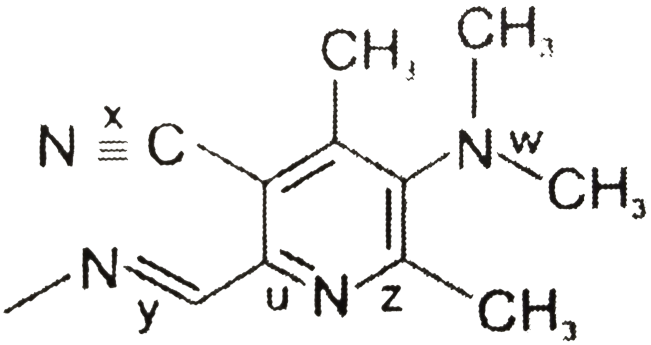
14. The longest $C - N$ bond length in the given compound is :



A. x

B. y

C. z

D. w

Answer: D

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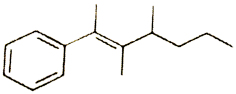
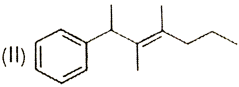
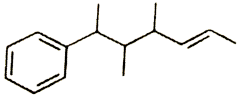
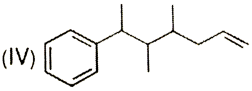
15. Select the correct order of heat of hydrogenation?

(I) 

(II) 

(III) 

(IV) 

A. $I > II > III > IV$

B. $IV > III > II > I$

C. $II > III > IV > I$

D. $II > III > I > IV$

Answer: B

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16. $H_3C - \overset{\oplus}{C}H - CH = CH_2$ does not involve :

A. $\sigma - p$ overlap

B. $\sigma - \pi^*$ overlap

C. $p\pi - p\pi$ overlap

D. $p\pi - d\pi$ overlap

Answer: D

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17. Stability of π-bond in following alkenes in the increasing order is :

$\underset{(I)}{CH_3 - CH = CH - CH_3}$ $\underset{(II)}{CH_3 - \overset{CH_3}{\overset{|}{C}} = \overset{CH_3}{\overset{|}{C}} - CH_3}$ $CH_3 - \overset{CH}{\overset{|}{C}}$ (III)

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

(IV)

A. $I < III < IV < II$

B. $I < II < III < IV$

C. $IV < III < II < I$

D. $II < III < IV < I$

Answer: A

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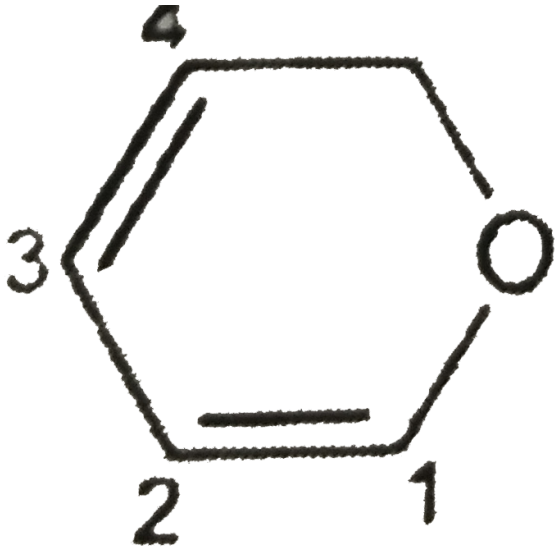

18.

In this molecules, π-electron density is more on :

A. C_1 and C_3

B. C_2 and C_4

C. C_2 and C_3

D. C_1 and C_4

Answer: B

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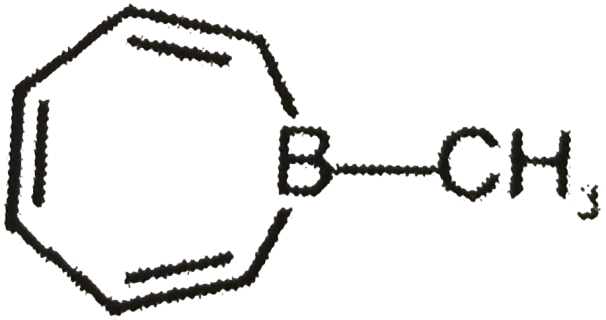

19.

If the given compound is planar. Select the correct statement.

A. The boron is sp^2 hybridized and the p-orbital contains an unshared pair of electron

B. The boron is sp^2 hybridized and a hybrid orbital contains an unshared pair of electron.

C. The boron in sp^2 hybridized and hybrid orbital is vacant

D. The boron is sp^2 hybridized and the p-orbital is vacant

Answer: D

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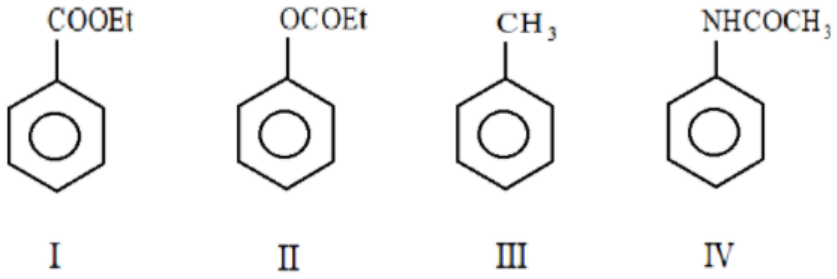

20.

The correct order of electron density in aromatic ring of following compounds is:

A. $IV > III > II > I$

B. $I > II > III > IV$

C. $IV > II > I > III$

D. $IV > II > III > I$

Answer: D

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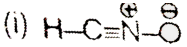
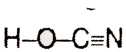
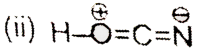
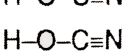
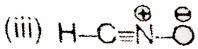
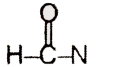
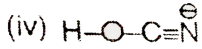
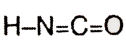
EXERCISE-2 PART-II SINGLE AND DOUBLE VALUE INTEGER TYPE

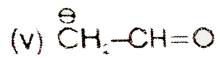
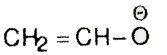
1. Among the given sets, how many of the following not represents the resonating structure :

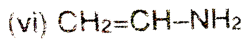
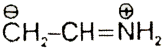
(i)  and 

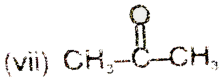
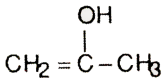
(ii)  and 

(iii)  and 

(iv)  and 

(v)  and 

(vi)  and 

(vii)  and 

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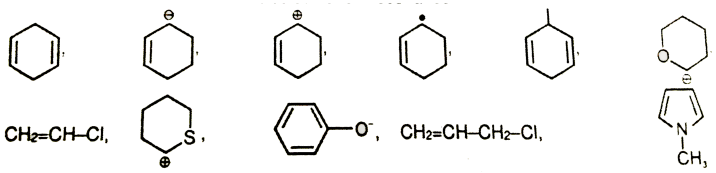
2. How many of the following species can show resonance.



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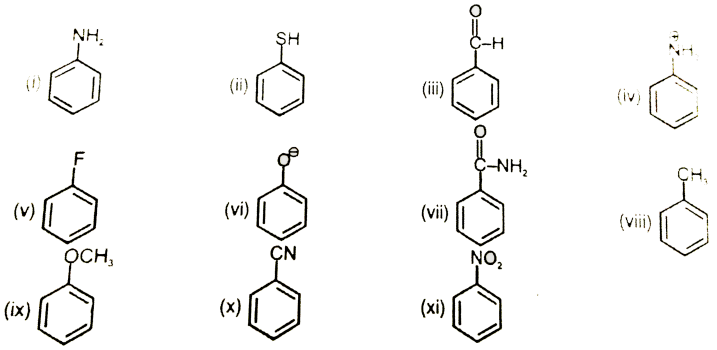
3. How many groups (attached with benzene ring) can show $+M$ effect ?



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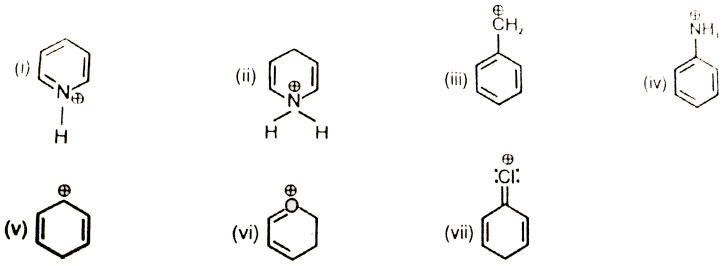
4. Identify the number of compounds in which positive charge will be delocalised?



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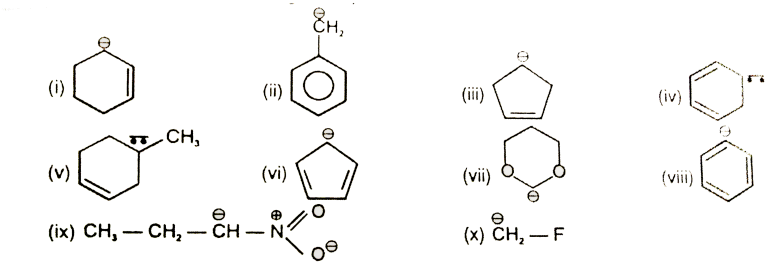
5. In how many of the following cases, the negative charge is delocalised?



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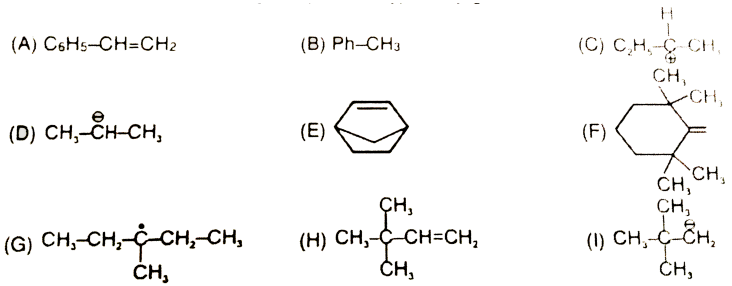
6. In how many of the following compounds Hyperconjugation effect is observed -



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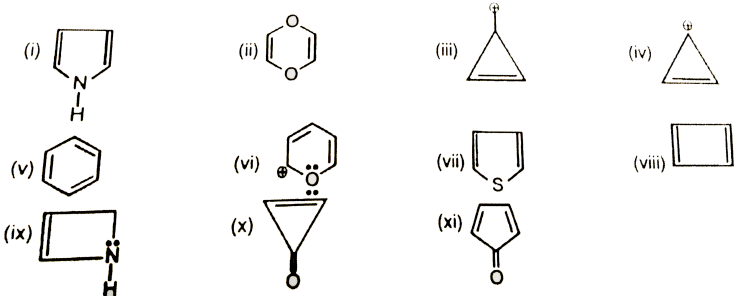
7. How many of the following compounds is/are aromatic ?



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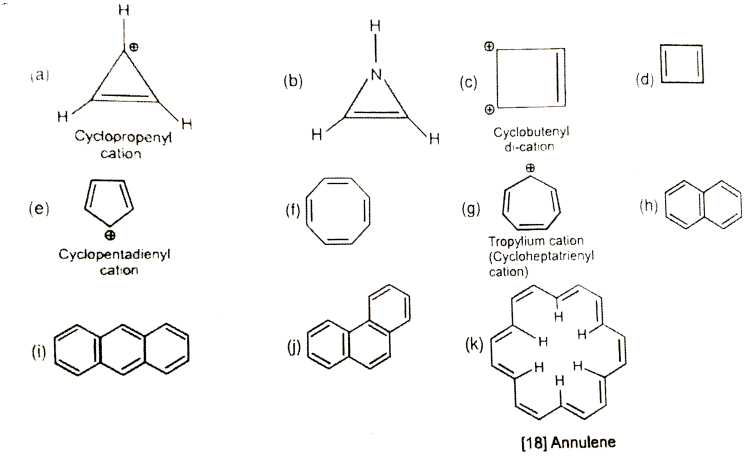
8. Total number of moelcules which are antiaromatic ?



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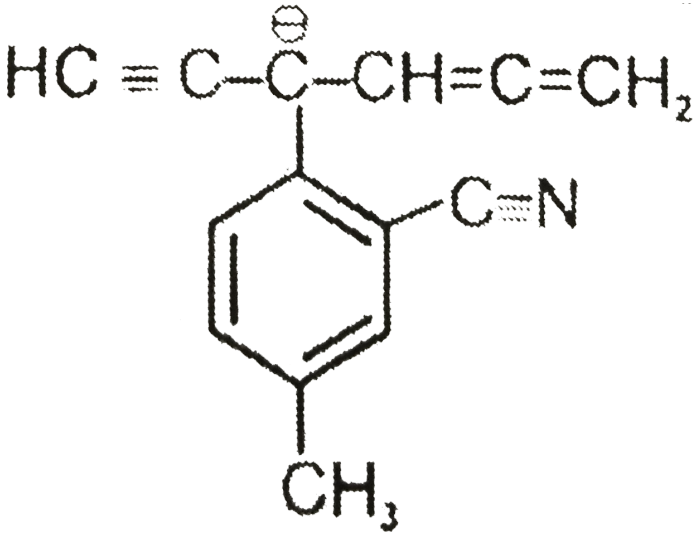
9. Find the number of carbon atoms including the given structure which can have negative change in resonating structures. (The structure with charge reperating are not accepted)



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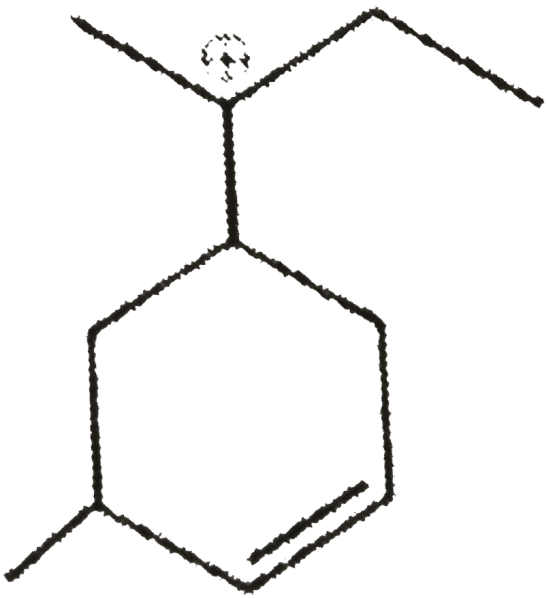
10. Observe the following compound and write the number of hydrogen atom involved in hyperconjugation ?



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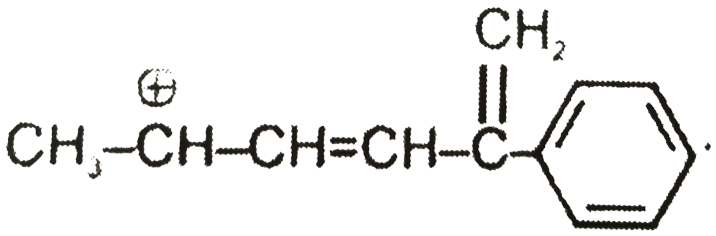
11. Find the total number of positions where positive charge can be delocalized by true resonance (Excluding the given position)



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EXERCISE-2 PART-III : ONE OR MORE THAN ONE OPTIONS CORRECT TYPE

1. Which statement is/are true about resonance ?

A. It decreases the energy of system.

B. The hybridisation of atoms do not change due to resonance

C. Resonance hybrid is more stable than any resonating structure.

D. Resonanting structures can not be isolated at any temperature

Answer: A::B::C::D

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2. Which of the following statement is incorrect about resonance?

A. The most stable resonance structure explains

all the characteristics of a species.

B. All resonating structures remain in equilibrium.

C. Resonance hybrid has maximum similarity with

most stable resonating structure.

D. Resonance hybrid is real.

Answer: A::B::C::D

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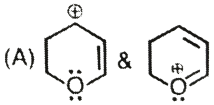
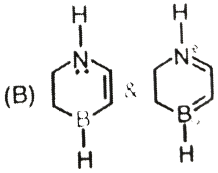
3. In which of the following pairs of compounds, will second structure have more contribution to resonance hybrid than first ?

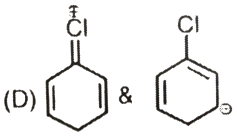
A.



B.



C. $F-\overset{\oplus}{\underset{\underset{NH_2}{|}}{C}}-OH \;\&\; \overset{\oplus}{F}-\underset{\underset{NH_2}{|}}{C}-OH$

D. 

Answer: A::B::C::D

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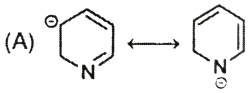
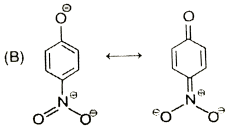
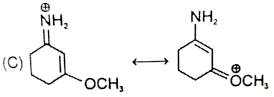
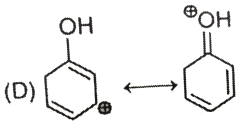
4. Which of the following pairs represents resonating structures ?

A. 

B. 

C. 

D. 

Answer: B::C

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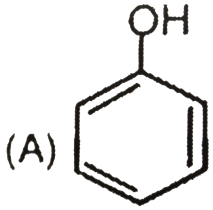
5. In which of the following compounds delocalisation of electrons and shifting of electron in the same direction ?

A. 

B. $CH_3 - NH - NO_2$

C. $CH_2 = CH - CH = CH - NO_2$

D. $H_2N - \overset{H}{\overset{|}{C}} = CH_2$

Answer: B::C

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6. Explain resonance in benzene.

A. $-COOH$

B. COO^{Θ}

C. $-\overset{\oplus}{N}H_3$

D. $-COCl$

Answer: C

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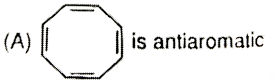
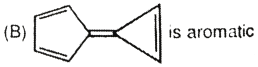
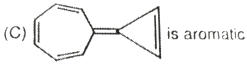
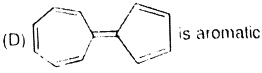
7. Which of the following is/are correct :

A. 

B. 

C. 

D. 

Answer: B::D

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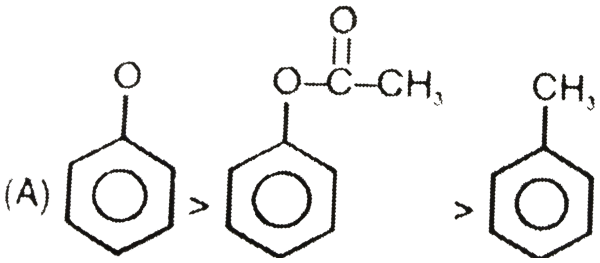
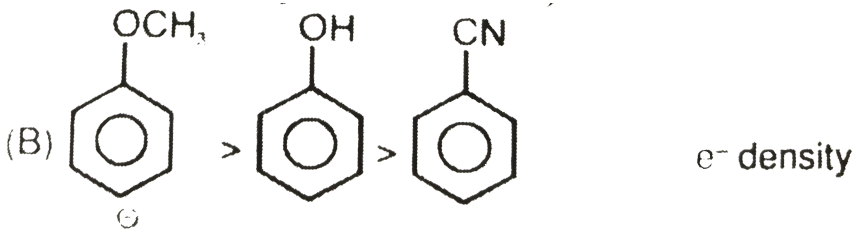
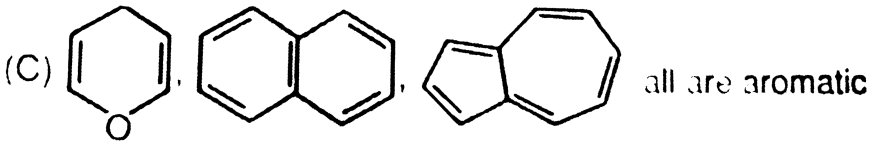
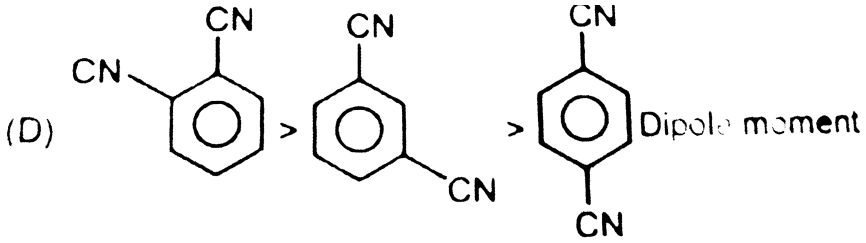
8. Which of the following is/are correct statement :

A. 

B. 

C. 

D. 

Answer: A::D

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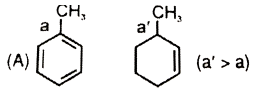
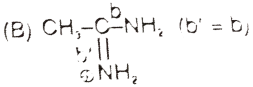
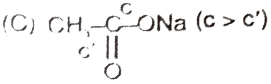
9. Which is the correct order of bond length ?

A. 

B. 

C. 

D. 

Answer: A::B::D

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EXERCISE-2 PART-IV : COMPREHENSION

1. Hydrogenation of unsaturated hydrocarbons is an exothermic reaction. Due to hyperconjugation and resonance the stability of unsaturated hydrocarbons increases and the increase in stability is more due to resonance. Compound with same number of $\pi-$ bonds and more stability has lower heat of hydrogenation.

Heat of formation is defined as the energy evolved when a molecule is formed from its atoms. For isomers the more stable compounds has higher heat of formation.

The correct heat of hydrogenation order is :

(p) 1,3-Pentadiene

(q) 1,3-Butadiene

(r) 2,3-Dimethyl-1,3-butadiene

(s) Propadiene

A. p > q > r > s

B. s > q > p > r

C. q > s > p > r

D. s > p > q > r

Answer: B

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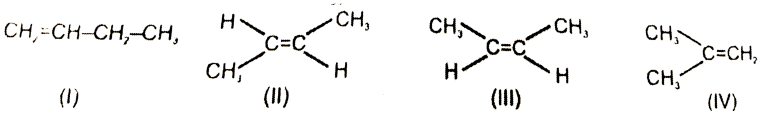
2. Hydrogenation of unsaturated hydrocarbons is an exothermic reaction. Due to hyperconjugation and resonance the stability of unsaturated hydrocarbons increases and the increase in stability is more due to resonance. Compound with same number of $\pi -$ bonds and more stability has lower heat of hydrogenation.

Heat of formation is defined as the energy evolved when a molecule is formed from its atoms. For isomers the more stable compounds has higher heat of formation.

The order of heat of formation of the following molecules is :



A. $I > II > III > IV$

B. $II > III > IV > I$

C. $IV > II > III > I$

D. $IV > III > II > I$

Answer: C

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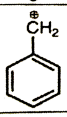
3.

	Column-I	Column-II	Column-III
(P)		(i) lone pair is present in hybrid orbital	(I) delocalised lone pair
(Q)		(ii) Charge is present in hybrid orbital	(II) localised lone pair
(R)		(iii) lone pair is present in p-orbital	(III) localised charge
(S)		(iv) charge is present in p-orbital	(IV) delocalised charge

The only correct combination for pyridine is -

A. (Q) (i), (II)

B. (P) (i) (II)

C. (R) (iv) (III)

D. (Q) (ii) (II)

Answer: B

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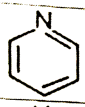
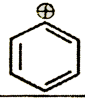
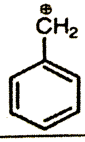
4.

	Column-I	Column-II	Column-III
(P)		(i) lone pair is present in hybrid orbital	(I) delocalised lone pair
(Q)		(ii) Charge is present in hybrid orbital	(II) localised lone pair
(R)		(iii) lone pair is present in p-orbital	(III) localised charge
(S)		(iv) charge is present in p-orbital	(IV) delocalised charge

The only correct combination is -

A. (P) (ii), (II)

B. (R) (iv) (IV)

C. (S) (iv) (IV)

D. Q (i) (II)

Answer: C

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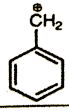
5.

	Column-I	Column-II	Column-III
(P)		(i) lone pair is present in hybrid orbital	(I) delocalised lone pair
(Q)		(ii) Charge is present in hybrid orbital	(II) localised lone pair
(R)		(iii) lone pair is present in p-orbital	(III) localised charge
(S)		(iv) charge is present in p-orbital	(IV) delocalised charge

The only correct combination for pyrrole is

A. (P) (ii), (II)

B. (R) (iv) (IV)

C. (S) (iv) (IV)

D. Q (iii) (I)

Answer: D

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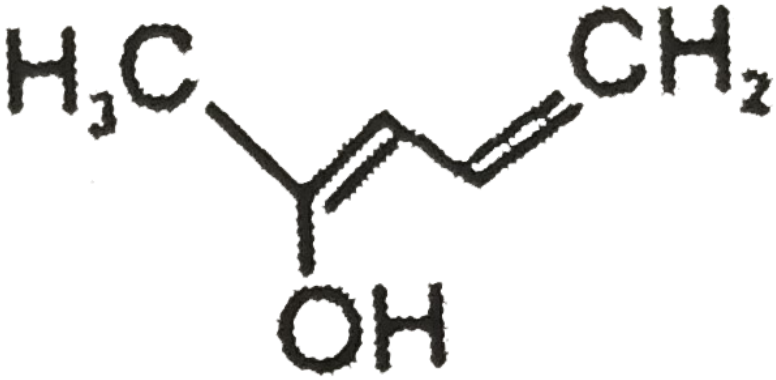
EXERCISE-3

1. Write resonating structure of the compound



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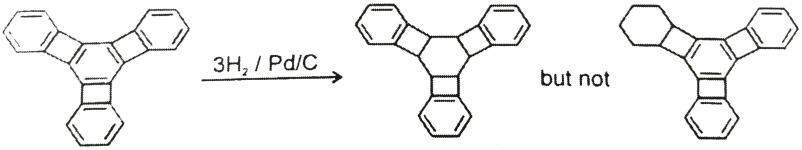
2. Explain the following observations



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3. Among the following the least stable resonating structure is

A. $CH_2 = CH - \overset{\oplus}{C}H - \overset{\ominus}{C}H - O - CH_3$

B. $\overset{\ominus}{C}H - \overset{\oplus}{C}H - CH = CH - OCH_3$

C. $\overset{\ominus}{C}H - CH = CH - CH = \overset{\oplus}{O} - CH_3$

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

Answer: A

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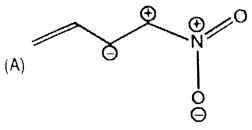
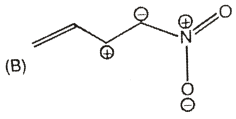
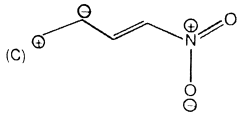
4. Among the following the least stable resonating structure is

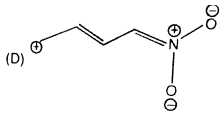
A.



B.



C. 

D. 

Answer: A

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5. Hyperconjugation involves overlap of which of the following orbitals?

A. $\sigma - \sigma$

B. $\sigma - p$

C. $p - p$

D. $\pi - \pi$

Answer: B

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6. The correct stability order of the following resonance structure is :

(I) $H_2C = \overset{+}{N} = \overset{-}{N}$ (II) $H_2\overset{+}{C} - N = \overset{-}{N}$ (III) $H_2\overset{-}{C} - \overset{+}{N} = N$ (IV) $H_2\overset{-}{C} - N = \overset{+}{N}$

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

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

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

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

Answer: B

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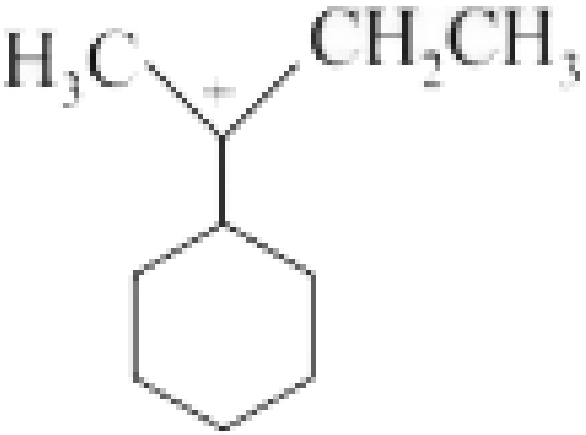
7. The total number of contributing structures showing hyperconjugation (involving C-H bonds) for the following carbocation is

_____.



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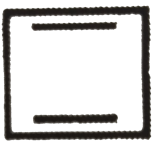
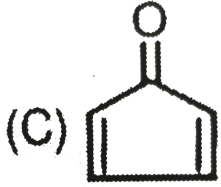
8. Which of the following molecules, in pure form, is (are) unstable at room temperature ?

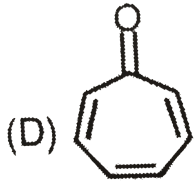
A. (A) 

B. (B) 

C.



D.



Answer: B::C

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9. The hyperconjugative stabilities of tert-butyl cationand 2-butene, respectively, are due to :

A. $\sigma \rightarrow p$ (empty) and $\sigma \rightarrow \pi^*$ electron delocalisations.

B. $\sigma \rightarrow \sigma^*$ and $\sigma \rightarrow \pi$ electron delocalisations.

C. $\sigma \rightarrow p$ (filled) and $\sigma \rightarrow \pi$ electron delocalisations.

D. P (filled) $\rightarrow \sigma^*$ and $\sigma \rightarrow \pi^*$ electron delocalisations.

Answer: A

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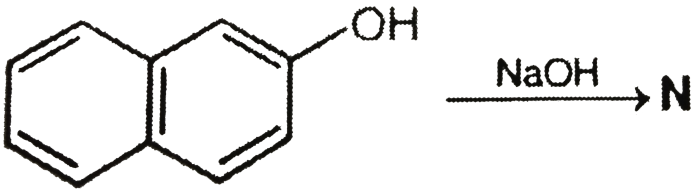
10. The number of resonance structures for N is



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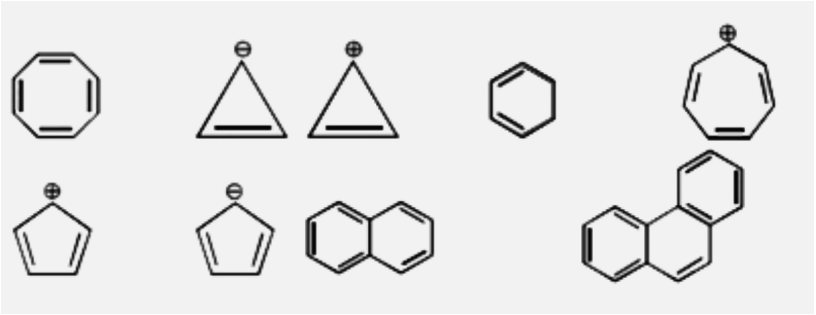
11. Among the following, the number of aromatic compound(s) is



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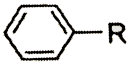
EXERCISE-3 PART-II (JEE (MAIN)/AIEEE PROBLEMS)

1. In the following benzyl/allyl system

$R - CH = CH_2$ and  (R is alkyl group)

Then decreasing order of inductive effect is :

A. $(CH_3)_3C - > (CH_3)_2CH - > CH_3CH_2 -$

B. $Ch_3CH_2 - > (CH_3)_2CH - > (CH_3)_3C -$

C. $(CH_3)_2CH - > CH_3CH_2 - > (CH_3)_3C -$

D. $(CH_3)_3C - > CH_3CH_2 - > (CH_3)_2CH -$

Answer: A

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2. In $HCOO^-$, the two carbon $-$ oxygen bonds to be of equal length.

What is the reason for this ?

A. electronic orbitals of carbon atom are are hybridised

B. the $C = O$ bond is weaker than the $C - O$ bond

C. the anion $HCOO^-$ has two resonating structures

D. the anion is obtained by removal of a proton from the acid molecule.

Answer: C

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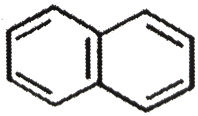
3. The non-aromatic compound among the following is

A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer: D

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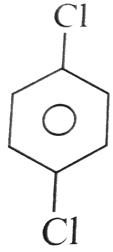
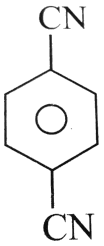
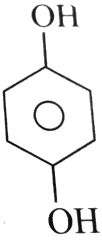
4. For which of the following molecule significant $\mu \neq 0$?

A. 

B. 

C. 

D. 

A. Only (a)

B. (a) and (b)

C. Only (c)

D. (c) and (d)

Answer: D

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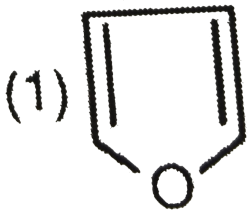
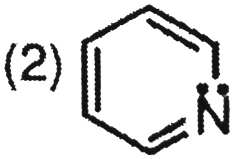
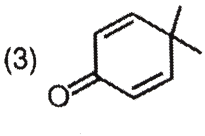
5. Which of the following ions is the most resonance stabilised?

A. 

B. 

C. 

(4) 

D.

Answer: C

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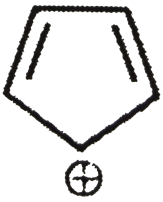
JEE(MAIN) ONLINE PROBLEMS

1. Which of the following compounds is not aromatic ?

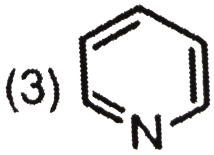
(1) 

A.

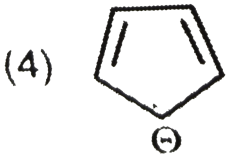
(2) 

B.

C.



D.



Answer: A

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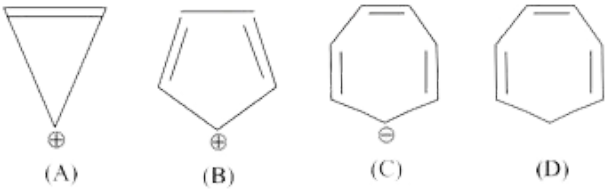
2. Which compound(s) out of the following is/are not aromatic?



A. (B)

B. (B), (C) and (D)

C. (C) & (D)

D. (A) & (D)

Answer: B

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PRACTICE TEST-1

1. Stability of π-bond in following alkenes in the increasing order is :

$\underset{(I)}{CH_3 - CH = CH - CH_3}$ $\quad$ $\underset{(II)}{CH_3 - \overset{\overset{CH_3}{|}}{C} = \overset{\overset{CH_3}{|}}{C} - CH_3}$ $\quad$ $CH_3 - C$ $\quad$ CH (III)

$CH_3 - \underset{\underset{CH_3}{|}}{\underset{(IV)}{C}} = CH - CH_3$

A. $I < III < IV < II$

B. $I < II < III < IV$

C. $IV < III < II < I$

D. $II < III < IV < I$

Answer: A

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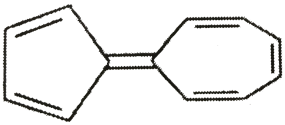
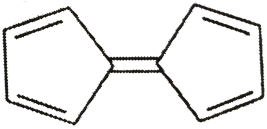
2. Select the correct statement regarding the following compounds :

(I) 

(II) 

A. II has a greater dipole moment than I

B. Covalent character of II is less than I

C. I is more soluble in polar solvent than II

D. None of these

Answer: C

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

A. (1) $\overset{\ominus}{C}H_2-CH=CH-CH=\overset{\oplus}{O}-CH_3$

B. (2) $CH_2=CH-\overset{\ominus}{C}H_2-CH=\overset{\oplus}{O}-CH_3$

C. (3) $\overset{\ominus}{C}H_2-\overset{\oplus}{C}H-CH=CH-O-CH_3$

D. (4) $CH_2=CH-\overset{\oplus}{C}H-\overset{\ominus}{C}H_2-OCH_3$

Answer: D

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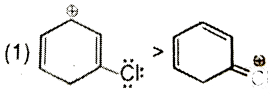
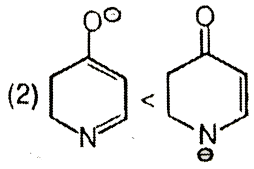
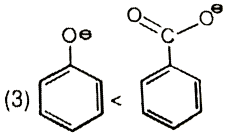
4. Select the correct option related to stability of following structures.

A. (1) 

B. (2) 

C. 

D. $H-\overset{\overset{O}{\|}}{C}-\overset{\Theta}{O} > CF_3-\overset{\overset{O}{\|}}{C}-\overset{\Theta}{O}$

Answer: C

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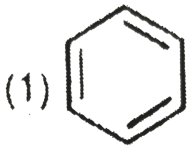
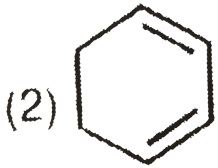
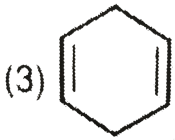
5. The minimum magnitude of heat of hydrogenation per mole of molecule is of:

A. 

B. 

C. 

D. (4) 

Answer: D

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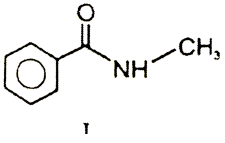
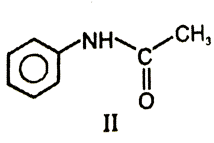
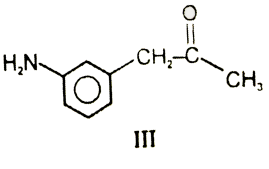
6. The decreasing order of electron density on the ring is :



I



II



III

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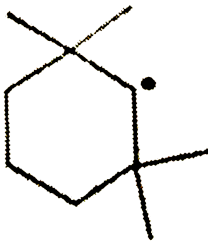
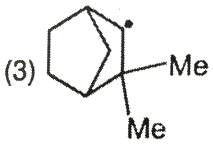
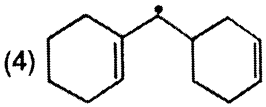
7. Hyperconjugation observed in

A. (1) 

B. $\dot{C}Ph_3$

C. 

D. 

Answer: D

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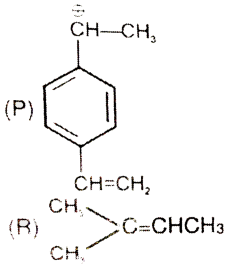
8. The number of hyperconjugable hydrogen atoms of following species are respectively :



(Q) $CH_3\overset{\oplus}{C}HCH_2CH_3$

(S) $CH_3CH{=}CHC_2H_5$

A. 3, 5, 9, 8

B. 3, 5, 9, 5

C. 5, 5, 3, 5

D. 5, 2, 6, 5

Answer: B

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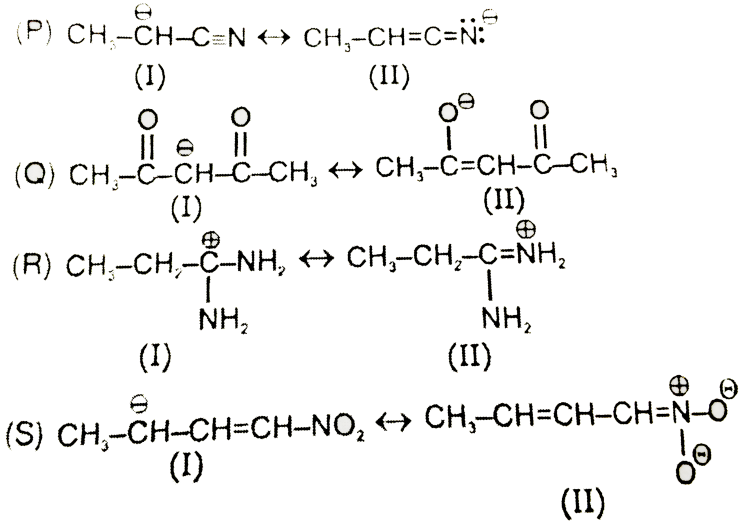
9. In the following sets of resonating structure, lable the major contributors towards resonance hybrid.



A. II, II, I, II

B. II, II, II, I

C. II, II, II, II

D. I, I, II, I

Answer: C

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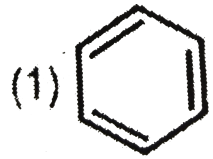
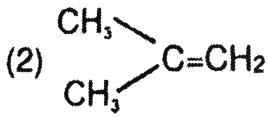
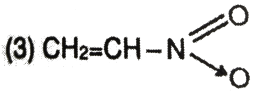
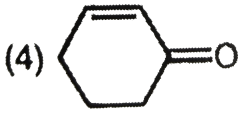
10. In which of the following $C = C$ bond length is minimum?

A. 

B. 

C. 

D. 

Answer: B

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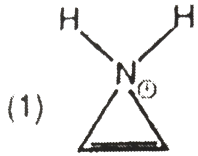
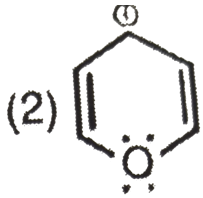
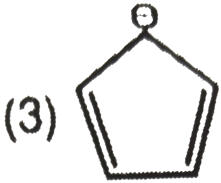
11. Which of the following compounds is not aromatic ?

A. 

B. 

C. 

D. 

Answer: A

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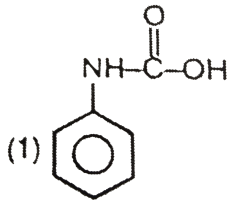
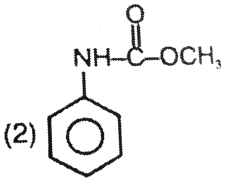
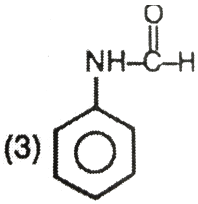
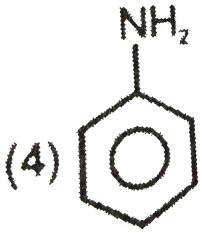
12. Which compound has least e^- density in benzene ring

A. 

B. 

C. 

D. 

Answer: C

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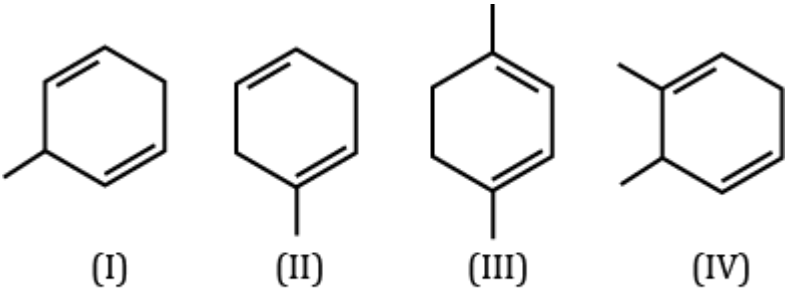
13. The order of heat of hydrogenation in following compounds is:



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

A. $I < II < IV < III$

B. $III < IV < II < I$

C. $II < III < I < IV$

D. $II < IV < I < III$

Answer: B

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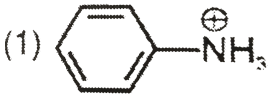
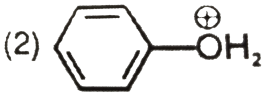
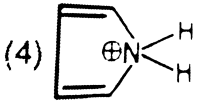
14. Resonance stabilized cation is:

A. 

B. 

C. 

D. 

Answer: C

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15. In $HCOO^-$, the two carbon $-$ oxygen bonds to be of equal length. What is the reason for this ?

A. The anion is obtained by the removal of a proton from the acid molecule.

B. Electronic orbtials of carbon atoms are hybridised.

C. The $C = O$ bond is weaker than $C - O$ bond.

D. The anion $HCOO^-$ has two equally stable resonating structures.

Answer: D

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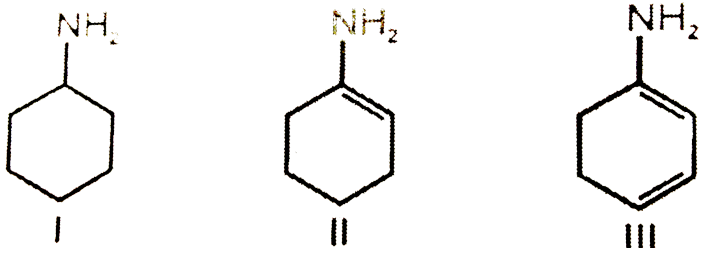
16. Compare $C - N$ bond length in the following :



I II III

A. $I > II > III$

B. $I > III > II$

C. $III > II > I$

D. $III > II > I$

Answer: A

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17. Which of the following is false for order of $-l$ effect :

A. $-F > -Cl > -Br > -l$

B. $-C \equiv CH > -CH = CH_2 > -CH_2 - CH_3$

C. $-C \equiv CN > -\underset{\underset{O}{||}}{C} - OH$

D. $-Ph > -C \equiv CH$

Answer: D

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18. $H - \underset{x}{N} = C = O \leftrightarrow H - \overset{\oplus}{\underset{y}{N}} \equiv C - \overset{\Theta}{O} \leftrightarrow H - \overset{\Theta}{\underset{z}{N}} - C \equiv \overset{\oplus}{O}$

which resonating structure is least stable

A. x

B. y

C. z

D. All are equivalent

Answer: C

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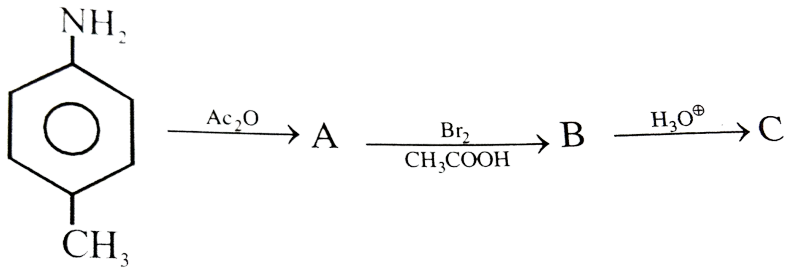
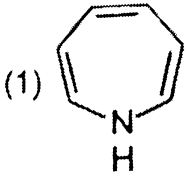
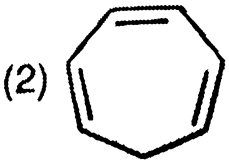
19. 

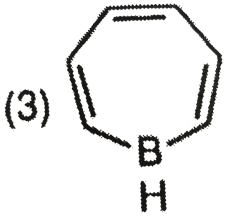
would be :

would be :

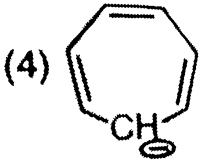
A. 

B. 

C.



D.



Answer: C

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20. Number of delocalized e^- pairs in squaric acid and dianion of squaric acid are respectively.

A. $5\&5$

B. $5\&7$

C. $3\&5$

D. $7\&7$

Answer: A

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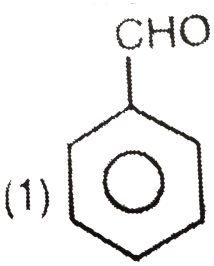
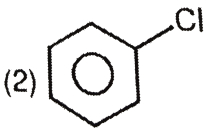
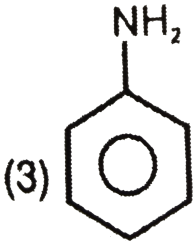
21. Which of the following benzene ring has greater electron density than Toulene

A. 

B. 

C. 

D. (4) 

Answer: C

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22. Which of the following has the miximum number of resonating structure ?

A. Benzene

B. Naphthalene

C. Anthracene

D. Phenanthrene

Answer: D

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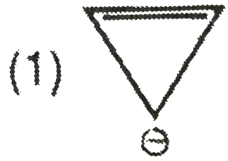
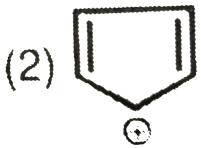
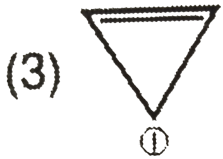
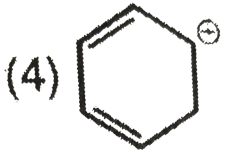
23. Among the following the aromatic compound is

A. 

B. 

C. 

D. 

Answer: C

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24. $\overset{\Theta}{\underset{\cdot\cdot}{C}}H_2 - \underset{\underset{O}{||}}{C} - CH_3$ and $CH_2 = \underset{\underset{:\underset{\cdot\cdot}{O}:_{\Theta}}{|}}{C} - CH_3$ are :

A. Resonating structures

B. Tautomers

C. Geometrical isomers

D. Optical isomers

Answer: A

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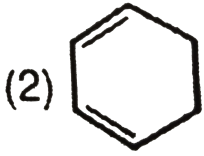
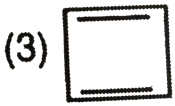
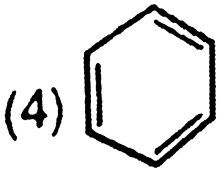
25. Which is not stable

A. (1) 

B. 

C. 

D. 

Answer: C

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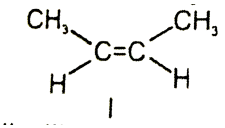
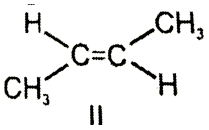
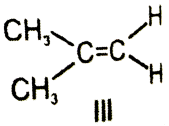
26. Correct order of stability of following alkenes is







A. $I > II > III$

B. $I > III > II$

C. $III > II > I$

D. $III > I > II$

Answer: C

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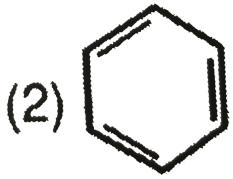
27. All the carbon-carbon bond lengths are equal in

A. $CH_2 = CH - CH_2 - CH_3$

B. 

C. $CH_3 - CH = CH - CH_3$

D. $CH_2 = CH - CH = CH_2$

Answer: B

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28. The kind of delocalisation involving sigma bond orbitals is called.....

A. Inductive effect

B. Hyperconjugation effect

C. Electromeric effect

D. Mesomeric effect

Answer: B

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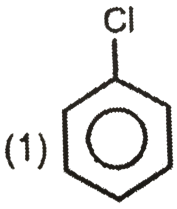
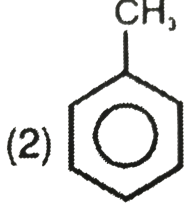
29. Which of the following has the highest dipole moment.

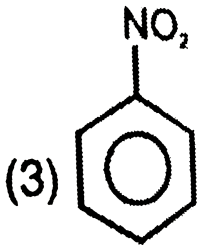
A.



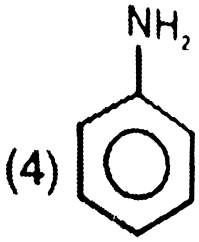
B.



C.



D.



Answer: C

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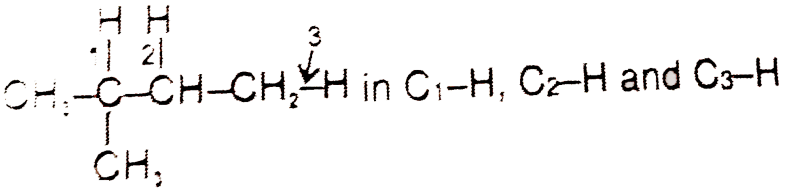
30.



in

$C_1 - H, C_2 - H$ and $C_3 - H$ the homolytic bond dissociation energy

order is :

A. $C_2 - H > C_3 - H > C_1 - H$

B. $C_2 - H > C_3 - H > C_1 - H$

C. $C_2 - H > C_3 - H > C_1 - H$

D. $C_3 - H > C_2 - H > C_1 - H$

Answer: D

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PART-2(NSEC)

1. Which of the following is true about the cycloheptatrienyl free radical ?

A. It is an isolatable stable free radical

B. It is an aromatic free radical

C. It has $4n + 2\pi$ electrons

D. None of these

Answer: D

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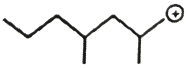
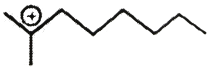
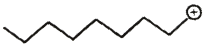
2. Select the most stable carbonium ion from amongst the following

A. (A) 

B. (B) 

C. (C) 

D. (D) 

Answer: B

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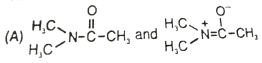
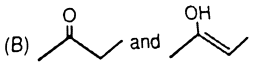
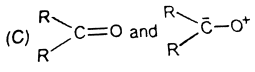
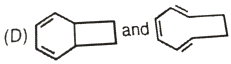
3. Which of the following pairs represents resonating structures ?

A. 

B. 

C. 

D. 

Answer: A

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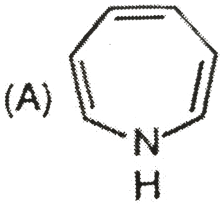
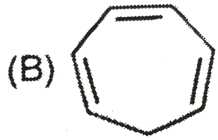
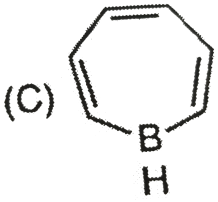
4. The aromatic compound would be

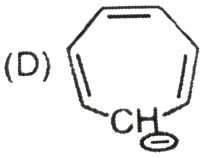
A. 

B. 

C.



D.



Answer: C

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5. Inductive effect is a polarisation of a

A. sigma bond

B. π-bond

C. co-ordinate bond

D. conjugated system.

Answer: A

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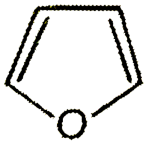
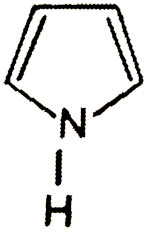
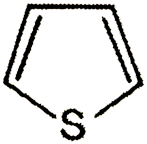
6. Match the resonance energies 67, 88 and 121 kJ mol^{-1} for the following compounds.



I



II



III

A. I - 67, II - 121, III- 88

B. I - 121, II-67, III-88

C. I-67, II-88, III-121

D. I-121, II-88, III-67

Answer: C

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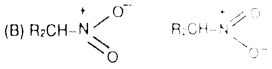
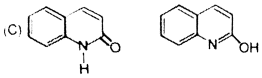
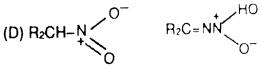
7. The pair of resonanating structures among the following is

A. $R_2CH - N = O \qquad R_2C = N - OH$

B. 

C. 

D. 

Answer: B

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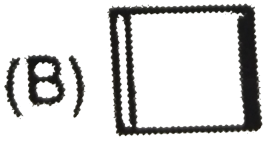
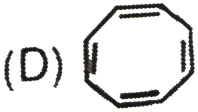
8. Identity the aromatic compound from the following.

A. 

B. 

C. 

D. 

Answer: A

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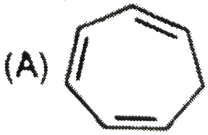
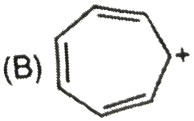
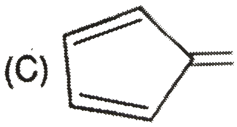
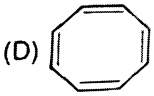
9. Which of the following species is aromatic?

A. 

B. 

C. 

D. (D) 

Answer: B

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10. The number of π electrons required for a planar cyclic conjugated system to exhibit aromatic behaviour is $(4n + 2)$. Here n is

A. number of C atoms in the system

B. number of π bonds

C. a non - negative integer

D. number of bonds in the system.

Answer: C

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11. Following is an example of

$$CH_2 = CH - \overset{O}{\overset{||}{C}}H \leftrightarrow \overset{\oplus}{C}H_2 - CH = \overset{O^-}{\overset{|}{C}} - H \leftrightarrow .^- CH_2 = CH - \underset{\oplus}{\overset{O^-}{\overset{|}{C}}} -$$

A. hyperconjuhation

B. tautomerism

C. resonance

D. inductive effect.

Answer: C

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12. The relative stabilites of the following carbocations is :

$$H_2CO\,CH = CH\overset{+}{C}H_2H_2C = \underset{OMe}{\overset{|}{C}} - \overset{+}{C}H_2CH_3OCH_2\overset{+}{C}H_2CH_3O\overset{+}{C}H_2$$

A. $I > II > III > IV$

B. $I > IV > II > III$

C. $II > III > IV > I$

D. $III > I > II > IV$

Answer: B

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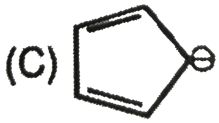
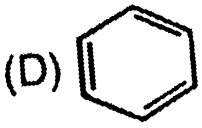
13. Identify the odd species out (which of the species among the following is different from others?)

A. 

B. 

C. 

D. 

Answer: B

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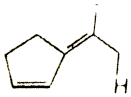
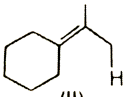
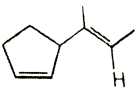
14. Which of the following represents the true order of bond dissociation energy of the idicated $C - H$ bond of the following molecules?



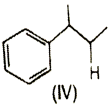
(I)



(II)



(III)



(IV)

A. $I < II < IV < III$

B. $III < IV < II < I$

C. $IV < II < I < III$

D. $III < IV < II < I$

Answer: A

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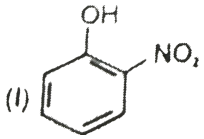
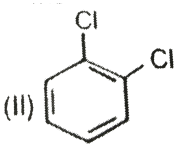
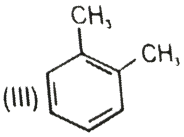
15. The correct order of dipole moment for the following molecules is







A. $I = II = III$

B. $I < II < III$

C. $I > II > II$

D. $II < III < I$

Answer: C

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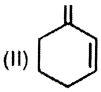
16. The order of decreasing stability is :



A. $IV > I > II > III$

B. $I > IV > III > II$

C. $I > II > IV > III$

D. $IV > II > I > III$

Answer: A

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17. The most Carbocations, carbanions, free radicals and radical cation are reactive carbon intermediates. Their hybrid orbitals respectively are

A. sp^2, sp^2, sp^3, sp

B. sp^2, sp^2, sp, sp^3

C. sp^2, sp^3, sp^2, sp

D. sp^3, sp^2, sp, sp^2

Answer: C

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18. The electronegativities of acetylene, ethylene and ethane are in the order :

A. ethylene > acetylene > ethane

B. acetylene > ethylene > ethane

C. ethane > acetylene > ethylene

D. acetylene > ethane > ethylene

Answer: B

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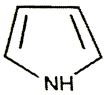
19. Which of the following structure is aromatic ?



I

II

III

IV

A. Structures I and II

B. Structure I only

C. Structures II only

D. Structure III only

Answer: B

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20. Which of the following is most stable?

A. 2,3-Dimethyl-2-butene

B. 2-Butene

C. 2-Methyl-1,2-butene

D. 1-Butene

Answer: A

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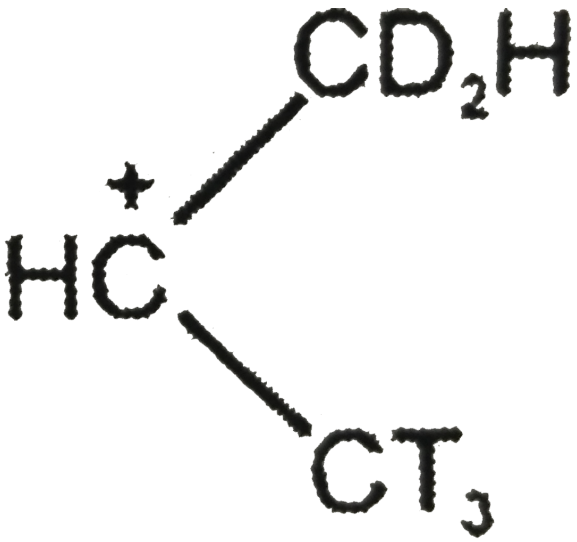
21. How many hperconjugative structures are possible in the following carbocation ?



A. 1

B. 3

C. 5

D. 6

Answer: D

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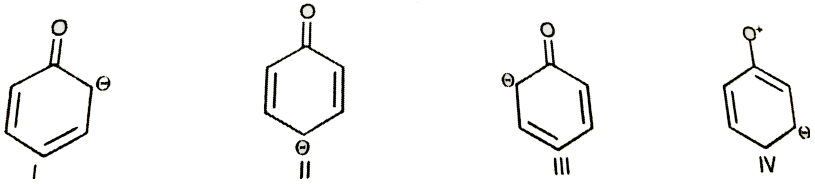
22. Which of the following is not a resonating structure for the phenoxide ion ?



A. I

B. II

C. III

D. IV

Answer: D

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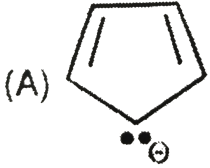
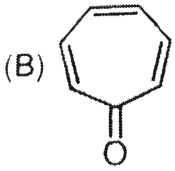
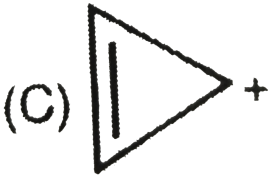
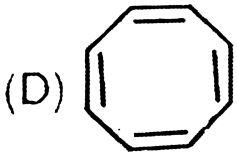
23. Among the following, the compound that is both paramagnetic and coloured is

A. 

B. 

C. 

D. 

Answer: D

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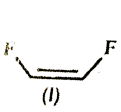
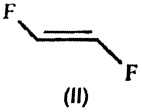
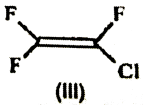
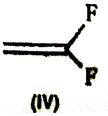
24. The correct order of dipole moment for the following molecules is









A. $IV > I > III > II$

B. $I > IV > III > II$

C. $III > I > II > IV$

D. $II > III > IV > I$

Answer: B

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PART-III : PRACTICE TEST-2

1. Which of the following is correctly ordered :

A. $-Oh > -NH_2$ $(+\text{M effect})$

B. $-SO_3H > -NO_2$ (-M effect)

C. $-F > -CN$ (-I effect)

D. $-CN > -F$ (-I effect)

Answer: D

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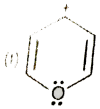
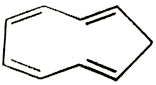
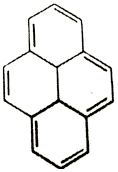
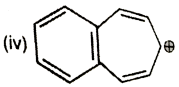
PART-III : PRACTICE TEST-3

1. Which of the following compound(s) is/are aromatic compounds ?

(i) 

(ii) 

(iii) 

(iv) 

A. I, II and III

B. III and IV

C. IV only

D. I, III and IV

Answer: D

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PART-III : PRACTICE TEST-4

1. 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. $CH_2 = CH - \overset{\ominus}{C}H - CH = \overset{\oplus}{O} - CH_3$

C. $CH_2 = CH - \overset{\oplus}{C}H - Ch\overset{\ominus}{C}H - O - CH_3$

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

Answer: B

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PART-III : PRACTICE TEST-5

1. Which of the following has the shortest C - CI bond ?

A. $CH_3 - Cl$

B. $CH_2 = CH - Cl$

C. 

D. $CH_2 = CH - CH = CH - Cl$

Answer: C

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PART-III : PRACTICE TEST-6

1. Which of the following is strongest $-m$ group

A. $-SO_3H$

B. $-COOH$

C. $-NO_2$

D. $-C \equiv N$

Answer: C

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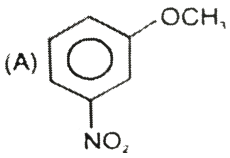
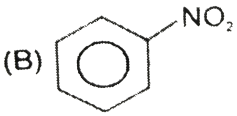
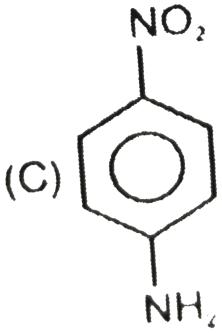
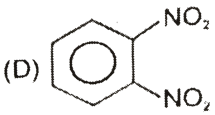
PART-III : PRACTICE TEST-7

1. In which of the following molecules π-electron density in ring is minimum :

A. 

B. 

C. 

D. 

Answer: D

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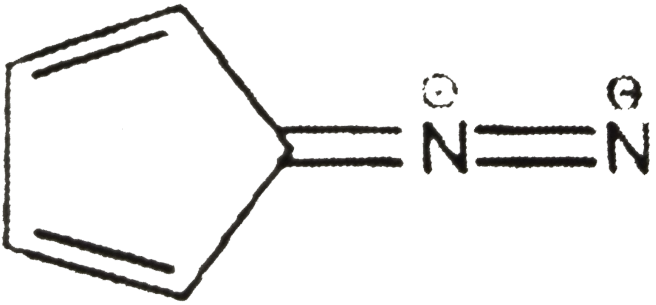
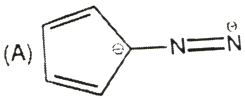
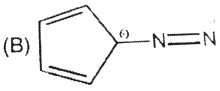
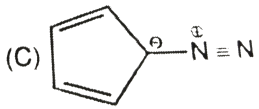
PART-III : PRACTICE TEST-8

1. 

The most stable canonical structure of this molecule is :

A. 

B. 

C. 

D. All are equally stable

Answer: C

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PART-III : PRACTICE TEST-9

1. Give the correct order of magnitude of heat of hydrogenation of the following 

A. $I < IV < III < II$

B. $IV < III < I < II$

C. $IV < I < III < II$

D. $IV < I < II < III$

Answer: C

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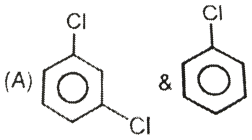
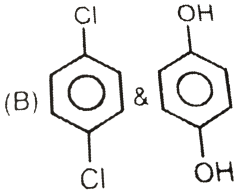
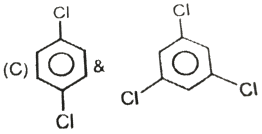
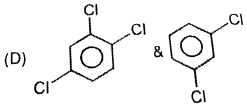
PART-III : PRACTICE TEST-10

1. Which of the following pairs have same dipole moment

A. 

B. 

C. 

D. 

Answer: A::C::D

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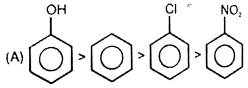
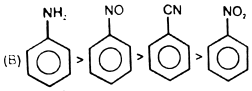
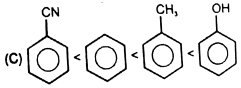
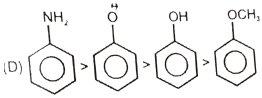
PART-III : PRACTICE TEST-11

1. Which is/are the correct order of electron density in aromatic ring ?

A. 

B. 

C. 

D. 

Answer: A::B::C::D

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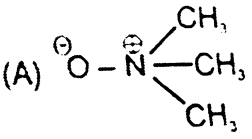
PART-III : PRACTICE TEST-12

1. In which cases delocalisation of charge is possible ?

A. 

B. $\overset{\Theta}{O} - P(CH_3)_2$

C. $\overset{\Theta}{O} - \overset{\oplus}{P}(CH_3)_2$

D. $\overset{\Theta}{O} - B(CH_3)_2$

Answer: B::C::D

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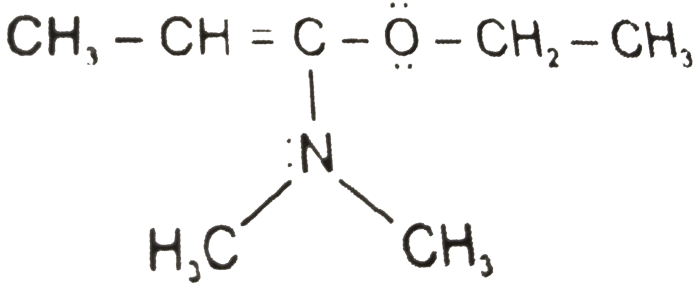
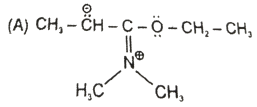
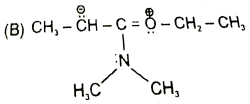
PART-III : PRACTICE TEST-13

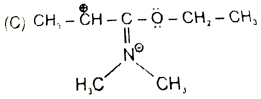
1. The acceptable resonating structure(s) of the following molecule is/are

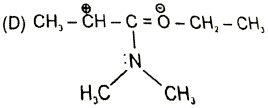
:



A. 

B. 

C. 

D. 

Answer: A::B

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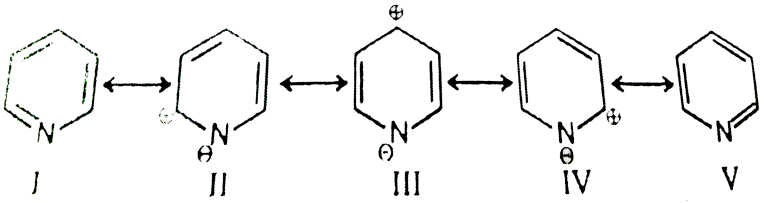
PART-III : PRACTICE TEST-14

1. 

Among these canonical structures of pyridine, the correct order of stability is/are :

A. (II = IV) gt (I = V)

B. (I = V) gt (II = IV)

C. III gt (II = IV)

D. (II = IV) gt III

Answer: B::D

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PART-III : PRACTICE TEST-15

1. Which of the following statement is/are correct?

A. Contributing structures contributes to the reonance hybrid is directly proportional of their energies.

B. Equivalent contributing structures make the resonance important.

C. Contributing structures represent hypothetical molecules having no real existance.

D. Contributing structures are less stable than the resonance hybrid.

Answer: B::C::D

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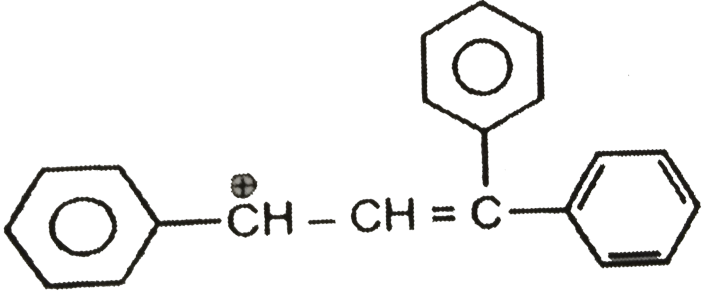
PART-III : PRACTICE TEST-16

1. Find total number of the position where positive charge can be delocalized by true resonance. (Excluding the given position)



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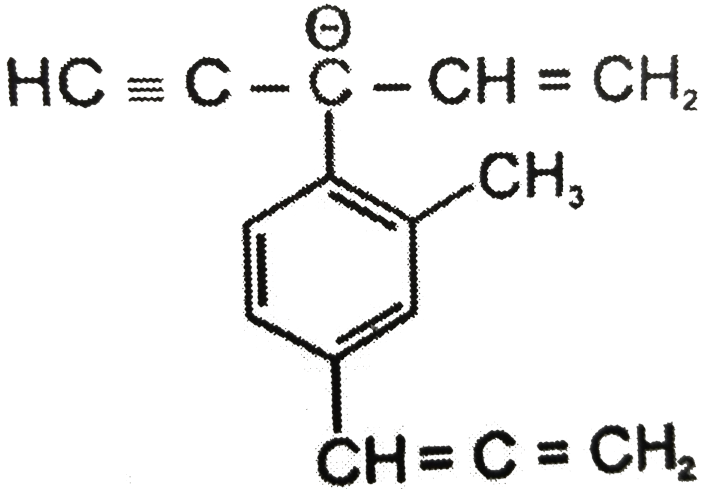
PART-III : PRACTICE TEST-17

1. Find the number of carbon atoms including the given structure which can have negative charge in resonating structures. (The structures with charge separation are not accptable)



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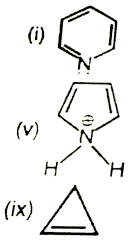
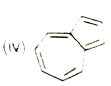
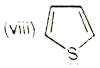
PART-III : PRACTICE TEST-18

1. How may species out of the following are aromatic ?







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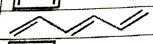
PART-III : PRACTICE TEST-19

1. Match the column.

	Column – I		Column – II
(P)		(1)	Aliphatic Hydrocarbon
(Q)		(2)	Anti aromatic
(R)		(3)	Aromatic
(S)		(4)	Alicyclic Compound

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