CHEMISTRY

BOOKS - MS CHOUHAN CHEMISTRY (HINGLISH)

THE BASIC BONDING AND MOLECULAR STRUCTURE

Solved Problem

1. There are two constitutional isomers with the formula C_2H_6O .

Write structural formulas of these isomers .

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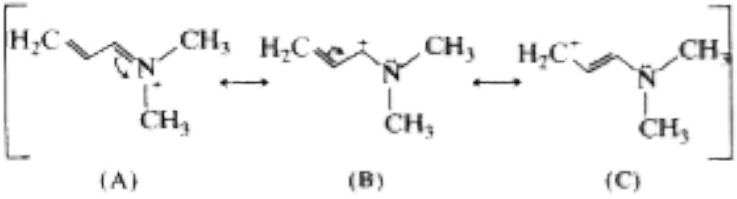
2. 

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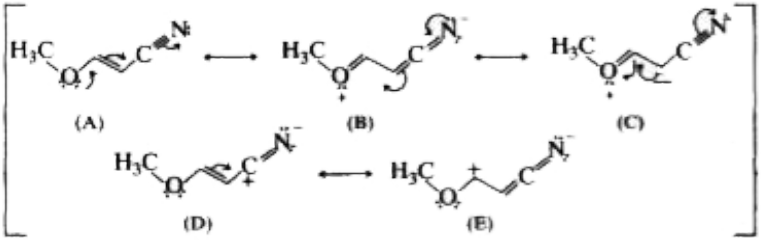
3. Predict the relative energies of the following resonating structures .



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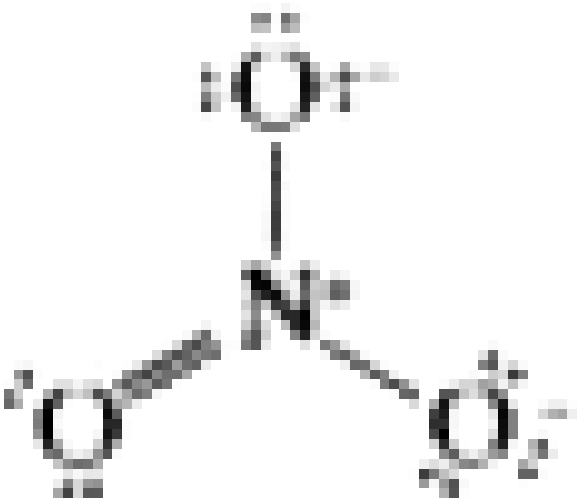
4. The following is one way of writing the structure of the nitrate ion:



However ,considerable physical evidence indicates that all three nitrogen -oxygen bonds are equivalent and that they have the same length , a bond distance between that expected for a nitrogen -oxygen single bond and a nitrogen -oxygen double bond . Explain this terms of resonance theory .

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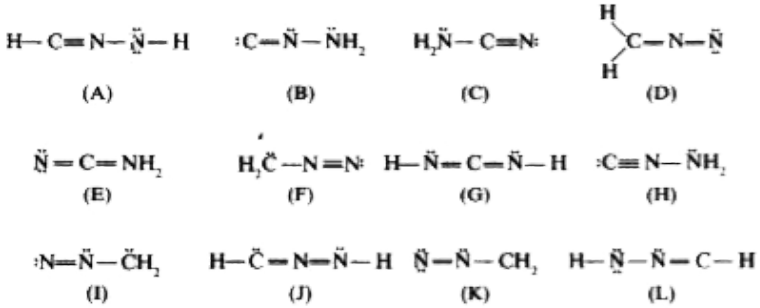
5. The following Lewis/Kelule structures (A) - (L) are isomeric (with molecular formula CN_2H_2)



Which of these structures match the following properties ? Indicate with letters (A) to (L) . If no structure fits the property write the letter X.

Which of the structures have at least one nitrogen atom with a (+) formal charge ?

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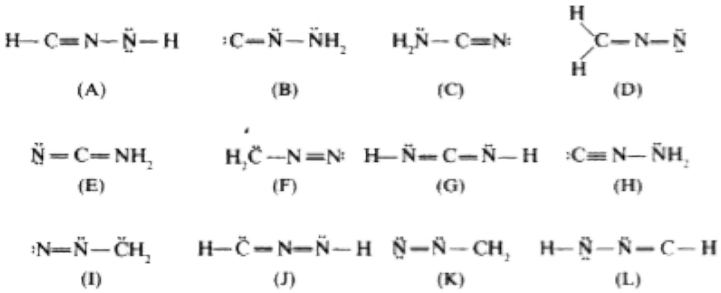
6. The following Lewis/Kelule structures (A) - (L) are isomeric (with molecular formula CN_2H_2)



Which of these structures match the following properties ? Indicate with letters (A) to (L) . If no structure fits the property write the letter X.

Which of the structures have at least one nitrogen atom with a (-) formal charge ?

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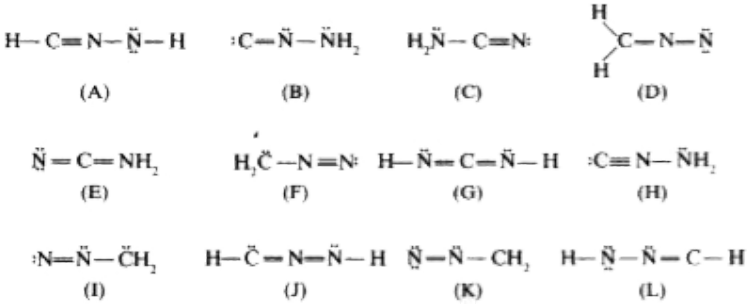
7. The following Lewis/Kelule structures (A) - (L) are isomeric (with molecular formula CN_2H_2)



Which of these structures match the following properties ? Indicate with letters (A) to (L) . If no structure fits the property write the letter X.

Which of the structures have at least one carbon atom with a (-) formal charge ?

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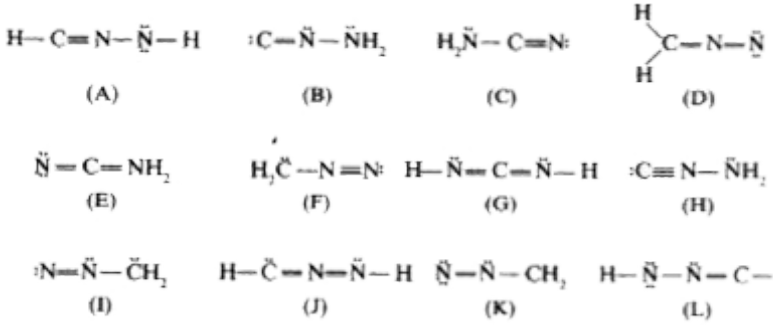
8. The following Lewis/Kelule structures (A) - (L) are isomeric (with molecular formula CN_2H_2)



Which of these structures match the following properties ? Indicate with letters (A) to (L) . If no structure fits the property write the letter X.

Which of the structures have electron deficient heavy atoms (N or C) ?

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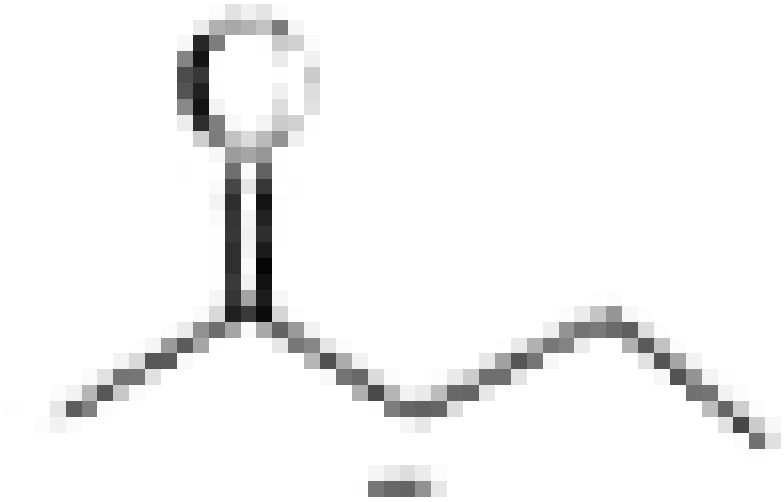
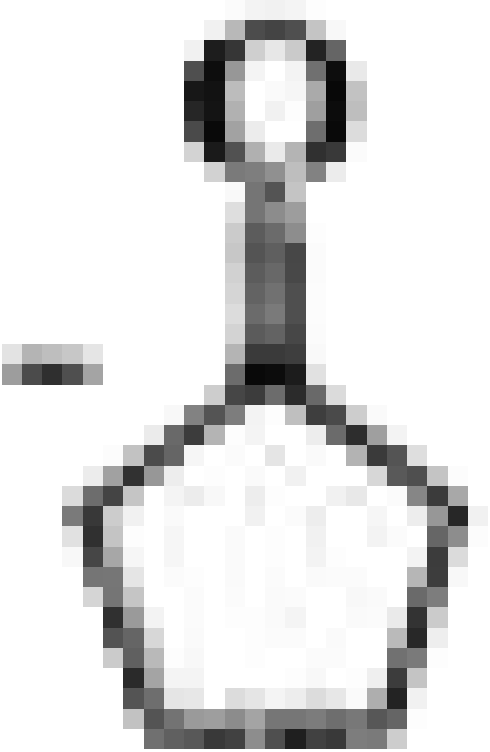
9. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.



View Text Solution

10. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.



View Text Solution

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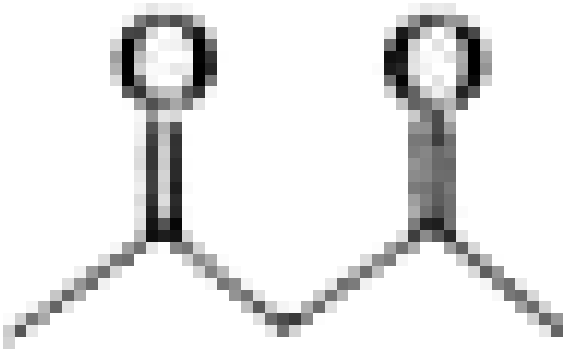
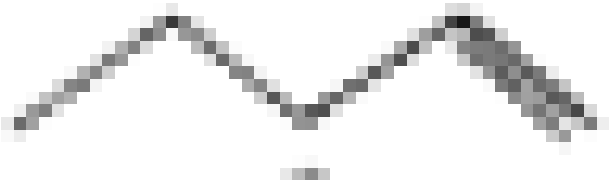


View Text Solution

12. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.



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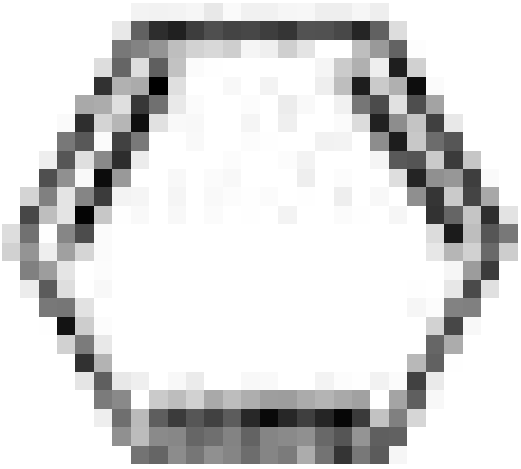
13. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.



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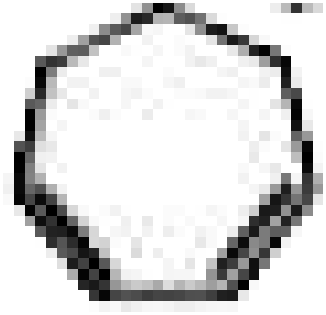
14. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.



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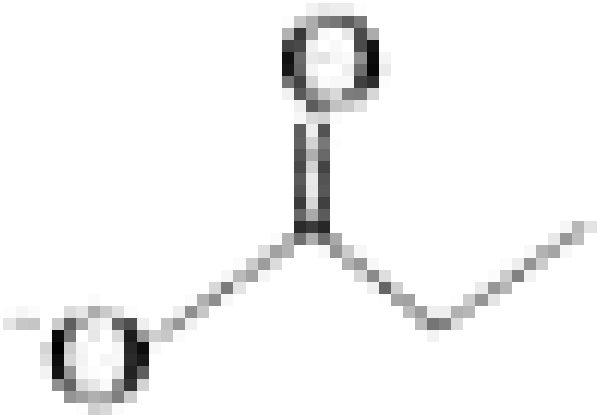
15. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.

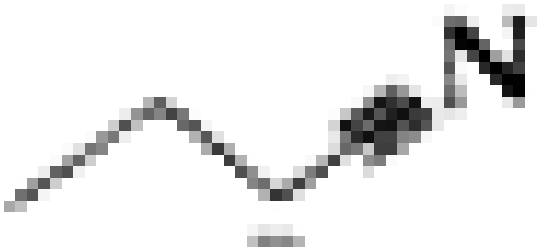


View Text Solution

16. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.

View Text Solution

17. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.



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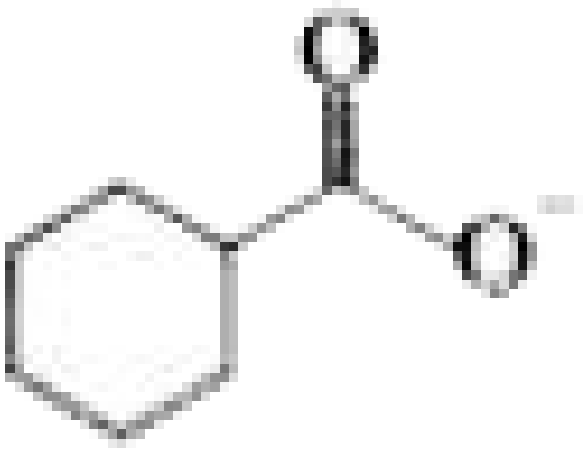
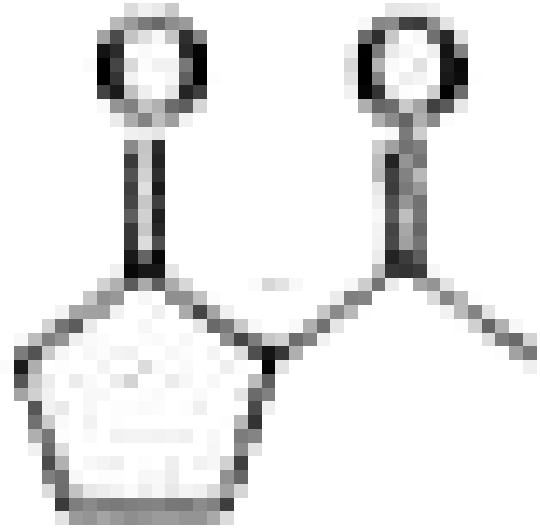
18. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.



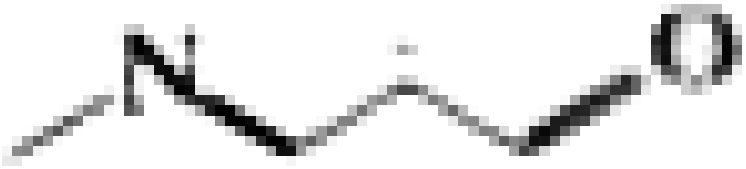
View Text Solution

19. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.



View Text Solution

20. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.



View Text Solution

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View Text Solution

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View Text Solution

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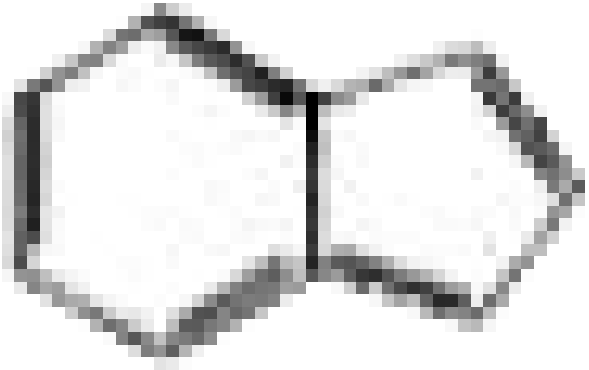

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View Text Solution

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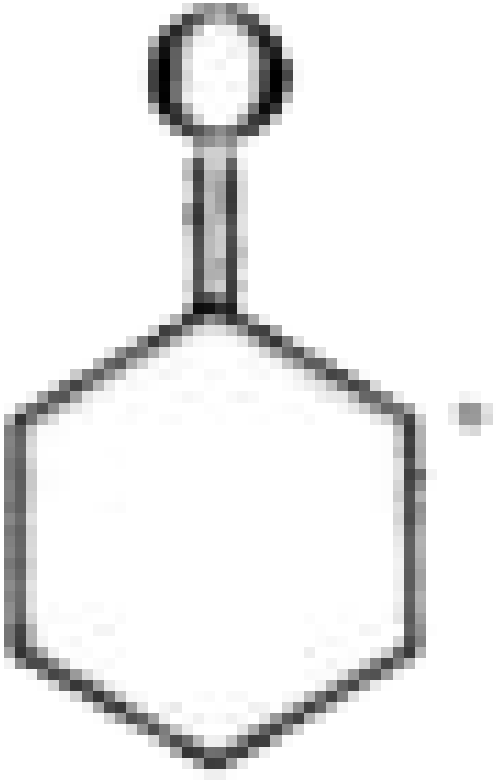
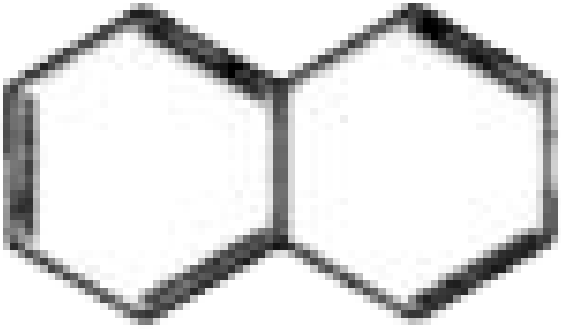


View Text Solution

26. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.



View Text Solution

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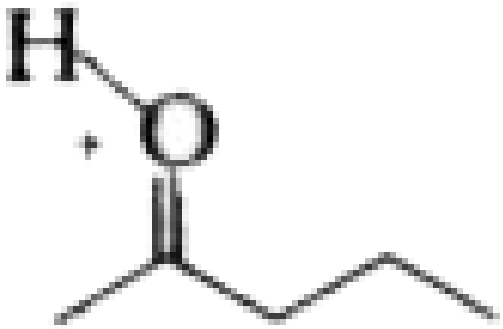

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View Text Solution

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View Text Solution

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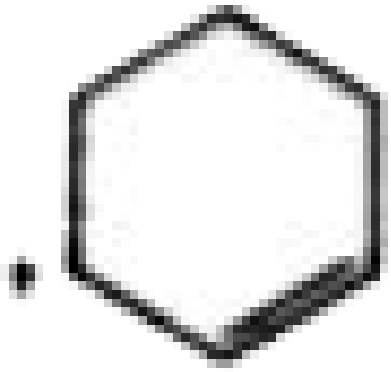

View Text Solution

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View Text Solution

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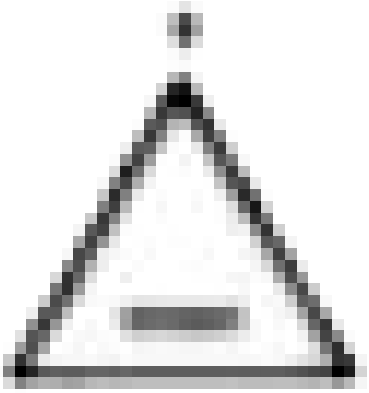

View Text Solution

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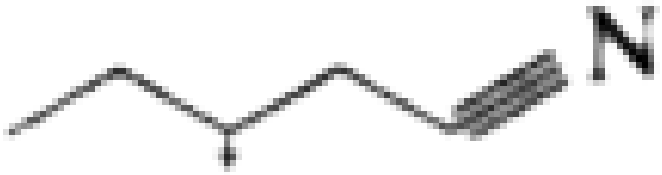
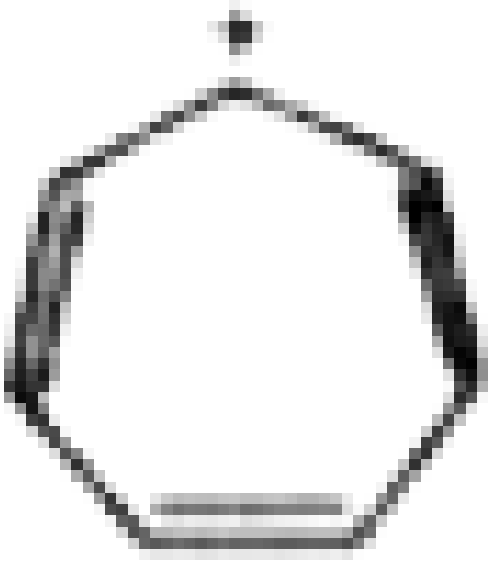


View Text Solution

34. Write the possible structures for the following molecules .Show the direction of the movement of electrons with the help of arrows.



View Text Solution

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View Text Solution

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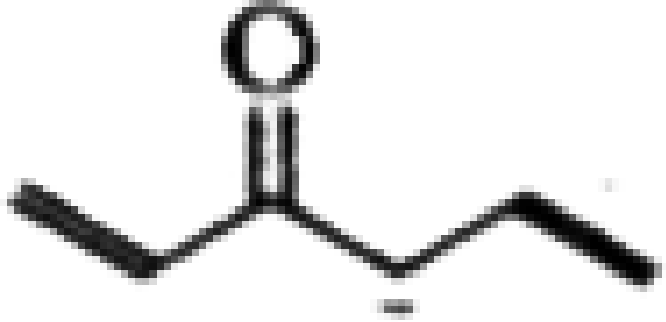

View Text Solution

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View Text Solution

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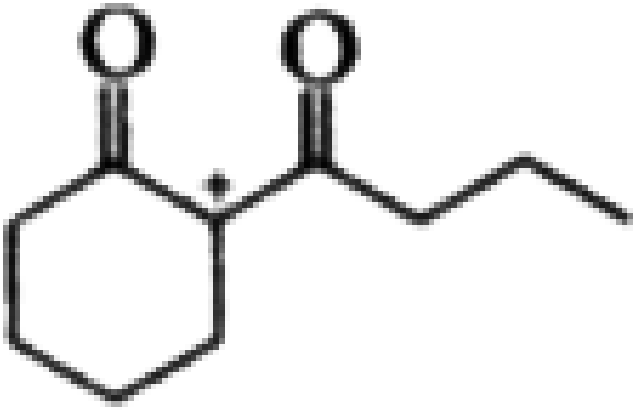

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39. How are the hyperconjugating structures drawn ?

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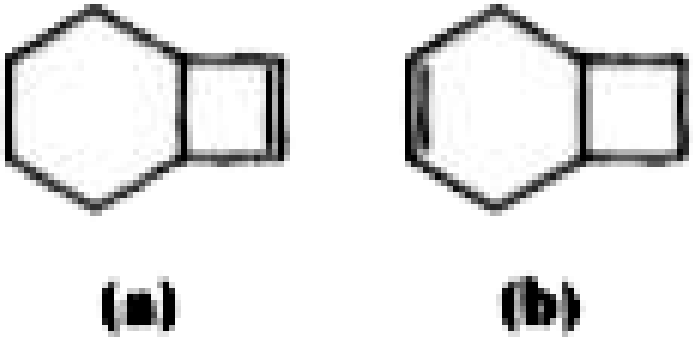
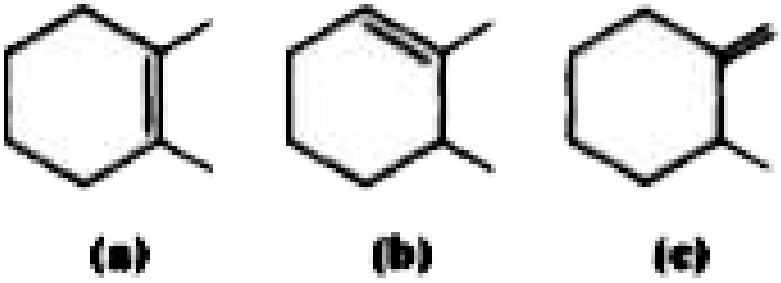
40. Compare the stabilites of the following alkenes



(a) (b)

View Text Solution

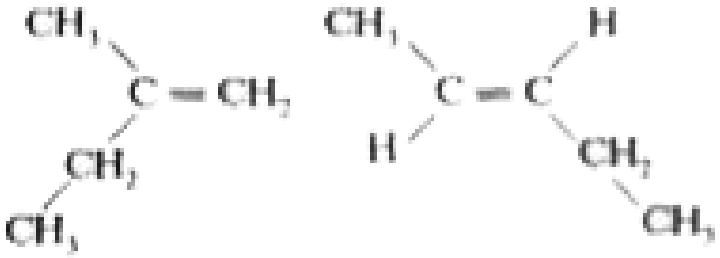
41. Compare the stabilites of the following alkenes



(a) (b) (c)

View Text Solution

42. Compare the stabilites of the following alkenes



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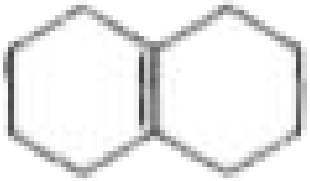
43. Compare the stabilites of the following alkenes

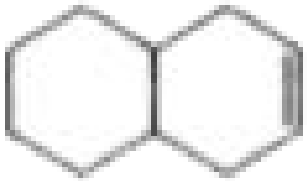
1-Hexene	2-Hexene	3-Hexene
(a)	(b)	(c)

View Text Solution

44. Compare the stabilites of the following alkenes



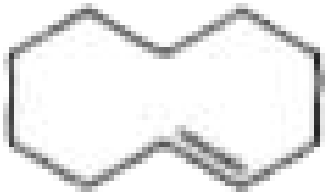
(a)



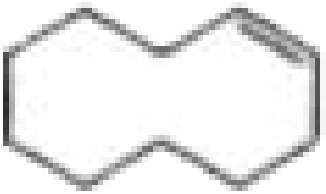
(b)

View Text Solution

45. Compare the stabilites of the following alkenes



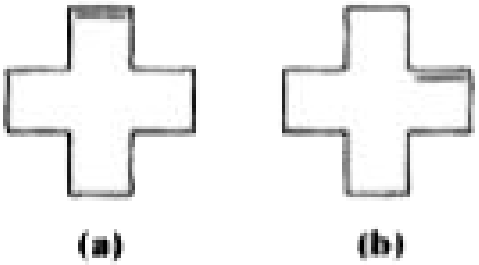
(a)



(b)

View Text Solution

46. Compare the stabilites of the following alkenes



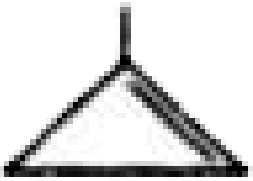
View Text Solution

47. Compare the stabilites of the following alkenes

View Text Solution

48. Compare the stabilites of the following alkenes

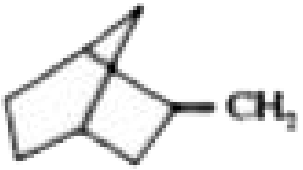
(a)



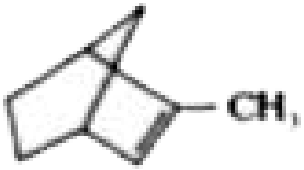
(b)

View Text Solution

49. Compare the stabilites of the following alkenes



(a)



(b)

View Text Solution

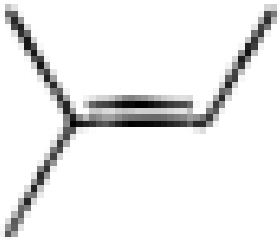
50. Compare the stabilites of the following alkenes

(a) $CH_3 - \overset{CH_3}{\overset{|}{C}} = CH - CH_2$

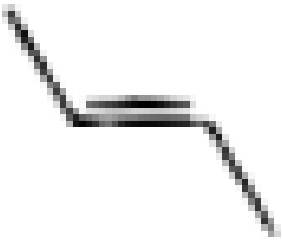
(b) $CH_3 - \overset{CH_3}{\overset{|}{C}}H = CH - CH_2$

View Text Solution

51. Compare the stabilites of the following alkenes



(a)



(b)

$H_2C = \overset{CH_3}{\overset{|}{C}} - CH_2 - CH_3$

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52. Compare the stabilites of the following alkenes

$CH_3 - O - CH = CH_2$

$CH_3 - CH = CH - CH_3$

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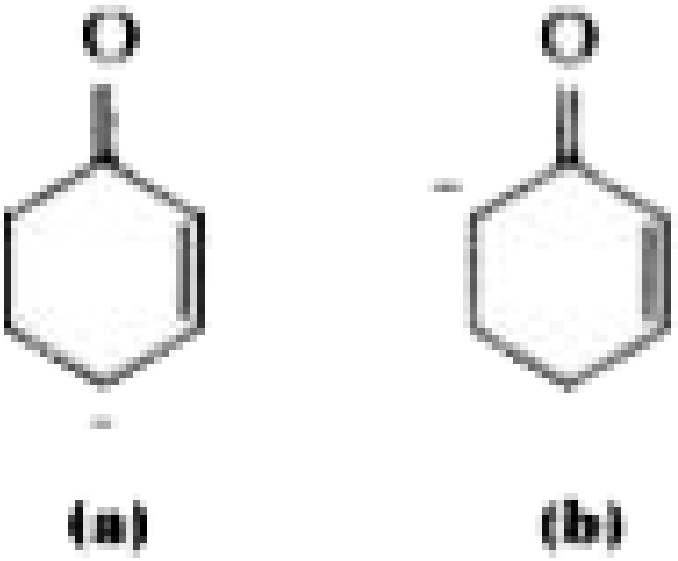
53. Compare the stabilities of the following carbanions :

$\underset{(a)}{CH_3 - CH_2 - CH_2}$

$\underset{(b)}{NO_2 - CH_2 - CH_2}$

View Text Solution

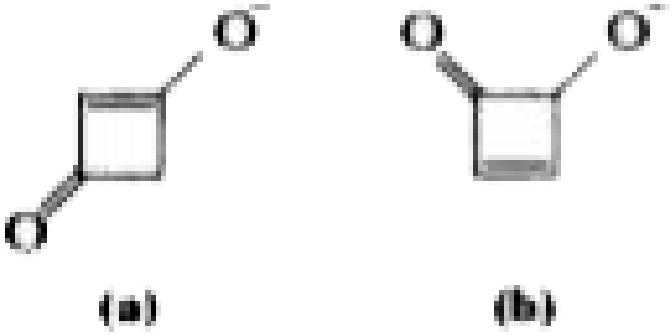
54. Compare the stabilities of the following carbanions :



(a) (b)

View Text Solution

55. Compare the stabilities of the following carbanions :



(a) (b)

View Text Solution

56. Compare the stabilities of the following carbanions :

$$Cl - \underset{\underset{Cl}{|}}{C} - Cl$$

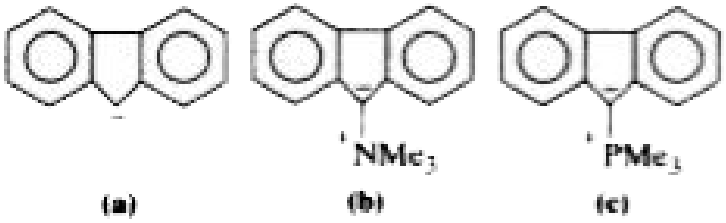
(a)

$$F - \overline{\underset{\underset{F}{|}}{C}} - F$$

(b)

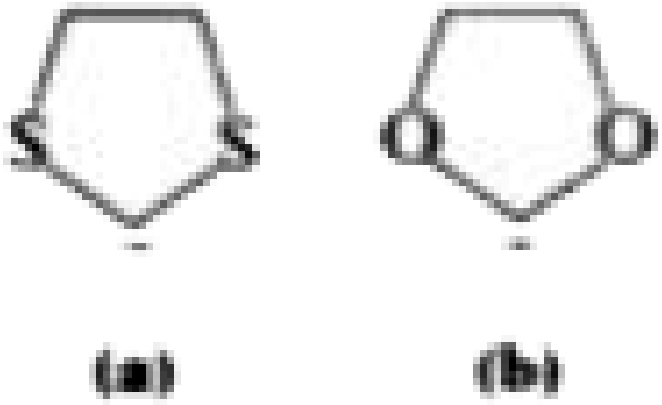
View Text Solution

57. Compare the stabilities of the following carbanions :



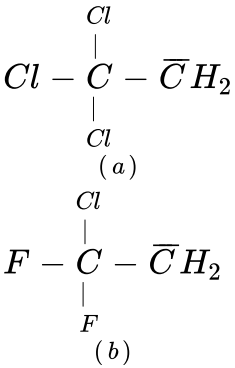
View Text Solution

58. Compare the stabilities of the following carbanions :



View Text Solution

59. Compare the stabilities of the following carbanions :

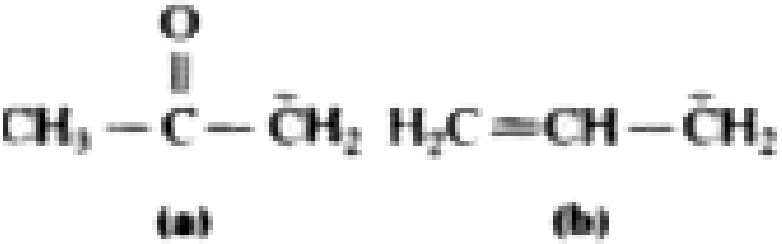


(a)

(b)

View Text Solution

60. Compare the stabilities of the following carbanions :



(a) (b)

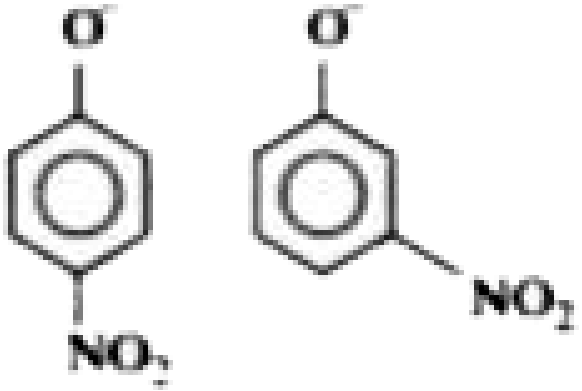
View Text Solution

61. Compare the stabilities of the following carbanions :

$$\underset{(a)}{H_2C = CH - \overline{N}H} \qquad \underset{(b)}{HN = CH - \overline{N}H}$$

View Text Solution

62. Compare the stabilities of the following carbanions :



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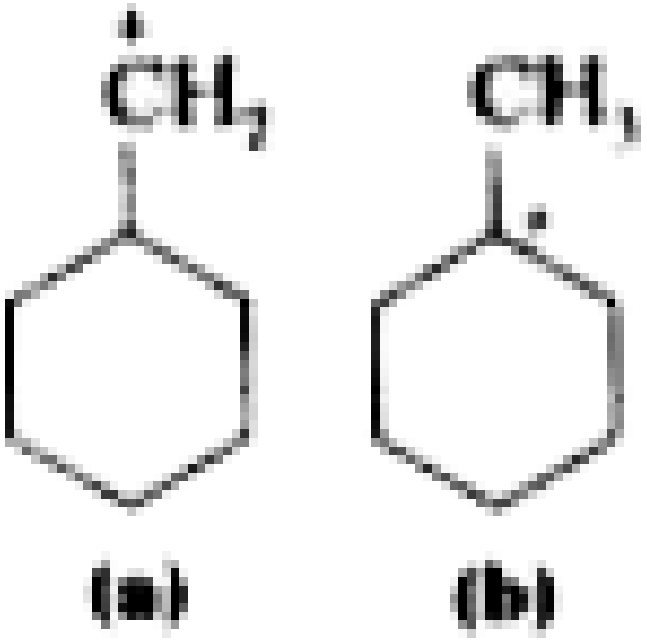
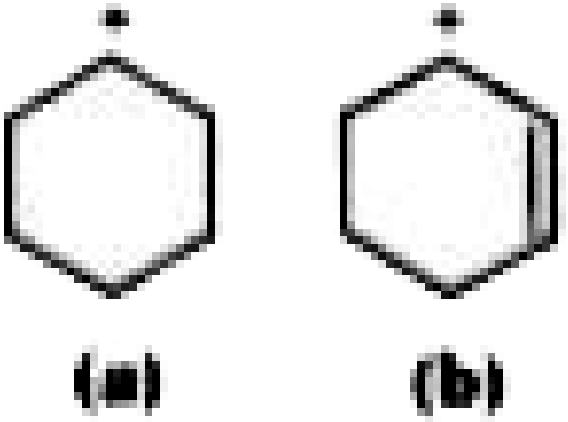
63. Compare the stabilities of the following intermediates :



View Text Solution

64. Compare the stabilities of the following intermediates :



View Text Solution

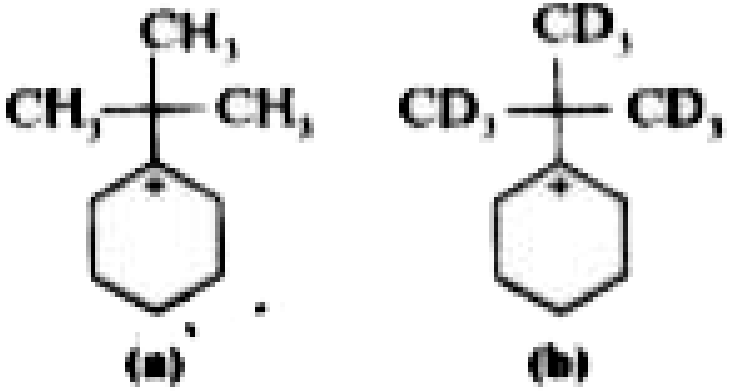
65. Compare the stabilities of the following intermediates :

$$H-\overset{+}{\underset{\underset{H}{|}}{C}}-H$$
$$(a)$$

$$H-\overset{+}{\underset{\underset{H}{|}}{C}}-H$$
$$(b)$$

View Text Solution

66. Compare the stabilities of the following intermediates :



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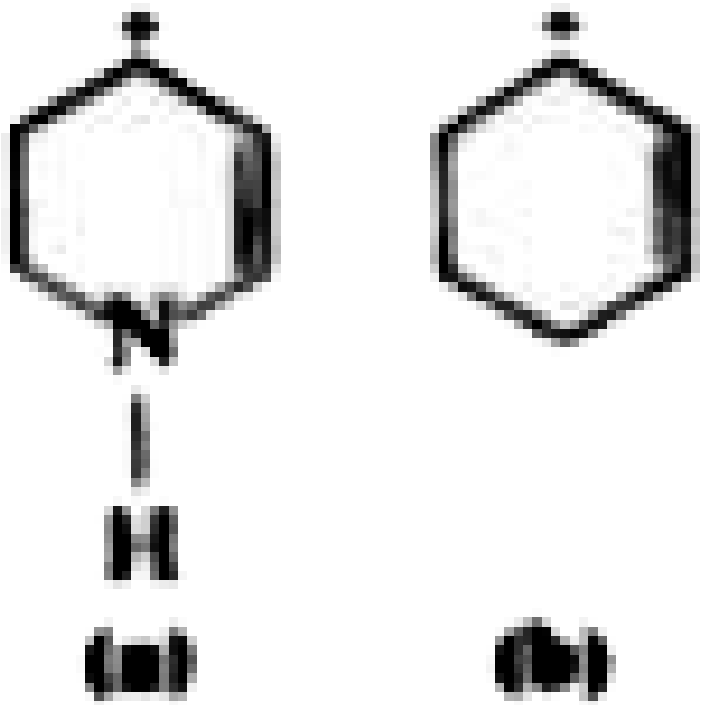
67. Compare the stabilities of the following intermediates :



View Text Solution

68. Compare the stabilities of the following intermediates :

$$\underset{(a)}{H \equiv C - CH_2 - CH_2}$$

$$\underset{(b)}{H_2C - CH - CH_2 - \overset{+}{C}H_2}$$

View Text Solution

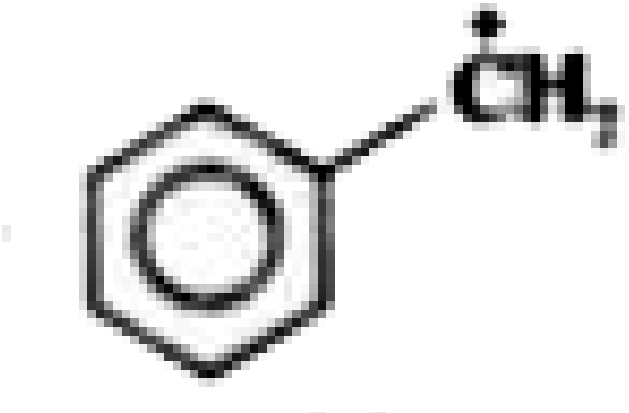
69. Compare the stabilities of the following intermediates :

$$\underset{(a)}{CH_3 - O - \overset{+}{C}H_2}$$

$$\underset{(b)}{CH_3 - CH_2 - \overset{+}{C}H_2}$$

View Text Solution

70. Compare the stabilities of the following intermediates :



(a)

(b)

View Text Solution

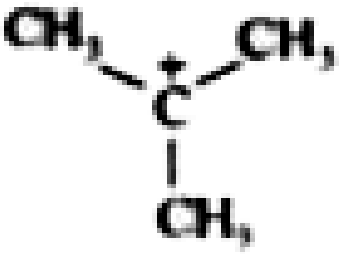
71. Compare the stabilities of the following intermediates :

$$\underset{(a)}{Cl - CH_2 - \overset{+}{C}H_2}$$

$$\underset{(b)}{Cl - CH_2 - CH_2} - \overset{+}{C}H_2$$

View Text Solution

72. Compare the stabilities of the following intermediates :

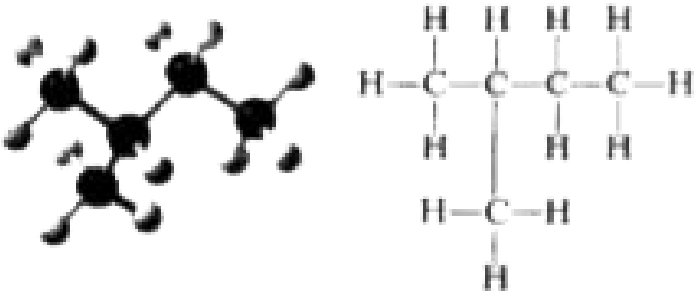


(a)

(b)

View Text Solution

73. Write a condensed structural formula for the compound that follows :



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74. Write the bond -line formula for

$$CH_3\underset{\underset{CH_3}{|}}{C}HCH_2CH_2CH_2OH$$

View Text Solution

Additional Objective Questions Single Correct Choice Type

1. CH_2I_2 is a _____halide .

A. vicinal

B. secondary

C. geminal

D. vinyl

Answer: C

View Text Solution

2. Identify the correct order of boiling point of the following compounds :

$\underset{1}{CH_3CH_2CH_2CH_2OH}$ $\underset{2}{CH_3CH_2CHO}$ $\underset{3}{CH_3CH_2CH_2COOH}$

A. $1 > 2 > 3$

B. $3 > 1 > 2$

C. $1 > 3 > 2$

D. $3 > 2 > 1$

Answer: B

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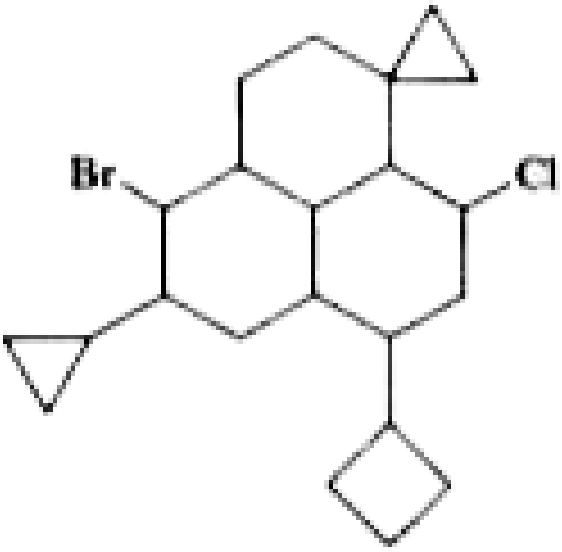
3. Total number of 2^o carbon present in given compound is x, so the value of $x - 7$ is



A. 6

B. 8

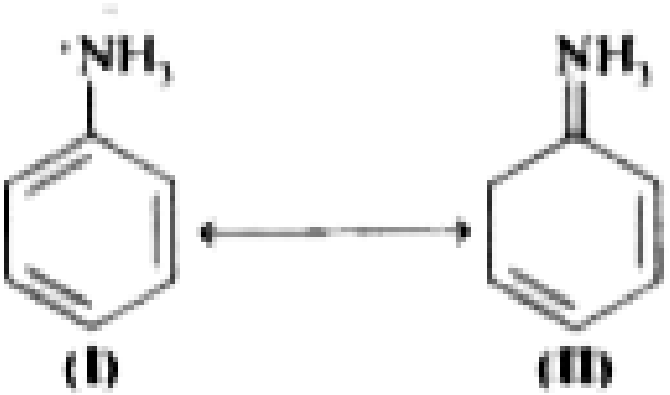
C. 9

D. None of these

Answer: A

View Text Solution

4. Choose the correct statement from the ones given below for the two anilinium ion structures .



A. II is not acceptable canonical structure because carbonium ions are less stable than ammonium ions.

B. II is not an acceptable canonical structure because it is non aromatic.

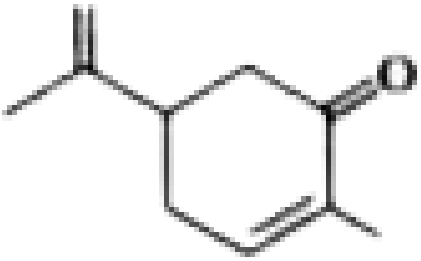
C. II is not an acceptable canonical structure because the nitrogen has 10 valence shell electrons .

D. II is not acceptable canonical structure .

Answer: C

View Text Solution

5. What is the molecular formula of carvone ?



Carvone
(responsible for odour of spearmint)

A. $C_8H_{10}O$

B. $C_{10}H_{14}O$

C. $C_{10}H_{12}O$

D. $C_9H_{12}O$

Answer: B

View Text Solution

6. The number of sigma of pi-bonds in butene 3-yne are

A. 5 sigma and 5 pi

B. 7 sigma and 3 pi

C. 8 sigma and 2 pi

D. 6 sigma and 4 pi.

Answer: B

View Text Solution

7. For 1 - methoxy- 1,3- butadience ,which of the following resonating structure is the least stable ?

A. $H_2\overset{+}{C} - \overset{+}{C}H - Ch = CH - O - CH_3$

B. $H_2\overset{+}{C} - CH = CH - CH = \overset{+}{O} - CH_3$

C. $H_2\overset{+}{C} - CH - \overset{+}{C}H - \overset{+}{C}H - O - CH_3$

D. $H_2C = CH - \overset{+}{C}H - CH = \overset{+}{O} - CH_3$

Answer: C

View Text Solution

8. Most stable carbanion is

A. CH_3^-

B. $CH_3CH_2^-$

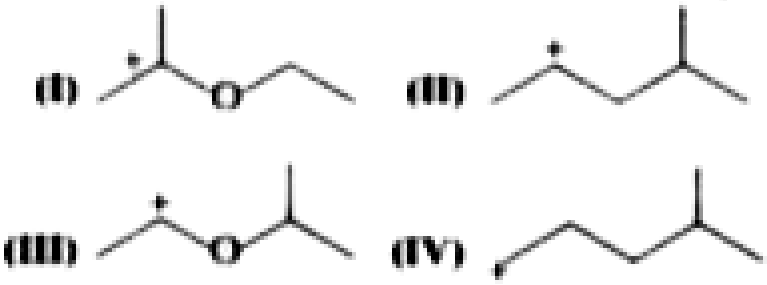
C.

D.

Answer: C

View Text Solution

9. The correct stability order for the following species is



A. $II > IV > I > III$

B. $I > II > III > IV$

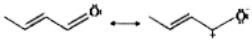
C. $II > I > IV > III$

D. $I > III > II > IV$

Answer: D

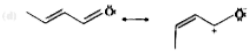
View Text Solution

10. Select the structures that are not resonance structures of the same molecule .

A. 

B. 

C. 

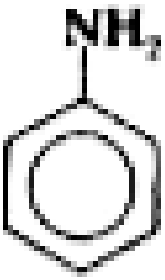
D. 

Answer: D

View Text Solution

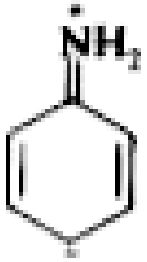
11. Which of the following is not a valid resonating structure ?

A.



B.

C.

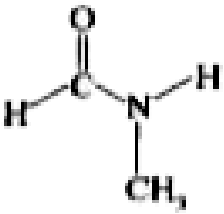


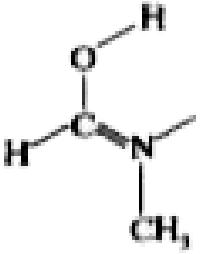
D.

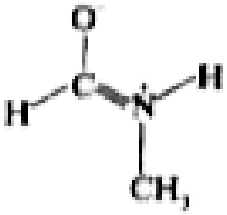
Answer: D

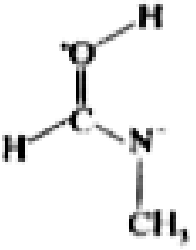
View Text Solution

12. Choose the incorrect statement about the following compounds .

(I) 

(II) 

(III) 

(III) 

A. Compounds (I) and (II) are constitutional isomers .

B. Compounds (I) and (III) are resonance structures

C. Compounds (I) and (IV) are resonance structures

D. Compounds (II) and (IV) are resonance structures .

Answer: C

View Text Solution

13. The correct stability order of the following resonance structure is

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

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

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

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

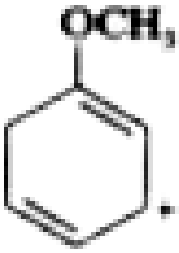
D. $(III) > (I) > (IV) > (II)$

Answer: B

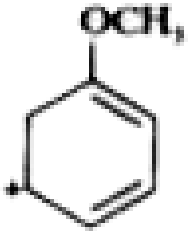
View Text Solution

14. Which of the following resonance structures contribute the most to the resonance hybrid ?

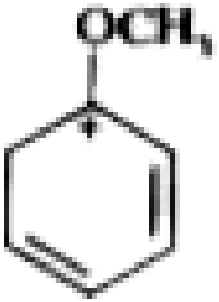
A.



B.



C.



D.

Answer: D

View Text Solution

15. Among the given cations , the most stable carbonium ion is

A. sec-butyl

B. tert-butyl

C. n-butyl

D. none of these

Answer: B

View Text Solution

16. $H_2C = CH - CH_2 - \underset{\underset{CH_2}{\|}}{C} - \overset{+}{C}H_2$

Resonance hybrid of the carbocation is

A. $H_2\overset{\delta+}{C} = CH = \overset{\delta+}{C}H_2 = \underset{\underset{\delta+}{CH_2}}{\overset{\|}{C}} = \overset{\delta+}{C}H_2$

B. $H_2C = CH - CH_2 - \underset{\underset{\delta+}{CH_2}}{\overset{\|}{C}} = \overset{\delta+}{C}H_2$

C. $\overset{\delta+}{H_2}C = CH - CH_2 - \underset{\underset{\delta+}{CH_2}}{\overset{\|}{C}} = \overset{\delta+}{C}H_2$

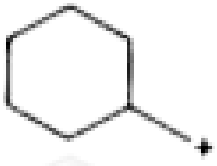
D. $H_2C = CH - CH_2 - \overset{\delta+}{C}H_2 = CH = \overset{\delta+}{C}H_2$

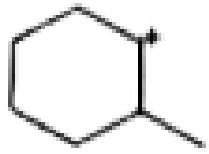
Answer: B

View Text Solution

17. Which of the following is the most stable carbocation ?

A. 

B. 

C. 

D. 

Answer: D

View Text Solution

18. Rank the following free radicals in order of decreasing stability

(I) $C_6H_5CH_6H_5$ (II) $C_6H_5 - CH - CH = CH_2$ (III)

$CH_3 - \dot{C}H - CH_3$ (IV) $C_6H_5 - \dot{C}H - CH_3$ (V)

$CH_3CH = CHCH_2\dot{C}H_2$ (VI) $CH_3 - CH_2 - \underset{\underset{CH_3}{|}}{\dot{C}} - CH_3$

A. $I > II > IV > CI > HI > V$

B. $VI > V > IV > III > II > I$

C. $I > II > III > IV > V > VI$

D. $I > IV > VI > V > II > III$

Answer: A

View Text Solution

19. In the following compound $H-\overset{1}{C}\equiv\overset{2}{C}-\overset{3}{C}H_2-\overset{4}{C}H_3$ the hybridization of C2 and C3 carbons are respectively .

A. sp^3 and sp^3

B. sp^2 and sp^3

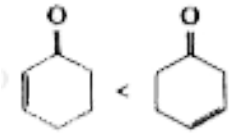
C. sp^2 and sp

D. sp^3 and sp

Answer: D

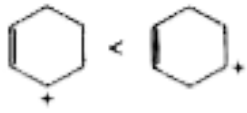
View Text Solution

20. Correctly matched option stability of compound in each of the following pairs :

A. 

B.

$$CH_3CH = CHCHCH = CH_2 < CH_3CH_2CH_2CH_2\dot{C}H = CH_2$$

C. 

D. $CH_3\overset{+}{C}HCH = CH_3CH_3 > CH_3CH = CHCH_2\overset{+}{C}H_2$

Answer: D

View Text Solution

21. The hyparconjugative stabilities of tert-butyl cation and 2-butene, respectively ,are due to

A. $\sigma \rightarrow p(\text{sigma})(\text{empty}\ )$ and $\sigma \rightarrow \pi^*$ electron delocalization.

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

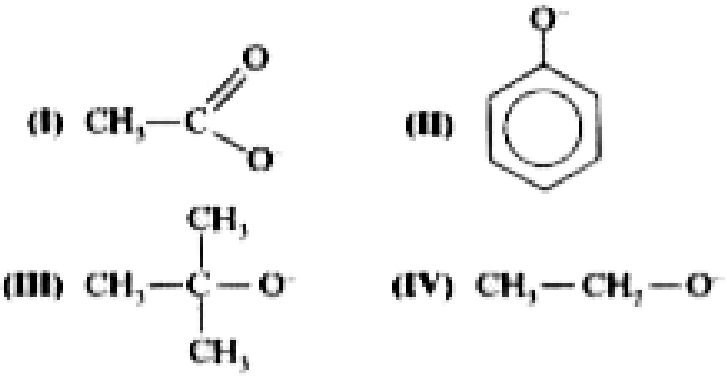
C. $\sigma \rightarrow$ p (filled) and $\sigma \rightarrow \pi$ electron delocalization.

D. p (filled) $\rightarrow \sigma^*$ and $\sigma \rightarrow \pi^*$ electron delocalization .

Answer: A

View Text Solution

22. Which of the correct stability order of oxy anions given below ?



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

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

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

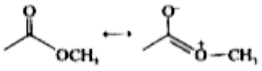
D. $(I) > (II) > (IV) > (III)$

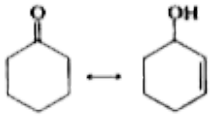
Answer: D

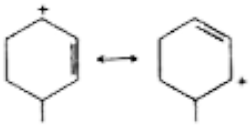
View Text Solution

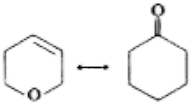
Additional Objective Questions Multiple Correct Choice Type

1. Which of the following is not resonating structure of each other ?

A. 

B. 

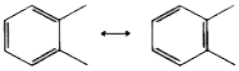
C. 

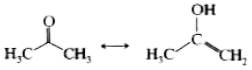
D. 

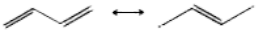
Answer: B::D

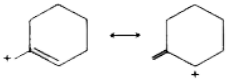
View Text Solution

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

A. 

B. 

C. 

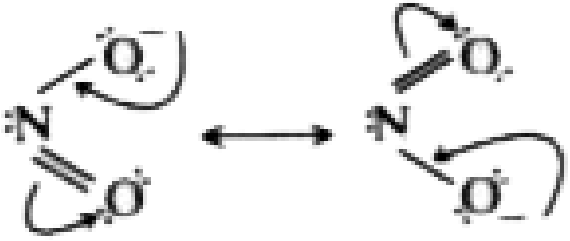
D. 

Answer: A::D

View Text Solution

Additional Objective Questions Linked Comprhension Choice Type

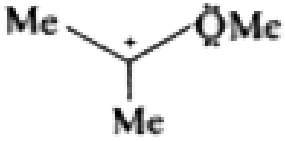
1. The theory of resonance was developed primarily by Pauling in the 1930s. According to this theory , many molecules and ions are best described by writing two or more Lewis structure and considering the real molecule of ion to be a composite of these structures .They are also sometimes referred to as resonance structures or resonance contributors . We show that the real molecule or ion is a resonance hybrid of the various contributing structures by interconnecting them with double headed arrows . Resonance structures are not in equilibrium with each other .



(equivalent contributing structures)

.

Find out the stability order of intermediate .

(I) 

(II) 

(III) 

(IV) 

A. $I > II > III > IV$

B. $I > II > IV > III$

C. $IV > I > II > III$

D. $III > I > II > IV$

Answer: B

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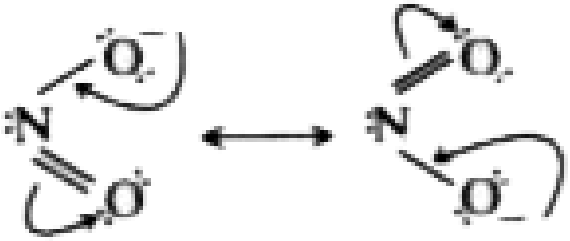
2. The theory of resonance was developed primarily by Pauling in the 1930s. According to this theory , many molecules and ions are best described by writing two or more Lewis structure and considering the

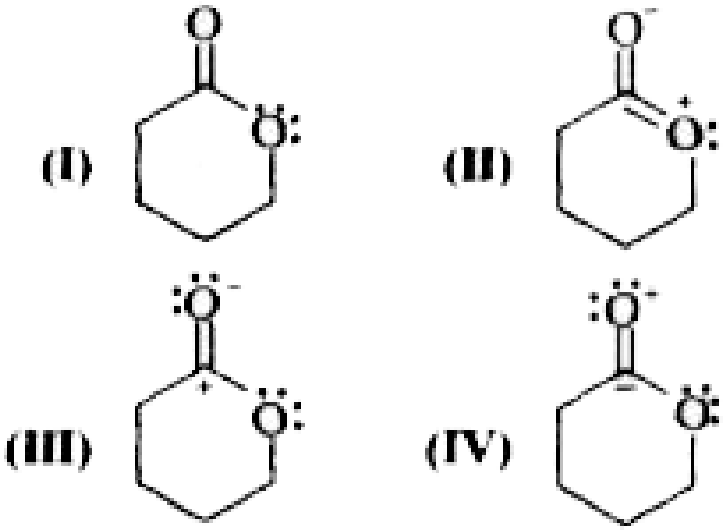
real molecule of ion to be a composite of these structures .They are also sometimes referred to as resonance structures or resonance contributors . We show that the real molecule or ion is a resonance hybrid of the various contributing structures by interconnecting them with double headed arrows . Resonance structures are not in equilibrium with each other .



(equivalent contributing structures)

.

Stability order of the following resonatin structure will be



A. $I > II > III > IV$

B. $II > I > III > IV$

C. $III > II > I > IV$

D. $I > III > II > IV$

Answer: A

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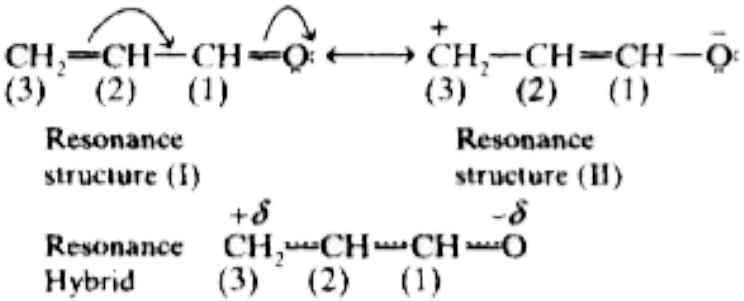
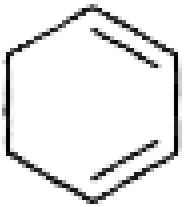
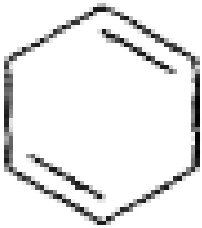
3. The bond length between C2 and C3 in acrutl aldehyde is not equal to the bond length between carbons of ethene because in acryl aldehyde double is in conjugation , so it it shows resonance which results in an increase in the bond length between C2 and C3 in acryl aldehyde .



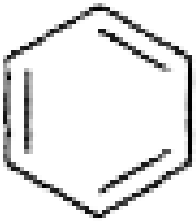
Which compound will not show the resonance ?



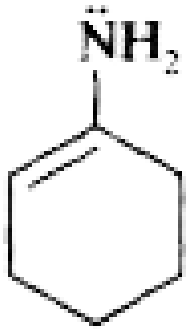
A.



B.



C.



D.

Answer: B

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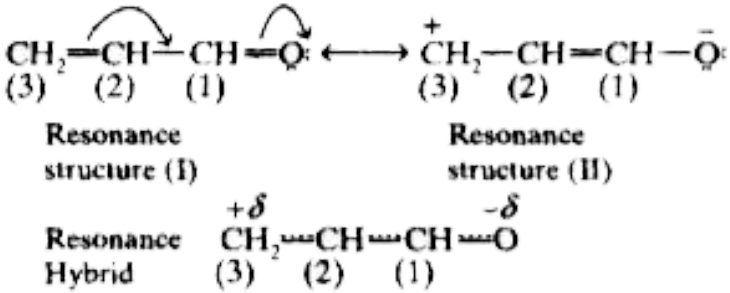
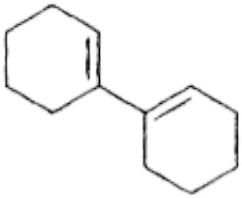
4. The bond length between C2 and C3 in acrutl aldehyde is not equal to the bond length between carbons of ethene because in acryl aldehyde double is in conjugation , so it it shows resonance which results in an increase in the bond length between C2 and C3 in acryl aldehyde .



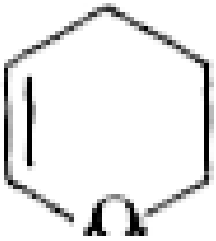
Which compound does not have the conjugative system to show the resonance ?

A. $CH_2 = CH - CH = CH - CH_2 - CH_3$

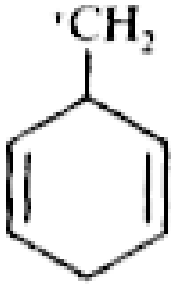
B.



C.



D.



Answer: D

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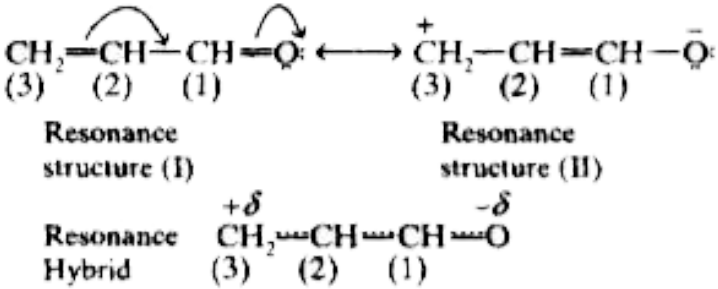
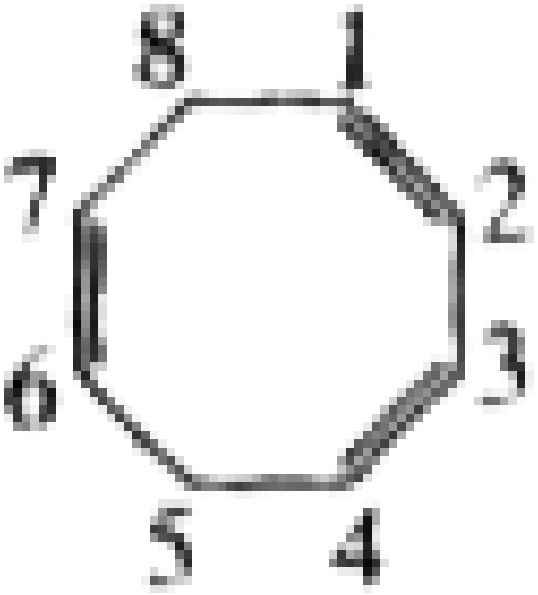
5. The bond length between C2 and C3 in acrutl aldehyde is not equal to the bond length between carbons of ethene because in acryl aldehyde double is in conjugation , so it it shows resonance which results in an increase in the bond length between C2 and C3 in acryl aldehyde .



Find out the correct statement (s) about the given compound ?



A. Bond length between C2 and C3 = Bond length between C5 and C6 .

B. Bond length between C1 and C2 = Bond length between C6 and C7.

C. Bond length between C6 and C7 $<$ Bond length between C3 and C4.

D. Bond length between C2 and C3 $<$ Bond length between C3 and C4

Answer: C

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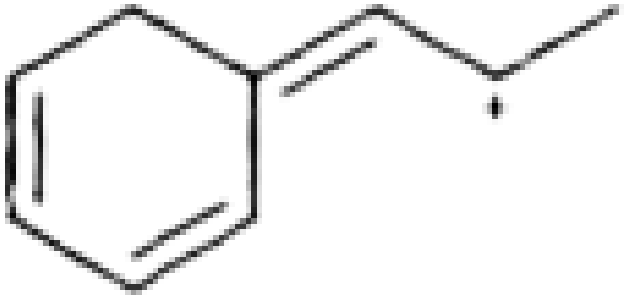
Additional Objective Questions Integar Type

1. Total number of resonating structures in the following compound is



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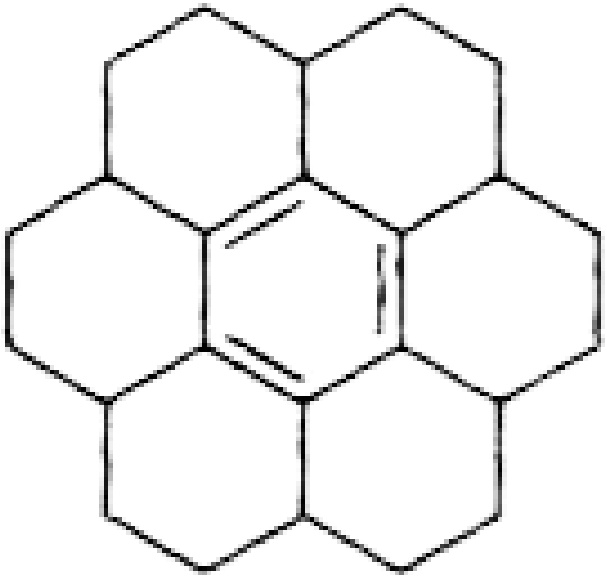
2. Total number of α - hydrogen in the following compound is



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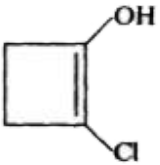
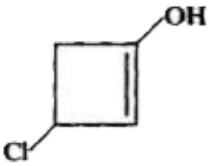
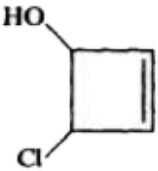
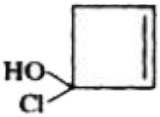
Additional Objective Questions Matrix Match Type

1.

Column I	Column II
(a) 	(p) Resonance stabilization in the compound
(b) 	(q) IUPAC name is 2-chloro-cyclobutenol
(c) 	(r) IUPAC name is 3-chlorocyclobutenol
(d) 	(s) Resonance is not possible

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