ORGANIC CHEMISTRY

DPP

DAILY PRACTICE PROBLEMS

DPP No. 3

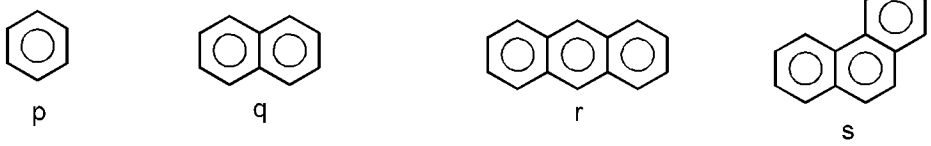
Total Marks : 33

Max. Time : 34 min.

Topic : General Organic Chemistry

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.4	(3 marks, 3 min.)	[12, 12]
Multiple choice objective ('–1' negative marking) Q.5 to Q.6	(4 marks, 4 min.)	[8, 8]
Comprehension ('–1' negative marking) Q.7 to Q.9	(3 marks, 3 min.)	[9, 9]
Subjective Questions ('–1' negative marking) Q.10	(4 marks 5 min.)	[4, 5]

1. The correct order of resonance energy of following molecules is :



p q r s

(A) p > q > r > s (B) s > r > q > p (C) r > s > q > p (D) q > s > r > p

2. Select the correct statement/s?

(A) All canonical forms always contribute equally to the resonance hybrid.

(B) In both ethanamine and ethenamine nitrogen is sp^3 hybridised.

(C) All 'C–O' bond length in carbonate dianion are equal.

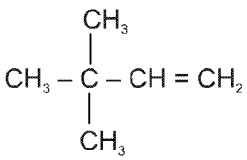
(D) $CH_2=C=O$ does not exhibit resonance because it is not a conjugated system.

3. The most stable resonating structure is :

(A) $H_2N - \overset{\oplus}{C}H - CH = CH - OCH_3$ (B) $H_2\overset{\oplus}{N} = CH - CH = CH - OCH_3$

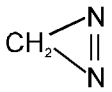
(C) $H_2N - CH = CH - CH = \overset{\oplus}{O}CH_3$ (D) $H_2\overset{\oplus}{N} = CH - \overset{\oplus}{C}H = \overset{+}{O}CH_3$

4. Hyperconjugation phenomenon is possible in :

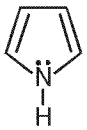
(A)  (B) $CH_2 = CH_2$

(C) $C_6H_5 - CH = CH_2$ (D) $CH_3 - CH_2 - CH = CH_2$

5.* Which of the following is/are resonating structures of diazomethane (CH_2N_2).

(A)  (B) $CH_2 = \overset{+}{N} = N^-$ (C) $\overset{-}{C}H_2 - \overset{+}{N} \equiv N$ (D) all of these

6.* In which case the unshared pair (lone pair) of electrons are delocalized.

(A)  (B) $H_2C = \ddot{N} - CH_3$ (C) $H_2C = \overset{\oplus}{N} = \overset{\ominus}{N}:$ (D) $:\overset{\ominus}{N} = \overset{\oplus}{N} = \overset{\ominus}{N}:$

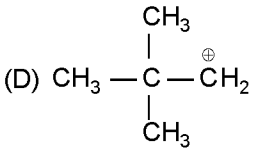
Comprehension # (Q.7 to Q.9)

Hyperconjugation describes the orbital interactions between the π-systems and the adjacent C – H σ bond in organic compounds. Hyperconjugation is also called as Baker and Nathan effect. The necessary and sufficient conditions for the hyperconjugation are :

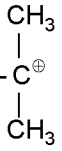
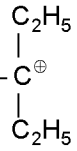
(i) Compound should have at least one sp^2-hybrid carbon of either alkene, carbocation or alkyl free radical.

(ii) sp^3 hybridised α-carbon with respect to sp^2-hybrid carbon should have at least one hydrogen.

7. Hyperconjugation is possible in which of the following species ?

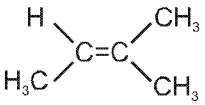
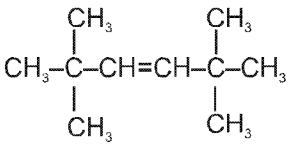
(A) $CH_3 - \overset{\ominus}{C}H_2$ (B) $C_6H_5—CH_3$ (C) $CH_2=CH_2$ (D) 

8. Which of the following carbocation will show highest number of hyperconjugation structures?

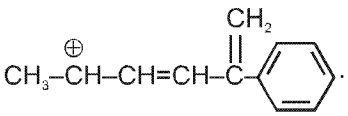
(A) $CH_3—\overset{\oplus}{C}H_2$ (B) $C_6H_5—\overset{\oplus}{C}H_2$ (C)  (D) 

9. Which of the following alkenes will show maximum number of hyperconjugation forms ?

(A)  (B) $CH_3–CH=CH–CH_3$

(C)  (D) 

10. Find the total number of the position where positive charge can be delocalized by true resonance



(Excluding the given position)

Answer Key

DPP No. # 3

1.	(B)	**2.**	(C)	**3.**	(B)	**4.**	(D)	**5.**	(B,C)
6.	(A,C,D)	**7.**	(B)	**8.**	(C)	**9.**	(A)	**10.**	2

Hints & Solutions

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1. The resonance energy of fused system increases as the number of principal canonical forms increases.

R.E.	p	q	r	s
(K cal/mole) =	36	61	84	92

In 'S' more number of canonical forms have stable kekule arrangement of 6π electrons in all the three rings as compared to anthracene.

4. $CH_3 - CH_2 - CH = CH_2$ has two α-hydrogen for hyperconjugation.

6. Lone pair of electrons of $H_2C = \ddot{N} - CH_3$ is in sp^2 hybrid orbital.

10.