INORGANIC CHEMISTRY

DPP
DAILY PRACTICE PROBLEMS

DPP No. 12

Total Marks : 26

Max. Time : 27 min.

Topic : Chemical Bonding

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.6	(3 marks, 3 min.)	[18, 18]
Multiple choice objective ('–1' negative marking) Q.7	(4 marks, 4 min.)	[4, 4]
Subjective Questions ('–1' negative marking) Q.8	(4 marks, 5 min.)	[4, 5]

1. Carbon atoms in $C_2(CN)_2$ are :

(A) All sp-hybridised (B) All sp^2-hybridised (C) All sp^3-hybridised (D) sp and sp^2–hybridised.

2. $BF_3 + F^- \rightarrow BF_4^-$

What is the hybridiation state of B in BF_3 and BF_4^- :

(A) sp^2, sp^3 (B) sp^3, sp^3 (C) sp^2, sp^2 (D) sp^3, sp^3d

3. The hybridisation of P in phosphate ion (PO_4^{3-}) is the same as :

(A) I in $IC\ell_4^-$ (B) S in SO_3 (C) N in NO_3^- (D) S in SO_3^{2-}

4. Specify the hybridisations of central atom in the following species respectively {N_3^-, NOCl, N_2O}

(A) sp , sp^2 , sp (B) sp , sp , sp^3 (C) sp^2 , sp , sp (D) sp^2 , sp^2 , sp.

5. The correct order of increasing s character (in percentage) in the hybrid orbitals in below molecules / ions is (assume all hybrid orbitals are exactly equivalent) :

CO_3^{2-}	XeF_4	I_3^-	NCl_3	$BeCl_2$ (g)
I	II	III	IV	V

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

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

6. Consider the following statements :

In $\overset{I}{CH_2} = \overset{II}{CH} - \overset{III}{C} \equiv \overset{IV}{C} - H$

1. There are 6 σ and 3 π bonds.
2. Carbon I & II are sp^2 hybridised.
3. Carbon III & IV are sp hybridised.

The above statements 1, 2, 3 respectively are (T = True, F = False) :

(A) T T T (B) F T T (C) F T F (D) T F T

7.* Which of the following species have linear shape with central atom sp hybridised :

(A) NO_2^+ (B) SCN^- (C) $HgCl_2$ (D) C_2H_2

8. Predict the hybridisation of the central atom in following molecules :

1.	BeH_2 (g)	.....	2.	BeF_2	.....
3.	CO_2	.....	4.	$HC \equiv CH$	.....
5.	O_3	.....	6.	BF_3	.....
7.	$CH_2=CH_2$	.....	8.	CH_3^+	.....
9.	HNO_3	.....	10.	HNO_2	.....
11.	SO_2	.....	12.	SO_3	.....
13.	HCO_3^-	.....	14.	$HCOO^-$	.....
15.	$SnCl_2$	.....	16.	$AlCl_3$	.....
17.	AlH_4^-	.....	18.	NF_3	.....
19.	PF_3	.....	20.	$AsCl_3$	.....
21.	CH_3^-	.....	22.	OF_2	.....
23.	SCl_2	.....	24.	SF_4	.....
25.	$[SiF_6]^{2-}$	.....	26.	PCl_6^-	.....
27.	ICl_2^-	.....	28.	ICl_5	.....
29.	ICl_4^-	.....	30.	XeF_6	.....

Answer Key

DPP No. # 12

1.	(A)	**2.**	(A)	**3.**	(D)	**4.**	(A)	**5.**	(A)
6.	(B)	**7.***	(ABCD)						

Hints & Solutions

DPP No. # 12

1. $N \equiv C - C \equiv C - C \equiv N$

3. Both $PO_4^{3\ominus}$ & $SO_3^{2\ominus}$ have hybridisation sp^3

4. $N_3^{\ominus} \equiv [\overset{\ominus}{N} = \overset{\oplus}{N} = N^-]$; $NOCl \equiv O = N - Cl$ & $N_2O \equiv \overset{-}{N} = \overset{+}{N} = O$

5.

Species	Hybridisation
$CO_3^{2\ominus}$	sp^2
XeF_4	sp^3d^2
I_3^{+}	sp^3d
NCl_3	sp^3
$BeCl_2$	sp

8.

1.	BeH_2	sp	2.	BeF_2	sp
3.	CO_2	sp	4.	$HC \equiv CH$	sp, sp
5.	O_3	sp^2	6.	BF_3	sp^2
7.	$CH_2=CH_2$	sp^2	8.	CH_3^+	sp^2

9.	HNO_3	sp^2	10.	HNO_2	sp^2
11.	SO_2	sp^2	12.	SO_3	sp^2
13.	HCO_3^-	sp^2	14.	$HCOO^-$	sp^2
15.	$SnCl_2$	sp^2	16.	$AlCl_3$	sp^2
17.	AlH_4^-	sp^3	18.	NF_3	sp^3
19.	PF_3	sp^3	20.	$AsCl_3$	sp^3
21.	CH_3^-	sp^3	22.	OF_2	sp^3
23.	SCl_2	sp^3	24.	SF_4	sp^3d
25.	$[SiF_6]^{2-}$	sp^3d^2	26.	PCl_6^-	sp^3d^2
27.	ICl_2^-	sp^3d	28.	ICl_5	sp^3d^2
29.	ICl_4^-	sp^3d^2	30.	XeF_6	sp^3d^3