DPP No: 07

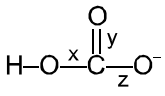
SYLLABUS : Periodic Table & Chemical Bonding

1. The octet rule is not obeyed in :

(A) CO_2 (B) BCl_3 (C) PCl_5 (D) (B) and (C) both

2. To which of the following species is the octet rule applicable ?

(A) BrF_5 (B) SF_6 (C) IF_7 (D) CO_2

3.  The relation between x, y and z in bicarbonate ion with respect to bond length is -

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

4. The correct order of increasing C-O bond length of CO, CO_3^{2-}, CO_2 is :

(A) $CO_3^{2-} < CO_2 < CO$ (B) $CO_2 < CO_3^{2-} < CO$

(C) $CO < CO_3^{2-} < CO_2$ (D) $CO < CO_2 < CO_3^{2-}$

5. Average bond order of C–C bond in C_6H_6 is

(A) 1 (B) 2 (C) 1.5 (D) 1.33

6. Among the species ,which has the weakest carbon- oxygen bond :

(A) CO_2 (B) CH_3COO^- (C) CO (D) CO_3^{2-}

7. Which of the following overlaps is **<u>incorrect</u>** [assuming z-axis to be the internuclear axis] ?

(a) $2p_y + 2p_y \rightarrow \pi\ 2p_y$ (b) $2p_z + 2p_z \rightarrow \sigma\ 2p_z$

(c) $2p_x + 2p_x \rightarrow \pi\ 2p_x$ (d) $1s + 2p_y \rightarrow \pi\ (1s\text{-}2p_y)$

(A) 'a' & 'b' (B) 'b' & 'd' (C) only 'd' (D) None of these

8. Which of following statement(s) is/are not correct?

(A) Pi-bond always exists with sigma-bond according to V.B.T.

(B) Pi-bond can exist independently acc. to V.B.T.

(C) Sigma-bond is weaker than pi-bond

(D) Pi-bond is less reactive than sigma-bond

9. Indicate the wrong statement according to Valence bond theory :

(A) A sigma bond is stronger then π - bond

(B) p-orbitals always have only sidewise overlapping

(C) s-orbitals never form π - bonds

(D) There can be only one sigma bond between two atoms

10. Choose the correct order of bond strength by overlapping of atomic orbitals :

(A) 1s - 1s > 1s - 2s > 2p

(B) 2s - 2s > 2s - 2p > 2p - 2p

(C) 2s - 2p > 2s - 2s > 2p - 2p

(D) 1s - 1s > 1s - 2p > 1s - 2s

11. C_3^{4-} has

(A) two σ and two π bond

(B) three σ and one π bond

(C) two σ and one π bond

(D) two σ and three π bond

12. Which of the following is not correct

(A) A sigma bond is weaker than π bond

(B) A sigma bond is stronger than π bond

(C) A double bond is stronger than a single bond

(D) A double bond is shorter than a single bond

13. Deduce the geometry of each of the following molecules :

(i) NH_3 (ii) C_2H_4 (iii) Cl_3^-

(A) pyramidal, pyramidal, tetrahedral

(B) pyramidal, tertrahedral, pyramidal

(C) pyramidal, planar, tetrahedral

(D) pyramidal, planar, pyramidal

14. Which of the following molecule has see-saw geometry?

(A) I_3^- (B) ICl_2^- (C) ClF_3^- (D) $IO_2F_2^-$

15. Which reaction involves a change in the electron–pair geometry for the under lined element ?

(A $\underline{B}F_3 + F^- \longrightarrow \underline{B}F_4^-$

(B) $\underline{N}H_3 + H^+ \longrightarrow \underline{N}H_4^+$

(C) $2\,\underline{S}O_2 + O_2 \longrightarrow 2\,\underline{S}O_3$

(D) $H_2\underline{O} + H^+ \longrightarrow H_3\underline{O}^+$

16. In which of the following molecules number of lone paris and bond pairs on central atom are not equal ?

(A) H_2O (B) I_3^- (C) O_2F_2 (D) SCl_2

17. Which of the following species given below have shape similar to $XeOF_4$?

(A) XeO_3 (B) IOF_4^+ (C) PCl_5 (D) $XeF_5^\oplus$

18. The hybridization of carbon atoms in $C_2 - C_3$ single bond of $\overset{4}{H}\overset{3}{C}\equiv\overset{2}{C}-\overset{1}{C}H=CH_2$ is :

(A) $sp^3 - sp^3$ (B) $sp^2 - sp$ (C) $sp - sp^2$ (D) $sp^3 - sp$

19. Determine the geometry of each of the following molecules and hybridisation about the central atom :

(i) $BeF_2(g)$ (ii) AlH_3 (iii) $CH \equiv CH$

(A) sp linear, sp^2 trigonal planar, sp^2 planar respectively

(B) sp^2 planar, sp linear, sp^2 planar respectively

(C) sp trigonal planar, sp^2 linear, sp^2 planar respectively

(D) sp linear, sp^2 trigonal planar, sp linear respectively

20. In pent-3-en-1-yne the terminal carbon-atoms have following hybridisation

(A) sp & sp^2 (B) sp^2 & sp^3 (C) sp^2 & sp (D) sp & sp^3

21. Carbon atoms in $C_2(CN)_4$ are :

(A) sp–hybridised (B) sp^2-hybridised

(C) sp-and sp^2-hybridised (D) sp, sp^2 and sp^3-hybridised

22. In which the following interaction form non-bonding molecular orbital, when z-axis is the bonding axis?

(A) $d_{yz} + d_{z^2}$ (B) $d_{yz} + d_{xy}$ (C) $d_{x^2-y^2} + d_{xy}$ (D) All form N.B.M.O.

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

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

Integer Value Quetions.

24. In OF_2, the number of bond pairs and lone pairs of electrons are respectively X and Y then $Y \div X$ is :

25. In how many of the following species, the central atoms have two lone pairs of electrons ?

XeF_4 XeF_5^- F_2SeO_2 XeF_3^+

$XeOF_4$ $ClOF_3$ ICl_4^- SCl_2 OSF_4

ANSWER KEY

1.	**(D)**	**2.**	**(D)**	**3.**	**(D)**	**4.**	**(D)**	**5.**	**(C)**	**6.**	**(D)**	**7.**	**(C)**
8.	**(B)**	**9.**	**(B)**	**10.**	**(D)**	**11.**	**(A)**	**12.**	**(A)**	**13.**	**(D)**	**14.**	**(D)**
15.	**(A)**	**16.**	**(B)**	**17.**	**(D)**	**18.**	**(B)**	**19.**	**(D)**	**20.**	**(D)**	**21.**	**(C)**
22.	**(D)**	**23.**	**(A)**	**24.**	**(4)**	**25.**	5						