Arjuna 2.0 JEE 2026

T.F.T. - 13 | **Chemical Bonding** | **By ATS Sir**

1. The correct order of d_{C-H} in the following option is -
(A) $CHF_3 = CH_2F_2 = CH_3F$
(B) $CHF_3 > CH_2F_2 > CH_3F$
(C) $CH_2F_3 > CH_3F > CHF_3$
(D) $CH_3F > CH_2F_2 > CHF_3$

2. O_2F_2 is an unstable yellow orange solid and H_2O_2 is a colourless liquid, both have O–O bond. O–O bond length in H_2O_2 & O_2F_2 is respectively.
(A) 1.22 Å, 1.48 Å (2) 1.48 Å, 1.22 Å
(C) 1.22 Å, 1.22 Å (4) 1.48 Å, 1.48 Å

3. Select the correct order of following property.
(A) % s-character : $sp^3 > sp^2 > sp$
(B) $O\hat{N}O$ bond angle : $NO_3^- > \overset{\oplus}{N}O_2$
(C) All angles in CH_2F_2 are not identical
(D) C – F bond length : $CF_4 > CH_3F > CH_2F_2 > CF_3H$

4. The strongest P – O bond is found in the molecule
(A) F_3PO (B) Cl_3PO
(C) Br_3PO (D) $(CH_3)_3PO$

5. F – As – F bond angle in AsF_3Cl_2 can be
(A) 90° & 180° only
(B) 120° onlt
(C) 90° and 120° onlt
(D) 90° only

6. Comment on the C – C bond length for C_2H_6 and C_2H_6 compounds :
(A) $d_{C-C}(C_2H_6) > d_{C-C}(C_2F_6)$
(B) $d_{C-C}(C_2F_6) > d_{C-C}(C_2H_6)$
(C) $d_{C-C}(C_2F_6) = d_{C-C}(C_2H_6)$
(D) Can't be predicted

7. Select the incorrect statement(s) about N_2F_4 and N_2H_4.
(A) In N_2F_4, d-orbitals are contracted by electronegative fluorine atoms, but d-orbital contraction is not possible by H-atom in N_2H_4.
(B) The N – N bond energy in N_2F_4 is more than N – N bond energy in N_2H_4.
(C) The N – N bond length in N_2F_4 is more than that of in N_2H_4.
(D) The N – N bond length in N_2F_4 is less than that of in N_2H_4.

8. The correct statements about the structures of H_2O_2, O_2F_2 and OF_2 is/are :
(A) H_2O_2, O_2F_2, OF_2 are polar compounds
(B) d_{O-O} of $H_2O_2 > d_{O-O}$ of O_2F_2
(C) d_{O-F} of $OF_2 > d_{O-F}$ of O_2F_2
(D) the strength of O–O bond in O_2F_2 is greater than that of H_2O_2

9. Which of the following statement is correct for $F_3C - CF_2 - CF_2$
(A) All C – F bond lengths are identical
(B) Two C – F bonds attached to middle C-atom are longer compared to other C – F bonds at the terminal C-atoms
(C) Two C – F bonds attached to middle C-atom are shorter compared to other C–F bonds at the terminal C-atoms
(D) No one is correct

10. Choose the correct statement regarding bond angle :
(A) FCF in $F_2CO <$ HCH in H_2CO
(B) BrPBr in $PBr_3 <$ FPF in PF_3
(C) FSF(eq) > FSF(ax) in SF_4
(D) All FIF angles in IF_5 are identical

11. If the % s-character in one Sb-H bond in SbH_3 is 1.0%. What is % p-character in the orbital occupied by its lone pair
(A) 99.0 (B) 97
(C) 90 (D) None

12. Which of the following statement is incorrect regarding the structure of XeO_2F_4 molecule :-
(A) Xe = O bonds are present in axial position
(B) All Xe –F bond lengths are identical
(C) FXeF angles are 90°
(D) Shape of the molecule is octahedral

13. Statement-1 : ClF_2^- is linear while ClF_2^+ is bent.
Statement-2 : Cl-atom in ClF_2^- and in ClF_2^+, is having same state of hybridisation.
(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement-2 is false.
(D) Statement- 1 is false, statement- 2 is true.

14. Statement-1 : C – H bond length in F_3C – H is higher than that in Cl_3C – H molecule.
Statement-2 : When % s-character increases then bond length decreases.
(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement-2 is false.
(D) Statement-1 is false, statement-2 is true.

15. Statement-1 : In P.B.P. geometry axial orbitals length are greater than that of equatorial orbital.
Statement-2 : IF_7 has P.B.P. geometry.
(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement-2 is false.
(D) Statement-1 is false, statement-2 is true.

Answer Key

1. (D)
2. (B)
3. (C)
4. (A)
5. (A)
6. (A)
7. (A, C)
8. (A, B, D)
9. (B)
10. (A)
11. (D)
12. (A)
13. (C)
14. (D)
15. (D)

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