



Chemical Bonding (2)

- In molecules of the type AX_2L_n (where L represents lone pairs and n is its number) there exists a bond between element A and X. The $\angle XAX$ bond angle.
(a) Always decreases if n increases (b) Always increases if n increases
(c) Will be maximum for $n = 3, 0$ (d) Generally decreases if n decreases
- 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) 1.22Å, 1.48Å (b) 1.48Å, 1.22Å (c) 1.22Å, 1.22Å (d) 1.48Å, 1.48Å
- Halogens form compounds among themselves with the formula XX' , XX & XX'_7 (where X is the heavier halogen) which of the following pair represent correct geometry with polar and non-polar nature (theoretically).
(a) XX'_3 – Linear – Polar (b) XX – Linear – Polar
(c) XX' – Linear – Non-polar (d) XX'_7 – Pentagonal bipyramidal – Non-polar
- Which molecular geometry is most likely to result, from a octahedral electron geometry?
(a) square planar (b) pyramidal (c) linear (d) V-shaped
- Which of the following molecule does not have open book structure.
(a) O_2F_2 (b) H_2O_2 (c) S_2Cl_2 (d) H_2C_2
- Assuming pure 2s and 2p orbitals of carbon are used in forming CH_4 molecule, which of the following statement is false ?
(a) Four C-H bonds will be at 90° .
(b) Three C-H bond will be stronger than 4th C-H bond.
(c) The angle of C-H bond formed by s-s overlapping will be uncertain with respect to other three bonds.
(d) No prediction regarding the shape of the molecule.
- Match the following :

Column I	Column II
(a) IOF_4^+	(P) See-Saw
(b) $IO_2F_2^-$	(Q) Trigonal bipyramidal
(c) XeO_6^{4-}	(R) Linear
(d) XeF_2	(S) Square octahedral

8. According to VSEPR theory, the geometry (with lone pair) around the central iodine in I_3^+ and I_3^- ions respectively are
 (a) tetrahedral and tetrahedral (b) trigonal bipyramidal and trigonal bipyramidal
 (c) tetrahedral and trigonal bipyramidal (d) tetrahedral and octahedral
9. The xenon compounds that are isostructural with IBr_2^- and BrO_3^- respectively are :
 (a) linear XeF_2 and pyramidal XeO_3 (b) bent XeF_2 and pyramidal XeO_3
 (c) bent XeF_2 and planar XeO_3 (d) linear XeF_2 and tetrahedral XeO_3
10. In which of the following C–H bond has the highest 's' character ?
 (a) acetylene (b) ethylene (c) methane (d) CH radical
11. In case of PF_5 , the ground state trigonal bipyramidal (TBP) structure converts into transition state and back to a new TBP structure. The hybridisation of central atom phosphorus in the transition state is.
 (a) $sp^3d_{z^2}$ (b) $sp^3d_{x^2-y^2}$ (c) sp^2 (d) $sp^3d_{x^2-y^2}d_{z^2}$
12. Which of the following statement is correct regarding BrF_5 and $BrCl_5$?
 (a) Both have equal X – Br – X bond angle (b) $\angle F - Br - F = \angle Cl - Br - Cl$
 (c) $\angle F - Br - F > \angle Cl - Br - Cl$ (d) Both are isostructural
13. Choose the correct on the Cl–O bond length in $NaClO_4$.
 (a) All Cl–O bonds are of equal length.
 (b) Three Cl–O bonds are of equal length one longer.
 (c) Two Cl–O bonds are of same length which are longer compound to other two Cl–O bond length.
 (d) All are different.
14. Which statement is incorrect about ICl_3 molecule
 (a) All I–Cl bonds are equivalent
 (b) Molecule is polar and non-planar
 (c) All adjacent bond angles are equal
 (d) All hybrid orbitals of central atom having equal s-character.
15. Among the following species identify the isostructural pairs.
 $NF_3, NO_3^-, BF_3, H_3O^+, N_3H$
 (a) $[NF_3, NO_3^-]$ and $[BF_3, H_3O^+]$ (b) $[NF_3, N_3H]$ and $[NO_3^-, BF_3]$
 (c) $[NF_3, H_3O^+]$ and $[NO_3^-, BF_3]$ (d) $[NF_3, H_3O^+]$ and $[N_3H, BF_3]$
16. In compounds of type ECl_3 , where E = B, P, As or Bi, the angle Cl—E—Cl
 (a) $B > P = As > Bi$ (b) $B > P > As > Bi$ (c) $B < P = As = Bi$ (d) $B < P < As < Bi$
17. Which of the following molecule has a planar geometry ?
 (a) $Ni(CO)_4$ (b) SF_4 (c) $CoCl_4^{2-}$ (d) XeF_4

ANSWER KEY

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|-------------------------------|-------|-------|-------|-------|-------|
| 1. c | 2. b | 3. a | 4. a | 5. d | 6. a |
| 7. (a—q), (b—p), (c—s), (d—r) | 8. c | 9. a | 10. a | 11. b | |
| 12. d | 13. a | 14. c | 16. c | 17. b | 18. d |