VSEPR Theory

21. BCl_3 is a planar molecule while NCl_3 is pyramidal, because

(a) BCl_3 has no lone pair of electrons but NCl_3 has a lone pair of electrons

(b) $B-Cl$ bond is more polar than $N-Cl$ bond

(c) Nitrogen atom is smaller than boron atom

(d) $N-Cl$ bond is more covalent than $B-Cl$ bond

22. The isoelectronic pair is

(a) $Cl_2O,\ ICl_2^-$ (b) $ICl_2^-, \rightleftarrows ClO_2$

(c) $IF_2^+,\ I_3^-$ (d) $ClO_2^-,\ CIF_2^+$

23. According to VSEPR theory, the most probable shape of the molecule having 4 electron pairs in the outer shell of the central atom is

(a) Linear (b) Tetrahedral

(c) Hexahedral (d) Octahedral

24. The molecular shapes of SF_4, CF_4 and XeF_4 are

(a) The same with 2, 0 and 1 lone pairs of electrons on the central atom, respectively

(b) The same with 1, 1 and 1 lone pair of electrons on the central atoms, respectively

(c) Different with 0, 1 and 2 lone pairs of electrons on the central atom, respectively

(d) Different with 1, 0 and 2 lone pairs of electrons on the central atom, respectively

25. Which of the following species is planar

(a) CO_3^{2-}

(b) NH_2

(c) PCl_3

(d) None of these

26. The shape of CH_3^+ species is

(a) Tetrahedral

(b) Square planar

(c) Trigonal planar

(d) Linear

27. Which of the following is the correct reducing order of bond-angle

(a) $NH_3 < CH_4 < C_2H_2 < H_2O$

(b) $C_2H_2 > NH_3 > H_2O < CH_4$

(c) $NH_3 > H_2O > CH_4 < C_2H_2$

(d) $H_2O < NH_3 > CH_4 < C_2H_2$

28. Which compound has bond angle nearly to $90°$

(a) H_2O (b) H_2S

(c) NH_3 (d) CH_4

29. A lone pair of electrons in an atom implies

(a) A pair of valence electrons not involved in bonding

(b) A pair of electrons involved in bonding

(c) A pair of electrons

(d) A pair of valence electrons

30. The bond angle of water is 104.5^odue to

(a) Repulsion between lone pair and bond pair

(b) sp^3 hybridization of O

(c) Bonding of H_2O

(d) Higher electronegativity of O

31. The correct sequence of decrease in the bond angle of the following hybrides is

(a) $NH_3 > PH_3 > AsH_3 > SbH_3$

(b) $NH_3 > AsH_3 > PH_3 > SbH_3$

(c) $SbH_3 > AsH_3 > PH_3 > NH_3$

(d) $PH_3 > NH_3 > AsH_3 > SbH_3$

32. Central atom of the following compound has one lone pair of electrons and three bond pairs of electrons

(a) H_2S (b) $AlCl_3$

(c) NH_3 (d) BF_3

33. Among KO_2, AlO_2^-, BaO_2 and NO_2^+ unpaired electron is present in

(a) NO_2^+ and BaO_2 (b) KO_2andAlO_2^-

(c) KO_2 only (d) BaO_2only

34. True order of bond angle is

(a) $H_2O > H_2S > H_2Se > H_2Te$

(b) $H_2Te > H_2Se > H_2S > H_2O$

(c) $H_2S > H_2O > H_2Se > H_2Te$

(d) $H_2O > H_2S > H_2Te > H_2Se$

35. Which of the following has not a lone pair over the central atom

(a) NH_3 (b) PH_3

(c) BF_3 (d) PCl_3

36. In BrF_3 molecule,the lone pairs occupy equatorial positions to minimize

(a) Lone pair- lone pair repuilsion and lone pair-bond pair repulsion

(b) Lone pair- lone pair repulsion only

(c) Lone pair- bond pair repulsion only

(d) Bond pair- bond pair repulsion only

37. H_2O is dipolar, whereas BeF_2 is not. It is because
(a) H_2O is linear and BeF_2 is angular
(b) H_2O is angular and BeF_2 is linear
(c) The electornegativity of *F* is greater than that of *O*
(d) H_2O involves hydrogen bonding whereas BeF_2 is a discrete molecule

38. Maximum bond angle is present in
(a) BCl_3 (b) BBr_3
(c) BF_3 (d) Same for all

39. The shape of a molecule of NH_3, in which central atoms contains lone pair of electron, is
(a) Tetrahedral
(b) Planar trigonal
(c) Square planar
(d) Pyramidal

40. The largest bond angle is in
(a) AsH_3 (b) NH_3
(c) H_2O (d) PH_3

41. The bond angle in ammonia molecule is
(a) $91^o8'$ (b) $93^o3'$
(c) $106^o45'$ (d) $109^o28'$

42. Which of the following gives correct arrangement of compounds involved based on their bond strength
(a) *HF > HCl > HBr > HI*
(b) *HI > HBr > HCl > HF*
(c) *HF > HBr > HCl > HI*
(d) *HCl > HF > HBr > HI*

43. Which one has a pyramidal structure
(a) CH_4 (b) NH_3
(c) H_2O (d) CO_2

44. Among the following the pair in which the two species are not isostructural is
(a) BH_4^- and NH_4^+
(b) PF_6^- and SF_6
(c) SiF_4 and SF_4
(d) IO_3^- and XeO_3

45. The maximum number of 90° angles between bond pair-bond pair of electrons is observed in
(a) dsp^2 hybridization
(b) sp^3d hybridization
(c) dsp^3 hybridization
(d) sp^3d^2 hybridization