1. Which of the following molecule/species have a same bond order as that of O_2^+ ?

(1) NO (2) N_2^-

(3) N_2^+ (4) All of these

2. Which of the following molecule/species are iso-structural with N_3^- ion?

(1) I_3^+ (2) I_3^-

(3) NH_2^- (4) HCO_2^-

3. Which of the following pair of species are iso-electronic?

(1) CN^- & NO^+ (2) N_2^- & N_2^+

(3) $H_2^{\oplus}$ & H_2^- (4) CO & NO^-

4. Which of the following molecule is hypovalent?

(1) AlF_3 (2) ICl_2^-

(3) BCl_3 (4) ICl_2^+

5. Determine the bond order & formal charge on each oxygen atom in HCO_2^- respectively?

(1) 1.5, –0.5 (2) 2, –0.5

(3) 1.33, –1.5 (4) 1.5, –1.33

6. Determine the incorrect order of bond angle?

(1) $NH_3 < NF_3 < NCl_3$

(2) $OF_2 < OH_2 < OCl_2$

(3) $SF_2 < SCl_2 < SBr_2 < SI_2$

(4) $ClO_2 > ClO_2^{-1} > OCl_2$

7. Which of the following molecule is non-polar & planar?

(1) XeF_4 (2) NH_2^-

(3) PF_3Cl_2 (4) PCl_3F_2

8. Which of the following is covalent solid.

(1) Solid CO_2 (2) SiO_2

(3) Diamond (4) 2 & 3 both

9. The percentage of p-character in the orbitals forming P–P bonds in P_4 is

(1) 25 (2) 33

(3) 50 (4) 75

10. Correct match is :-

	Ion	Bond order of M-O bond
(a)	ClO_4^-	$\frac{1}{4}$
(b)	PO_4^{-3}	$\frac{3}{4}$
(c)	NO_2^-	$\frac{2}{3}$
(d)	CO_3^{-2}	$\frac{5}{3}$

(1) d (2) a, b (3) c, d (4) None

11. Which is iso-structural?

(1) XeF_2, ICl_2^-, ClF_3 (2) ClF_3, PCl_3, NCl_3

(3) CO_2, XeF_2, I_3^- (4) PCl_5, $XeOF_2$, ICl_5

12. Which of the following molecule have both $p\pi - p\pi$ and $p\pi - d\pi$ bonding?

(1) ClO_2^+ (2) NO_2^+ (3) SO_3^{2-} (4) ClO_4^-

13. Select correct order out of given options :-

(1) $BeCO_3 < BaCO_3 \rightarrow$ Covalent character

(2) $BeO > SrO \rightarrow$ Lattice energy

(3) $Be^{2+} < Li^+ \rightarrow$ Hydration energy

(4) $Be^{2+}_{(aq.)} > Li^+_{(aq.)} \rightarrow$ Ionic Mobility

14. Which of the following statement are true and false ?

(a) In PCl_5 hybridisation is sp^3d and it has a trigonal pyramidal structure.

(b) The angle between the P-Cl bonds is 90°, which is same for all the P and Cl present in PCl_5

(c) The bond length of P-Cl in axial position is higher than in equitorial position

(d) PCl_5 have zero dipole moment

Choose the correct option.

(1) TFTT (2) FTTT

(3) FFTT (4) TFFT

15. Bond length and bond energy order is same for :

(1) C - C > Si - Si > Ge - Ge

(2) N - N > O - O > F - F

(3) C - N > C - O > C - F

(4) $F_2 > Cl_2 > Br_2 > I_2$

16. Which halide has highest melting point ?

(1) NaCl (2) LiCl

(3) LiBr (4) NaI

17. If AB_4^n, type species are tetrahedral, then which of the following is incorrectly matched ?

	A	B	n
(1)	Xe	O	Zero
(2)	Se	F	Zero
(3)	P	O	–3
(4)	N	H	+1

18. The species having no $p\pi - p\pi$ bond but its bond order equal to that of O_2^-

(1) ClO_3^- (2) PO_4^{3-}

(3) SO_4^{2-} (4) XeO_3

19. How many π–bond does C_2 have?

(1) 1 (2) 2

(3) 0 (4) 3

20. Which of the following is not true about H_2O molecule ?

(1) The molecule has $\mu = 0$

(2) The molecule can act as a base

(3) Shows abnormally high boiling point in comparison to the hydrides of other elements of oxygen group

(4) The molecule has a bent shape

21. Match the following and choose the correct option given below.

(a) $N_2 \rightarrow N_2^+$ (p) bond order increases

(b) $N_2 \rightarrow N_2^-$ (q) bond order decreases

(c) $O_2 \rightarrow O_2^+$ (r) paramagnetism increases

(d) $O_2 \rightarrow O_2^-$ (s) paramagnetism decreases

(t) No change in bond order

(1) a - (q, r), b - (q, r), c - (p, s), d - (q, s)

(2) a - (q, s), b - (q, s), c - (p, s), d - (q, r)

(3) a - (p, q), b - (q, s), c - (p, r), d - (q, t)

(4) a - (p, s), b - (q, p), c - (q, t), d - (q, t)

22. Which pair(s) has same bond angle?

(a) BF_3, BCl_3 (b) PO_4^{-3},SO_4^{-2}

(c) BF_3, PF_3 (d) NO_2^+,N_2O

(e) N_3^-,NO_2

correct option are –

(1) a, b, d (2) b, d

(3) b, c, d (4) a, d, e

23. Which is correct?

(1) PbS > ZnS (Solubility)

(2) $Li_2CO_3 > Na_2CO_3$ (Thermal stability)

(3) NaF > KF (Lattice energy)

(4) $BaSO_4 > MgSO_4$ (Solubility)

24. Which among the following attractions is strongest?

(1) HF ....H_2O (2) Na^+....H–Cl

(3) H_2O...Cl_2 (4) Cl–Cl...Cl–Cl

25. Among the following, the pair in which the two species are not iso-structural is

(1) IO_3^- and NH_3 (2) BH_4^- and NH_4^+

(3) PF_6^- and SF_6 (4) SiF_4 and SF_4

26. Which of the following is correct statement ?

(a) $AlCl_3$ is conducting in fused state

(b) Mobility of Li^+ ion in water is greater than Cs^+ ion

(c) MCl_2 is more volatile than MCl_4

(d) $BeSO_4$ is more soluble in water than $BaSO_4$

(1) a, b (2) b, c, d

(3) b, d (4) Only d

27. Which of the following order is not correct :-

(1) $SO_4^{-2} = PO_4^{-3} = ClO_4^-$ Bond angle

(2) $OCl_2 < ClO_2$ Bond angle

(3) $ZnCl_2 < CdCl_2 < HgCl_2$ ionic character

(4) CH_3–Cl > CH_3F > CH_3–Br > CH_3–I Dipole moment

28. **Statement-1 :** p-Hydroxybenzoic acid has a lower boiling point than o-hydroxybenzoic acid.

Statement-2 : o-Hydroxybenzoic acid has intermolecular hydrogen bonding.

(1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.

(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.

(3) Statement-1 is True, Statement-2 is False.

(4) Statement-1 is False, Statement-2 is False.

29. Hydration energy of Mg^{2+} is higher than

(1) Be^{2+} (2) $Na^{\oplus}$

(3) Al^{3+} (4) All of these

30. Total number of sp-hybridised C-atoms in the following Hydrocarbon will be:

$H_3C-C\equiv C-CH=CH_2$

(1) 5 (2) 4 (3) 2 (4) 1

31. Match the column

Column I	**Column II**
(a) C_2H_2	(P) sp^3d hybridisation
(b) SO_2	(Q) sp^3 hybridisation
(c) I_3^-	(R) sp^2 hybridisation
(d) NH_4^+	(S) sp hybridisation

(1) (a) S (b) P (c) R (d) Q

(2) (a) P (b) S (c) R (d) Q

(3) (a) S (b) R (c) P (d) Q

(4) (a) R (b) S (c) P (d) Q

32. Match the column

Column I (Solid)	**Column II** (Examples)
(a) Covalent	(P) SiO_2
(b) Molecular	(Q) CaO
(c) Ionic	(R) CCl_4
(d) Metallic	(S) Bronze

(1) (a) P (b) Q (c) R (d) S

(2) (a) R (b) P (c) Q (d) S

(3) (a) S (b) P (c) Q (d) R

(4) (a) P (b) R (c) Q (d) S

33. Match the column

Compound	**No. of σ & π Bonds**
(a) $H_2S_2O_3$	(P) 6 σ & 2 π
(b) H_2SO_5	(Q) 11 σ & 4 π
(c) $H_2S_2O_8$	(R) 9 σ & 4 π
(d) $H_2S_2O_6$	(S) 7 σ & 2 π

(1) (a) S (b) P (c) Q (d) R

(2) (a) P (b) S (c) Q (d) R

(3) (a) P (b) Q (c) R (d) S

(4) (a) Q (b) S (c) P (d) R

34. Match the column

Compound	**Shape**
(a) XeO_2F_2	(P) Linear
(b) XeF_5^-	(Q) Square planar
(c) I_3^-	(R) See-saw
(d) XeF_4	(S) Pentagonal planar

(1) (a) R (b) S (c) P (d) Q

(2) (a) R (b) S (c) Q (d) P

(3) (a) P (b) S (c) Q (d) R

(4) (a) S (b) Q (c) P (d) R

35. Which is incorrect?

(1) Dipole moment order $\rightarrow CH_4 < NF_3 < NH_3 < H_2O$

(2) For PCl_5 molecule $\rightarrow$ B.L.$_{equatotial}$ < B.L.$_{Axial}$

(3) Melting point order $\rightarrow H_2O_{(s)} > NH_{3(s)} > HF_{(s)}$

(4) no. of unpaired e^- in H_2O_2 = 1

36. Which is correct?

(1) Bond order $\rightarrow$ $CO > CO_3^{2-}$

(2) Bond angle $\rightarrow PH_3 > PF_3$

(3) Bond energy $\rightarrow Cl_2 > Br_2 > I_2 > F_2$

(4) Bond length order $\rightarrow$ C–C < N–N < O–O < F–F

37. Which is not correct?

(1) White vitriol and epsom salt are isomorphous

(2) Thermal stability

$\rightarrow BeCO_3 < MgCO_3 < CaCO_3 < SrCO_3$

(3) Solubility

$\rightarrow NaHCO_3 < KHCO_3 < RbHCO_3 < CsHCO_3$

(4) Melting point $\rightarrow Al_2O_3 < MgF_2$

38. Which molecule does not exist?

(1) MnF_4 (2) SH_6

(3) $(BCl_3)_2$ (4) 2 & 3 both

39. Which is correct?

(1) Ionic mobility in aqueous medium

$\rightarrow Li^+ < Na^+ < K^+ < Rb^+$

(2) Covalant character

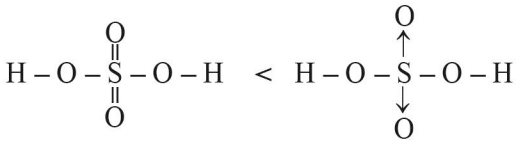
$\rightarrow KCl > CaCl_2 > AlCl_3 > SnCl_4$

(3) Boiling point order $\rightarrow H_2O > H_2Se > H_2Te > H_2S$

(4) Dipole – dipole attraction $\rightarrow KCl + H_2O$

40. Which is correct?

(1) Stability order



(2) In XeF_6(s) hybridisation of anion $\rightarrow sp^3d$

(3) For O_2 molecule bond order is 2.0

(4) Bond angle order $CF_4 < CH_4$

41. Match column-I and Column-II

Column-I	**Column-II**
(A) SF_4	(1) Tetrahedral
(B) BrF_3	(2) Pyramidal
(C) BrO_3^-	(3) See-saw
(D) NH_4^+	(4) Bent-T

Code :

(1) A (3), B (2), C (1), D (4)

(2) A (3), B (4), C (2), (D) 1

(3) A (2), B (4), C (3), (D) 1

(4) A (1), B (4), C (2), D (3)

42. Consider the following order

(1) $PH_3 > NH_3 > AsH_3$ (basic character)

(2) $PH_3 > NH_3 > AsH_3$(boiling point)

(3) $HOCl > HClO_2 > HClO_3 > HClO_4$ (oxidising property)

(4) HF > HCl > HBr > HI (acidic)

(5) $H_2O > H_2S > H_2Se$ (bond angle)

(6) $H_2SO_4 > H_3PO_4 > H_2CO_3$ (acidic character)

correct order(s) are

(1) 1,2,4,5 (2) 2,3,5,6

(3) 3,5,6 (4) 4,5,6

43. Which solubility order is correct ?

(1) $BaSO_4 > SrSO_4 > CaSO_4 > MgSO_4$

(2) $ZnS > Na_2S > CoS$

(3) $BaCO_3 > MgCO_3 > Na_2CO_3$

(4) $KOH > NaOH > Mg(OH)_2$

44. What is incorrect about reaction of NH_3 and BF_3?

(1) hyrbridisation of both N & B change

(2) It is an example of redox change

(3) In the final adduct formed, back bonding appears between B & N

(4) All

45. In which molecule / ion there are more than one type of XO bond lengths

(a) NO_3^- (b) $Cr_2O_7^{2-}$

(c) $HCOO^-$ (d) $HClO_3$

(e) PO_4^{3-} (f) SO_4^{2-}

correct code is

(1) a,b,d (2) b,d

(3) b,c,d,f (4) a,b,c,f

46. Correct order of dipole moment is (decreasing order)

(1) CH_3Cl, CH_3Br, CH_3F

(2) CH_3F, CH_3Cl, CH_3Br

(3) CH_3Cl, CH_3F, CH_3Br

(4) CH_3Br, CH_3Cl, CH_3F

47. Correct order of stability of species

N_2, N_2^+, N_2^-

(1) $N_2 > N_2^+ = N_2^-$ (2) $N_2 > N_2^+ > N_2^-$

(3) $N_2 > N_2^- > N_2^+$ (4) $N_2^+ > N_2 > N_2^-$

48. Isostructural species are those which have same shape. Among the following pairs identify isostructural pairs.

(1) [NF_3 & BF_3] (2) [BF_4^- & NH_4^+]

(3) [BCl_3 & $BrCl_3$] (4) [NH_3 & NO_3^-]

49. Which is not stable

(1) KHF_2 (2) KI_3

(3) $CH_3–CH(OH)_2$ (4) $Cl_3C–CH(OH)_2$

50. Which of the following compound will give metal and oxygen gas at high temperature

(1) $NaNO_3$ (2) Ag_2CO_3

(3) K_2CO_3 (4) Li_2CO_3

51. Based on VSEPR theory, the number of 90 degree F–Br–F angles in BrF_5 is

(1) 5 (2) 4

(3) 0 (4) 1

52. Which of the following represent most effective π-bond

(1) 2pπ-3pπ (2) 3dπ-3dπ

(3) 2pπ-3dπ (4) 3dπ-3pπ

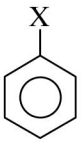
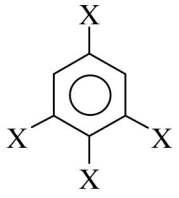
53. In which reaction hybridisation of underlined atom does not change.

(1) $\underline{B}F_3 + F^- \rightarrow BF_4^-$

(2) $\underline{N}H_3 + H^+ \rightarrow NH_4^+$

(3) $\underline{B}F_3 + NH_3 \rightarrow BF_3.NH_3$

(4) $\underline{S}iF_4 + 2F^- \rightarrow SiF_6^{2-}$

54. Dipole moment of  is 1.5 D. The dipole moment of  will be

(1) 1.5 D (2) 3.0 D
(3) 1.0 D (4) 2.35 D

55. Which of the following compound has non-zero dipole moment

(1) XeF_4 (2) B_2H_6 (3) PF_3Cl_2 (4) PCl_3F_2

56. Which of the following molecule is planar due to back bonding

(1) NCl_3 (2) PF_3 (3) BF_3 (4) None

57. Amongst the following, molecule having maximum bond angles of 90° is

(1) XeF_4 (2) XeF_6 (3) SF_6 (4) IF_7

58. Which of the following statement is incorrect

(1) Removal of an electron is easier from O_2 in comparison to O_2^{+2}
(2) In the double bond of C_2 molecule, both are π-bonds
(3) NO is more stable than NO^+
(4) NO_2^+ and CO_2 are isoelectronic and isostructural

59. The coordinate bond is absent in

(1) $NaNO_3$ (2) $CaCO_3$
(3) O_3 (4) KNC

60. Which of the following is least stable

(1) O^- (2) C^- (3) B^- (4) Be^-

61. The true statements from the following are

(1) PH_5 , NCl_5 and $BiCl_5$ do not exist
(2) I_3^- has bent geometry
(3) XeF_4 is polar molecule
(4) O_2 and O_2^{-2} has same bond order

62. The bond order for NO and NO^+, respectively are

(1) 3.0, 2.5 (2) 2.5, 3.0
(3) 3.0, 3.0 (4) 2.5, 2.5

63. Back bonding always changes

(1) bond angle
(2) hybridisation of central atom
(3) planarity
(4) bond length

64. Bond angle in H_2O is

(1) 104.5° (2) 120° (3) 109.5° (4) 107°

65. The correct stability order of N_2 and its given ions is

(1) $N_2 > N_2^+ > N_2^- > N_2^{2-}$
(2) $N_2^- > N_2^+ > N_2^- > N_2^{2-}$
(3) $N_2^+ > N_2^- > N_2 > N_2^{2-}$
(4) $N_2 > N_2^+ = N_2^- > N_2^{2-}$

66. Which of the following have same bond order:-

(I) CO (II) CN^- (III) O_2^+ (IV) NO^+
(1) I, II, III (2) I, II, IV
(3) I, III, IV (4) II, III, IV

67. In XeF_2, XeF_4 and XeF_6 the number of lone pairs of electron on Xe are respectively

(1) 2, 3, 1 (2) 1,2,3 (3) 4,1,2 (4) 3,2,1

68. Which one is most soluble in water

(1) $Mg(OH)_2$ (2) $Sr(OH)_2$
(3) $Ca(OH)_2$ (4) $Ba(OH)_2$

69. The correct order of N–O bond length is

(1) $NO_3^- > NO_2^+ > NO_2^-$
(2) $NO_3^- > NO_2^- > NO_2^+$
(3) $NO_2^+ > NO_3^- > NO_2^-$
(4) $NO_2^- > NO_3^- > NO_2^+$

70. The correct order of A–O–A bond angle of (A=H, F or Cl)

(1) $H_2O > Cl_2O > F_2O$ (2) $Cl_2O > H_2O > F_2O$
(3) $F_2O > Cl_2O > H_2O$ (4) $F_2O > H_2O > Cl_2O$

71. There are some species given below :-

(a) O_2^+ (b) CO
(c) B_2 (d) O_2^-
(e) NO^+ (f) He_2^+
(g) C_2^{+2} (h) CN^-
(i) N_2^-

Total no. of species which have their fractional bond order.

(1) 3 (2) 4 (3) 5 (4) 6

72. Which of the following has fractional bond order

(1) O_2^{2+} (2) O_2^{2-}

(3) F_2^{2-} (4) H_2^-

73. When $AgNO_3$ is heated strongly, the product formed are

(1) NO and NO_2 (2) NO_2 and O_2

(3) NO_2 and N_2O (4) NO and O_2

74. Which of the following carbonate of a metals has the least thermal stability

(1) Li_2CO_3 (2) K_2CO_3

(3) Cs_2CO_3 (4) Na_2CO_3

75. Which of the following order is not correct :-

(1) $N_2 < N_2^+$ (Bond length)

(2) $O_2 < O_2^+$ (Bond strength)

(3) $O_2 < O$ (IP)

(4) $NO < NO^+$ (Magnetic moment)

76. The state of hybridisation for the transition state of hydrolysis mechanism of BCl_3 and SF_4 are respectively

(1) sp^2, sp^3d (2) sp^3, sp^2

(3) sp^3, sp^3 (4) sp^3, sp^3d^2

77. The dipole moment of AX_3, BX_3 and CY_3 are 4.97×10^{-30}, 0.60×10^{-30} and 0.00 Cm respectively then the shape of molecule may be

(1) pyramidal, T-shape, trigonal planar

(2) pyramidal, trigonal planar, T-shape

(3) T-shape, pyramidal, trigonal planar

(4) pyramidal, T-shape, linear

78. The bond strength in O_2^+, O_2, O_2^- & O_2^{2-} follows the order

(1) $O_2^{2-} > O_2^- > O_2 > O_2^+$

(2) $O_2^+ > O_2 > O_2^- > O_2^{2-}$

(3) $O_2 > O_2^- > O_2^{2-} > O_2^+$

(4) $O_2^- > O_2^{2-} > O_2^+ > O_2$

79. A compound which leaves behind no residue on heating is

(1) $Cu(NO_3)_2$ (2) KNO_3

(3) NH_4NO_3 (4) None of these

80. Which of the following molecule is polar and non-planar

(1) XeF_4 (2) XeF_5^-

(3) CH_2F_2 (4) ClF_3

81. Dipole moment of NH_3 is more than NF_3 because

(1) N–F bond is more polar than N–H bond

(2) NH_3 is pyramidal while NF_3 is planar

(3) In NH_3 orbital dipole due to lone pair is in the same direction as the resultant dipole moment of N–H bonds while in NF_3 orbital dipole due to lone pair is opposite direction of the resultant dipole moment of N–F bonds

(4) None of these

82. Which of the following pairs of ions are isoelectronic and isostructural

(1) CO_3^{-2}, NO_2^- (2) ClO_3^-, CO_3^{-2}

(3) SO_3^{-2}, NO_3^- (4) ClO_3^-, SO_3^{-2}

83. Which of the following pair is having planar structure

(1) SF_4, XeF_4 (2) H_3O^+, SO_2

(3) BF_3, $XeOF_2$ (4) XeF_4, NO_3^-

84. Ammonia is soluble in water but phosphine is insoluble because

(1) phsophine has higher molecular mass than ammonia

(2) ammonia is polar while phosphine is non polar

(3) Ammonia forms inter molecular H-bond with water but phosphine does not

(4) Ammonia is ionic while phosphine is covalent

85. Which of the following resist hydrolysis at room temperature

(1) PCl_3, SF_6 (2) CCl_4, NO_2

(3) PCl_5, XeF_6 (4) SF_6, CCl_4

86. Which of the following is polar

(1) p-dichlorobenzene

(2) trans-1-chloropropene

(3) boron tri fluoride

(4) xenon tetra fluoride

87. Which molecule / ion out of the following does not contain unpaired electrons?

(1) N_2^+ (2) O_2

(3) O_2^{2-} (4) B_2

88. Which of following molecule is having shortest bond length

(1) O_2^+

(2) O_2^{2-}

(3) O_2

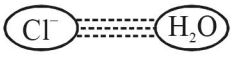
(4) All have same bond length

89. Which of the following attraction is strongest?

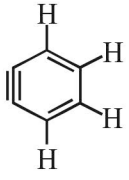
(1) 

(2) 

(3) 

(4) 

90. How many sp^2 and sp-hybridised carbon atoms are present respectively in the following compound?


(Benzyne)

(1) 4, 2 (2) 6, 0 (3) 3, 3 (4) 5, 1

91. Phosphorus pentachloride in the solid exists as:

(1) PCl_5 (2) $PCl_4^+Cl^-$

(3) $PCl_4^+PCl_6^-$ (4) $PCl_5 \cdot Cl_2$

92. Least stable hydride is :

(1) stannane (2) silane

(3) plumbane (4) germane

93. Solid NaCl is a bad conductor of electricity because:

(1) In solid NaCl there are no ions

(2) Solid NaCl is convalent

(3) In solid NaCl there is no mobility of ions

(4) In solid NaCl there are no electrons

94. Which of the following halides is inert towards hydrolysis at room temperature?

(1) $SiCl_4$ (2) PCl_3

(3) NCl_3 (4) NF_3

95. The correct order of dipole moment is:

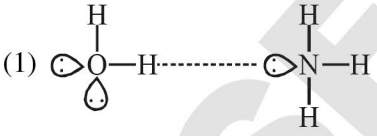
(1) $CH_4 < NF_3 < NH_3 < H_2O$

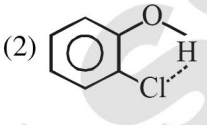
(2) $NF_3 < CH_4 < NH_3 < H_2O$

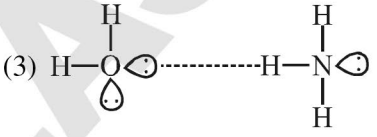
(3) $NH_3 < NF_3 < CH_4 < H_2O$

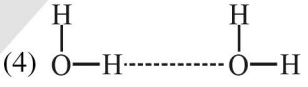
(4) $H_2O < NH_3 < NF_3 < CH_4$

96. Which of the following is not a best representation of the H-bond?

(1) 

(2) 

(3) 

(4) 

97. Which order are correct?

(I) Thermal stability :

$$BeSO_4 < MgSO_4 < CaSO_4 < BaSO_4$$

(II) Basic nature :

$$ZnO > BeO > MgO > CaO$$

(III) Solubility in water :

$$LiOH > NaOH > KOH > RbOH > CsOH$$

(IV) Melting point :

$$NaCl > KCl > RbCl > CsCl > LiCl$$

(1) (I), (IV) (2) (I), (II) and (IV)

(3) (II), (III) (4) All correct

98. In which of the following diatomic molecule, bond dissociation energy is maximum?

(1) H_2 (2) F_2 (3) Cl_2 (4) I_2

99. Which of of the following carbonate is maximum stable to heat?

(1) $CaCO_3$ (2) Li_2CO_3

(3) Na_2CO_3 (4) $BaCO_3$

100. The most stable structure of NO is

(1) :N = O: (2) N = O

(3) :N = O: (4) :N = O:

101. What is/are true about CO_2 and SO_2?

(1) Both turn acidified $K_2Cr_2O_7$ solution green

(2) Both turn lime water milky

(3) Both are oxidising agents not the reducing agents

(4) All of these

102. Which of the following is most stable?

(1) Na_3N (2) Li_3N

(3) Rb_3N (4) K_3N

103. Consider the following statements

I. PCl_3 on hydrolysis in the presence of moisture gives fumes of HCl.

II. PCl_5 exists as $[PCl_4]^{(-)}$ $[PCl_6]^{(+)}$ in solid state.

III. All the five bonds in PCl_5 molecule are equivalent.

Choose the correct statement(s) :

(1) II & III (2) I, II & III

(3) Only I (4) I & II

104. According to Fajan's Rule, ionic character increases for :

(1) Small cation and small charge on cation

(2) Large cation and small anion

(3) Small cation and large anion

(4) Large anion and small charge on anion

105. Which molecule/ion out of the following does not contain unpaired electrons?

(1) N_2^+ (2) O_2

(3) O_2^{2-} (4) B_2

106. In which of the following molecule/ion all the bonds are not equal?

(1) XeF_4 (2) BF_4^-

(3) C_2H_4 (4) SiF_4

Para.: The electronic configurations of three elements, A, B and C are given below. Answer the questions 187-190 on the basis of these configurations.

A $1s^2$ $2s^2$ $2p^6$

B $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^3$

C $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^5$

107. Stable form of A may be represented by the formula

(1) A (2) A_2 (3) A_3 (4) A_4

108. Stable form of C may be represented by the formula

(1) C (2) C_2 (3) C_3 (4) C_4

109. The molecular formula of the compound formed from B and C will be

(1) BC (2) B_2C (3) BC_2 (4) BC_3

110. The bond between B and C will be

(1) ionic (2) covalent

(3) hydrogen (4) coordinate.

111. Which of the following order of energies of molecular orbitals of N_2 is correct?

(1) $(\pi 2p_y) < (\sigma 2p_z) < (\pi^* 2p_x) \approx (\pi^* 2p_y)$

(2) $(\pi 2p_y) > (\sigma 2p_z) > (\pi^* 2p_x) \approx (\pi^* 2p_y)$

(3) $(\pi 2p_y) < (\sigma 2p_z) > (\pi^* 2p_x) \approx (\pi^* 2p_y)$

(4) $(\pi 2p_y) > (\sigma 2p_z) < (\pi^* 2p_x) \approx (\pi^* 2p_y)$

112. Formation of PH_4^+ is difficult as compared to NH_4^+ because :-

(1) Lone Pair of Phosphorus is optically inert

(2) Lone Pair of phosphorus resides in almost pure p - orbital

(3) Lone pair of phosphorus resides in sp^3 orbital

(4) Lone pair of phosphorus resides in almost pure s - orbital

113. The incorrect order of solubility in water :-

(1) $Ca(OH)_2 < Sr(OH)_2 < Ba(OH)_2$

(2) $Li_2CO_3 < Na_2CO_3 < K_2CO_3$

(3) AgF<AgCl<AgBr

(4) $BaSO_4 < MgSO_4$

114. Which of the following statement is incorrect?

(1) In O_2^-, O_2^+, the magnetic behavior is not changed

(2) In N_2^+, N_2^-, the magnetic moment remains unchanged

(3) If z-axis is the overlapping axis, the P_x orbital of one atom and dxy orbital of another atom result antibonding M.O.

(4) None of these

115. Which of the following is planar in monomer as well as in dimer form ?

(1) $AlCl_3$ (2) ICl_3 (3) BH_3 (4) All

116. Which statement is correct in the following :-

(1) $NH_3 > NF_3$: bond angle

(2) $NH_3 > NF_3$: reactivity towards lewis acid

(3) $NH_3 > NF_3$: Dipole moment

(4) All are correct

117. The species having no. $p\pi$-$p\pi$ bond but has bond order equal to that of O_2 :-

(1) XeO_3 (2) ClO_3^-

(3) PO_4^{3-} (4) SO_4^{2-}

118. Which has a giant covalent structure?

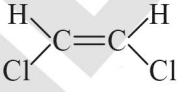
(1) PbO_2 (2) SiO_2

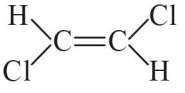
(3) NaCl (4) $AlCl_3$

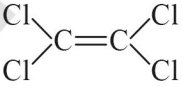
119. A molecule which cannot exist theoretically is:

(1) SF_4 (2) OF_2 (3) OF_4 (4) O_2F_2

120. Select the isomers given below, which have non-zero dipole moment?

(1) 

(2) 

(3) 

(4) All of these

121. Select the correct relation:

(1) $\mu_{CH_3OH} = \mu_{CH_3SH}$ (2) $\mu_{CH_3OH} > \mu_{CH_3SH}$

(3) $\mu_{CH_3OH} < \mu_{CH_3SH}$ (4) can't compare

122. The correct order of decreasing polarisability of ions is:

(1) $Cl^- > Br^- > I^- > F^-$

(2) $F^- > I^- > Br^- > Cl^-$

(3) $I^- > Br^- > Cl^- > F^-$

(4) $F^- > Cl^- > Br^- > I^-$

123. Among the following which species has same number σ and π-bonds?

(1) C_2H_6 (2) $C_2(CN)_4$

(3) C_2H_4 (4) $HC\equiv CH$

124. In which of the following pairs, the two species are isostructural?

(1) SO_3^{2-} and NO_3^-

(2) BF_3 and NF_3

(3) BrO_3^- and XeO_3

(4) SF_4 and XeF_4

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

(1) I in ICl_4^- (2) S in SO_3

(3) N in NO_3^- (4) S in SO_3^{2-}

126. In $POCl_3$ compound. P shows which multiple bond :

(1) $p\pi$–$p\pi$ (2) $d\pi$–$d\pi$

(3) No π bond (4) $p\pi$–$d\pi$

127. Intramolecular hydrogen bonding is found in:

(1) Salicylaldehyde (2) Water

(3) Acetaldehyde (4) Phenol

128. Two ice cubes are pressed over each other and unite to form one cube. Which force is responsible for holding them together?

(1) van der Waals' forces

(2) Covalent attraction

(3) Hydrogen bond formation

(4) Dipole-dipole attraction

129. The most suitable method of separation of mixture of ortho and para-nitrophenol in the ratio 1 : 1 is:

(1) Distillation (2) Crystallisation

(3) vaporisation (4) Colour spectrum

130. The forces present in the crystals of naphthalene are:

(1) van der Waal's forces

(2) Electrostatic forces

(3) Hydrogen bonding

(4) Ionic bond

131. If d represents the bond length, then select the correct relation.

(1) $d_{N_2} = d_{N_2^+}$ and $d_{O_2} = d_{O_2^+}$

(2) $d_{N_2} < d_{N_2^+}$ and $d_{O_2} > d_{O_2^+}$

(3) $d_{N_2} < d_{N_2^+}$ and $d_{O_2} < d_{O_2^+}$

(4) $d_{N_2} > d_{N_2^+}$ and $d_{O_2} > d_{O_2^+}$

132. Which of the following conducts electricity:

(1) Diamond (2) NaCl

(3) KCl(fused) (4) $BaSO_4$

133. What hybridization is expected on the central atom of each of the following molecules?

(i) BeH_2 (ii) CH_2Br_2

(iii) PF_6^- (iv) BF_3

(1) sp^2, sp, sp^3, sp^2 (2) sp, sp^3, sp^3d, sp^2

(3) sp, sp^3, sp^3d^2, sp^2 (4) sp^2, sp, sp^2, sp^3

134. What is the value of 1 debye in SI units?

(1) 3.336×10^{-30} C.m. (2) 33.36×10^{-30} C.m.

(3) 333.6×10^{-30} C.m. (4) None of these

135. Which of the following molecule has a planar structure?

(1) O_2SF_2 (2) OSF_2

(3) XeF_4 (4) ClO_4^-

136. Which type of shape is found in SF_2 molecule?

(1) V-shaped

(2) Bipyramidal

(3) Linear

(4) Irregular tetrahedron

137. In XeF_2, XeF_4 and XeF_6 the hybridisation of central atom is ?

(1) sp^3d^3, sp^3d^2, sp^3d

(2) sp^3d, sp^3d^3, sp^3d^2

(3) sp^3, sp^3 sp^3

(4) sp^3d, sp^3d^2, sp^3d^3

138. The correct sequence of decrease in bond angles of following hydrides is:

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

(2) $SbH_3 > AsH_3 > PH_3 > SbH_3$

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

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

139. Which of the following is soluble in water?

(1) CS_2 (2) C_2H_5OH

(3) CCl_4 (4) $CHCl_3$

140. Correct order is :-

(1) $SOF_2 > SOCl_2 > SOBr_2$ (B.A.) : $\left(X-\hat{S}-X\right)_{X=F/Cl/Br}$

(2) $SF_4 > XeF_4$ (Dipole moment)

(3) $BF_3 < BCl_3 < BBr_3$ (Bond angle)

(4) $PO_4^{3-} < SO_4^{2-} < ClO_4^-$ (Bond length)

141. Among the following, the molecule with highest dipole moment is:

(1) CH_3Cl (2) CH_2Cl_2

(3) $CHCl_3$ (4) CCl_4

142. Which of the following is least volatile?

(1) HF (2) HCl (2) HBr (4) HI

143. Which of the following has the shortest carbon-carbon bond length?

(1) C_6H_6 (2) C_2H_6

(3) C_2H_4 (4) C_2H_2

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

(1) *sp*-hybridized

(2) Sp^2-hybridized

(3) *sp*-and sp^2-hybridized

(4) *sp*, sp^2, and sp^3-hybridized

145. Two elements X and Y have following electronic configurations:

X = $1s^2$, $2s^2$ $2p^6$,$3s^2$ $3p^6$, $4s^2$ and

Y = $1s^2$, $2s^2$ $2p^6$, $3s^2$ $3p^5$

The compound formed by the combination of X and Y is:

(1) XY_2 (2) X_5Y_2

(3) X_2Y_5 (4) XY_5

146. Compare F — Î — O and F_{axial} — Î — F_{axial} bond angle in IOF_3 molecule:

(1) F—Î—O > F_{axial}—Î—F_{axial}

(2) F_{axial}—Î—F_{axial} > F—Î—O

(3) F_{axial}—Î—F_{axial} = F—Î—O

(4) None of these

147. How many bondings pairs and lone pairs surround the central atom in the I_3^- ion?

	Bonding pairs	Lone pairs
(1)	2	2
(2)	2	3
(3)	3	2
(4)	4	3

CHEMICAL BONDING ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**4**	**2**	**1**	**3**	**1**	**1**	**1**	**4**	**4**	**4**	**3**	**1**	**2**	**3**	**2**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**1**	**2**	**3**	**2**	**1**	**1**	**1**	**3**	**2**	**4**	**4**	**3**	**4**	**2**	**3**
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	**3**	**4**	**2**	**1**	**4**	**1**	**4**	**4**	**1**	**3**	**2**	**3**	**4**	**4**	**2**
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	**3**	**2**	**2**	**3**	**2**	**3**	**3**	**2**	**1**	**3**	**4**	**3**	**3**	**2**	**4**
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	**1**	**2**	**4**	**1**	**1**	**2**	**4**	**4**	**2**	**2**	**2**	**4**	**2**	**1**	**4**
Que.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ans.	**4**	**1**	**2**	**3**	**3**	**3**	**4**	**4**	**3**	**4**	**2**	**3**	**1**	**4**	**2**
Que.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
Ans.	**3**	**3**	**3**	**4**	**1**	**3**	**1**	**1**	**3**	**3**	**2**	**2**	**3**	**2**	**3**
Que.	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Ans.	**3**	**1**	**2**	**4**	**2**	**1**	**4**	**3**	**3**	**2**	**4**	**1**	**2**	**3**	**1**
Que.	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
Ans.	**2**	**3**	**2**	**3**	**4**	**4**	**1**	**3**	**1**	**1**	**2**	**3**	**3**	**1**	**3**
Que.	136	137	138	139	140	141	142	143	144	145	146	147			
Ans.	**1**	**4**	**1**	**2**	**2**	**1**	**1**	**4**	**3**	**1**	**2**	**2**			