1. The number of unpaired electrons in a paramagnetic diatomic molecule of an element with atomic number 16 is
(1) 1 (2) 2 (3) 3 (4) 4

2. Which of the following is **not** a correct statement?
(1) Multiple bonds are always shorter than corresponding single bonds
(2) The electron-deficient molecules can act as Lewis acids
(3) The canonical structures have no real existence
(4) Every AB_5 molecule does in fact have square pyramid structure.

3. Which of the following species has a linear shape?
(1) O_3 (2) NO_2^- (3) SO_2 (4) NO_2^+

4. Which of the following is not isostructural with $SiCl_4$?
(1) NH_4^+ (2) SCl_4 (3) SO_4^{2-} (4) PO_4^{3-}

5. The electronegativity difference between N and F is greater than that between N and H yet the dipole moment of NH_3 (1.5 D) is larger than that of NF_3 (0.2 D). This is because
(1) in NH_3 the atomic dipole and bond dipole are in the opposite directions whereas in NF_3 these are in the same direction
(2) in NH_3 as well as in NF_3 the atomic dipole and bond dipole are in the same direction
(3) in NH_3 the atomic dipole and bond dipole are in the same direction whereas in NF_3 these are in opposite directions
(4) in NH_3 as well as NF_3 the atomic dipole and bond dipole are in opposite directions

6. In which of the following molecules are all the bonds **not** equal?
(1) NF_3 (2) $C\ell F_3$ (3) BF_3 (4) $A\ell F_3$

7. The correct order of increasing thermal stability of K_2CO_3 , $MgCO_3$ $CaCO_3$ and $BeCO_3$ is
(1) $BeCO_3 < MgCO_3 < CaCO_3 < K_2CO_3$
(2) $MgCO_3 < BeCO_3 < CaCO_3 < K_2CO_3$
(3) $K_2CO_3 < MgCO_3 < CaCO_3 < BeCO_3$
(4) $BeCO_3 < MgCO_3 < K_2CO_3 < CaCO_3$

8. In which of the following pairs the two species are iso-structural
(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

9. The correct order of C–O bond length among CO, CO_3^{-2} , CO_2 is
(1) $CO < CO_3^{-2} < CO_2$ (2) $CO_3^{-2} < CO_2 < CO$
(3) $CO < CO_2 < CO_3^{-2}$ (4) $CO_2 < CO < CO_3^{-2}$

AIPMT 2008

10. Four diatomic species are listed below in different sequences. Which of these represents the correct order of their increasing bond order ?
(1) $C_2^{2-} < He_2^+ < NO < O_2^-$
(2) $He_2^+ < O_2^- < NO < C_2^{2-}$
(3) $O_2^- < NO < C_2^{2-} < He_2^+$
(4) $NO < C_2^{2-} < O_2^- < He_2^+$

11. The angular shape of ozone molecule (O_3) consists of
(1) 1 sigma and 1 pi bonds
(2) 2 sigma and 1 pi bonds
(3) 1 sigma and 2 pi bonds
(4) 2 sigma and 2 pi bonds

12. The correct order of increasing bond angles in the following triatomic species is:-
(1) $NO_2^+ < NO_2 < NO_2^-$
(2) $NO_2^+ < NO_2^- < NO_2$
(3) $NO_2^- < NO_2^+ < NO_2$
(4) $NO_2^- < NO_2 < NO_2^+$

AIPMT 2009

13. In which of the following molecules/ions BF_3, NO_2^-, NH_2^- and H_2O, the central atom is sp_2 hybridized?

(1) BF_3 and NO_2^- (2) NO_2^- and NH_2^-

(3) NH_2^- and H_2O (4) NO_2^- and H_2O

14. According to MO theory which of the following lists ranks the nitrogen species in terms of increasing bond order?

(1) $N_2^- < N_2^{2-} < N_2$ (2) $N_2^- < N_2 < N_2^{2-}$

(3) $N_2^{2-} < N_2^- < N_2$ (4) $N_2 < N_2^{2-} < N_2^-$

15. In the case of alkali metals, the covalent character decreases in the order :

(1) MI > MBr > MCl > MF

(2) MCl > MI > MBr > MF

(3) MF > MCl > MBr > MI

(4) MF > MCl > MI > MBr

16. What is the dominant intermolecular force or bond that must be overcome in converting liquid CH_3OH to a gas ?

(1) London or dispersion force

(2) Hydrogen bonding

(3) Dipole-dipole interaction

(4) Covalent bonds

AIPMT 2010

17. Some of the properties of the two species, NO_3^- and H_3O^+ are described below. Which one of them is correct :-

(1) Isostructural with same hybridization for the central atom.

(2) Isostructural with different hybridization for the central atom.

(3) Similar in hybridization for the central atom with different structures.

(4) Dissimilar in hybridization for the central atom with different structures.

18. In which of the following molecules the central atom does not have sp^3 hybridization:-

(1) SF_4 (2) BF_4^- (3) NH_4^+ (4) CH_4

19. Which one of the following species does not exist under normal conditions ?

(1) Li_2 (2) Be_2^+ (3) Be_2 (4) B_2

20. In which of the following pairs OF molecules/ions, the central atoms have sp^2 hybridization ?

(1) BF_3 and NH_2^- (2) NO_2^- and NH_3

(3) BF_3 and NO_2^- (4) NH_2^- and H_2O

21. Which of the following alkaline earth metal sulphates has hydration enthalpy higher than the lattice enthalpy ?

(1) $SrSO_4$ (2) $CaSO_4$

(3) $BeSO_4$ (4) $BaSO_4$

22. In which one of the following species the central atom has the type of hybridisation which is not the same as that present in the other three ?

(1) PCl_5 (2) SF_4

(3) I_3^- (4) $SbCl_5^{2-}$

23. Property of the alkaline earth metals that increases with their atomic number :-

(1) Electronegativity

(2) Solubility of their hydroxides in water

(3) Solubility of their sulphates in water

(4) Ionization energy

24. How many bridging oxygen atoms are present in P_4O_{10} :-

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

AIPMT Pre-2011

25. Which of the following has the minimum bond length?

(1) O_2^+ (2) O_2^- (3) O_2^{2-} (4) O_2

26. Which of the two ions from the list given below that have the geometry that is explained by the same hybridization of orbitals, NO_2^-, NO_3^-, NH_2^-, NH_4^+, SCN^- ?

(1) NO_2^- and NO_3^- (2) NH_4^+ and NO_3^-

(3) SCN^- and NH_2^- (4) NO_2^- and NH_2^-

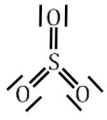
27. Which of the following compounds has the lowest melting point ?

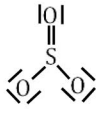
(1) $CaCl_2$ (2) $CaBr_2$

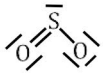
(3) CaI_2 (4) CaF_2

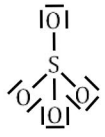
AIPMT Mains -2011

28. Which of the following structures is the most preferred and hence of lowest energy for SO_3?

(1) 

(2) 

(3) 

(4) 

AIPMT Pre -2012

29. Which one of the following pairs is isostructural (i.e. having the same shape and hybridization)?

(1) [NF_3 and BF_3] (2) $\left[BF_4^- \text{ and } NH_4^+\right]$

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

30. Which of the following species contains three bond pairs and one lone pair around the central atom?

(1) NH_2^- (2) PCl_3

(3) H_2O (4) BF_3

31. The pair of species with the same bond order is:

(1) NO, CO (2) N_2, O_2

(3) O_2^{2-}, B_2 (4) O_2^+, NO^+

32. Bond order of 1.5 is show by:

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

(3) O_2^+ (4) O_2^-

AIPMT Mains -2012

33. During change of O_2 to O_2^- ion, the electron adds on which one of the following orbitals ?

(1) σ^* orbital (2) σ orbital

(3) π^* orbital (4) π orbital

34. Four diatomic species are listed below. Identify the correct order in which the bond order is increasing in them :

(1) $C_2^{2-} < He_2^+ < O_2^- < NO$

(2) $He_2^+ < O_2^- < NO < C_2^{2-}$

(3) $NO < O_2^- < C_2^{2-} < He_2^+$

(4) $O_2^- < NO < C_2^{2-} < He_2^+$

NEET-UG 2013

35. Which one of the following molecules contains no π bond ?

(1) NO_2 (2) CO_2 (3) H_2O (4) SO_2

36. XeF_2 is isostructural with :-

(1) $SnCl_2$ (2) TeF_2 (3) ICl_2^- (4) $SbCl_3$

37. Dipole induced dipole interactions are present in which of the following pairs :-

(1) SiF_4 and He atoms

(2) H_2O and alcohol

(3) Cl_2 and CCl_4

(4) HCl and He atoms

38. Which of the following is a polar molecule ?

(1) XeF_4 (2) BF_3 (3) SF_4 (4) SiF_4

39. Which of the following is paramagnetic ?

(1) NO^+ (2) CO (3) O_2^- (4) CN^-

AIPMT-2014

40. Which of the following molecules has the maximum dipole moment ?

(1) CO_2 (2) CH_4 (3) NH_3 (4) NF_3

41. Which one of the following species has plane triangular shape ?

(1) N_3^- (2) NO_3^- (3) NO_2^- (4) CO_2

AIPMT-2015

42. The correct bond order in the following species is:-

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

(3) $O_2^- < O_2^+ < O_2^{2+}$ (4) $O_2^{2+} < O_2^+ < O_2^-$

43. Which of the following pairs of ions are isoelectronic and isostructural ?

(1) ClO_3^-, CO_3^{2-} (2) SO_3^{2-}, NO_3^-

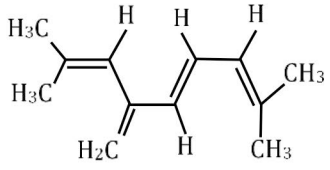
(3) ClO_3^-, SO_3^{2-} (4) CO_3^{2-}, SO_3^{2-}

44. Which of the following options represents the correct bond order ?

(1) $O_2^- < O_2 < O_2^+$ (2) $O_2^- > O_2 < O_2^+$

(3) $O_2^- < O_2 > O_2^+$ (4) $O_2^- > O_2 > O_2^+$

45. The total number of π-bond electrons in the following structure is :-



(1) 8 (2) 12 (3) 16 (4) 4

46. Solubility of the alkaline earth's metal sulphates in water decreases in the sequence:-

(1) Ca > Sr > Ba > Mg

(2) Sr > Ca > Mg > Ba

(3) Ba > Mg > Sr > Ca

(4) Mg > Ca > Sr > Ba

47. Maximum bond angle at nitrogen is present in which of the following ?

(1) NO_2^- (2) NO_2^+

(3) NO_3^- (4) NO_2

48. Which of the following species contains equal number of σ- and π- bonds :-

(1) XeO_4 (2) $(CN)_2$

(3) $CH_2(CN)_2$ (4) HCO_3^-

Re-AIPMT-2015

49. On heating which of the following releases CO_2 most easily ?

(1) $MgCO_3$ (2) $CaCO_3$

(3) K_2CO_3 (4) Na_2CO_3

50. Decreasing order of stability of O_2, O_2^-, O_2^+ and O_2^{2-} is :-

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

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

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

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

51. In which of the following pairs, both the species are not isostructural ?

(1) NH_3, PH_3

(2) XeF_4, XeO_4

(3) $SiCl_4$, PCl_4^+

(4) Diamond, silicon carbide

52. The variation of the boiling points of the hydrogen halides is in the order

HF > HI > HBr > HCl.

What explains the higher boiling point of hydrogen fluoride ?

(1) The bond energy of HF molecules is greater than in other hydrogen halides

(2) The effect of nuclear shielding is much reduced in fluorine which polarises the HF molecule

(3) The electronegativity of fluorine is much higher than for other elements in the group.

(4) There is strong hydrogen bonding between HF molecules

NEET-I 2016

53. Consider the molecules CH_4, NH_3 and H_2O. Which of the given statements is false ?

(1) The H –C–H bond angle in CH_4, the H–N–H bond angle in NH_3, and the H–O–H bond angle in H_2O are all greater than 90°

(2) The H–O–H bond angle in H_2O is larger than the H–C–H bond angle in CH_4.

(3) The H–O–H bond angle in H_2O is smaller than the H–N–H bond angle in NH_3.

(4) The H–C–H bond angle in CH_4 is larger than the H–N–H bond angle in NH_3.

54. Which one of the following orders is correct for the bond dissociation enthalpy of halogen molecules?

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

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

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

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

55. Predict the correct order of repulsion among the following :-

(1) lone pair- lone pair > lone pair - bond pair > bond pair - bond pair

(2) lone pair - lone pair > bond pair - bond pair > lone pair - bond pair

(3) bond pair - bond pair > lone pair - bond pair > lone pair - lone pair

(4) lone pair - bond pair > bond pair - bond pair > lone pair - lone pair

56. Match the compounds given in column I with the hybridisation and shape given in column II and mark the **correct** option.

Column-I		Column-II	
(a)	XeF_6	(i)	Distorted octahedral
(b)	XeO_3	(ii)	Square planer
(c)	$XeOF_4$	(iii)	Pyramidal
(d)	XeF_4	(iv)	Square pyramidal

Code :-

	(a)	(b)	(c)	(d)
(1)	(i)	(iii)	(iv)	(ii)
(2)	(i)	(ii)	(iv)	(iii)
(3)	(iv)	(iii)	(i)	(ii)
(4)	(iv)	(i)	(ii)	(iii)

NEET-II 2016

57. The correct geometry and hybridization for XeF_4 are:

(1) Planar triangle, sp^3d^3

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

(3) octahedral, sp^3d^2

(4) trigonal bipyramidal, sp^3d

58. Among the following which one is a wrong statement?

(1) SeF_4 and CH_4 have same shape

(2) I_3^+ has bent geometry

(3) PH_5 and $BiCl_5$ do not exist

(4) $p\pi$-$d\pi$ bonds are present in SO_2

59. The hybridizations of atomic orbitals of nitrogen in NO_2^+, NO_3^- and NH_4^+ respectively are

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

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

60. Which of the following fluoro-compounds is most likely to behave as a Lewis base ?

(1) CF_4 (2) SiF_4 (3) BF_3 (4) PF_3

61. Which of the following pairs of ions is isoelectronic and isostructural ?

(1) SO_3^{2-}, NO_3^- (2) ClO_3^-, SO_3^{2-}

(3) CO_3^{2-}, NO_3^- (4) ClO_3^-, CO_3^{2-}

NEET(UG) 2017

62. Ionic mobility of which of the following alkali metal ions is lowest when aqueous solution of their salts are put under an electric field ?

(1) K (2) Rb (3) Li (4) Na

63. Match the interhalogen compounds of column-I with the geometry in column II and assign the correct code.

Column-I		Column-II	
(a)	XX'	(i)	T-shape
(b)	XX'_3	(ii)	Pentagonal bipyramidal
(c)	XX'_5	(iii)	Linear
(d)	XX'_7	(iv)	Square-pyramidal
		(v)	Tetrahedral

Code :

	(a)	(b)	(c)	(d)
(1)	(iii)	(i)	(iv)	(ii)
(2)	(v)	(iv)	(iii)	(ii)
(3)	(iv)	(iii)	(ii)	(i)
(4)	(iii)	(iv)	(i)	(ii)

64. Which of the following pairs of compounds is isoelectronic and isostructural ?

(1) TeI_2, XeF_2 (2) IBr_2^-, XeF_2

(3) IF_3, XeF_2 (4) $BeCl_2, XeF_2$

65. The species, having bond angles of 120° is :-

(1) ClF_3 (2) NCl_3 (3) BCl_3 (4) PH_3

66. Which of the following pairs of species have the same bond order ?

(1) O_2, NO^+ (2) CN^-, CO

(3) N_2, O_2^- (4) CO, NO

NEET(UG) 2018

67. Among CaH_2, BeH_2, BaH_2, the order of ionic character is

(1) $BeH_2 < CaH_2 < BaH_2$

(2) $CaH_2 < BeH_2 < BaH_2$

(3) $BeH_2 < BaH_2 < CaH_2$

(4) $BaH_2 < BeH_2 < CaH_2$

68. Magnesium reacts with an element (X) to form an ionic compound. If the ground state electronic configuration of (X) is $1s^2\ 2s^2\ 2p^3$, the simplest formula for this compound is

(1) Mg_2X_3 (2) MgX_2

(3) Mg_2X (4) Mg_3X_2

69. Consider the following species :
CN^+, CN^-, NO and CN
Which one of these will have the highest bond order?
(1) NO (2) CN^- (3) CN^+ (4) CN

70. Which one of the following elements is unable to form MF_6^{3-} ion ?
(1) Ga (2) Al (3) B (4) In

71. In the structure of ClF_3, the number of lone pairs of electrons on central atom 'Cl' is
(1) one (2) two (3) four (4) three

NEET(UG) 2019

72. Which of the following diatomic molecular species has only π bonds according to Molecular Orbital Theory ?
(1) O_2 (2) N_2 (3) C_2 (4) Be_2

73. Which of the following species is **not** stable ?
(1) $[SiF_6]^{2-}$ (2) $[GeCl_6]^{2-}$
(3) $[Sn(OH)_6]^{2-}$ (4) $[SiCl_6]^{2-}$

74. Identify the **incorrect** statement related to PCl_5 from the following :-
(1) Three equatorial P–Cl bonds make an angle of 120° with each other
(2) Two axial P–Cl bonds make an angle of 180° with each other
(3) Axial P–Cl bonds are longer than equatorial P–Cl bonds
(4) PCl_5 molecule is non–reactive

75. Match the Xenon compounds in **Column–I** with its structure in **Column–II** and assign the **correct** code

Column–I		**Column–II**	
(a)	XeF_4	(i)	pyramidal
(b)	XeF_6	(ii)	square planar
(c)	$XeOF_4$	(iii)	distorted octahedral
(d)	XeO_3	(iv)	square pyramidal

Code :

	(a)	**(b)**	**(c)**	**(d)**
(1)	(i)	(ii)	(iii)	(iv)
(2)	(ii)	(iii)	(iv)	(i)
(3)	(ii)	(iii)	(i)	(iv)
(4)	(iii)	(iv)	(i)	(ii)

76. Which is the **correct** thermal stability order for H_2E (E=O, S, Se, Te and Po) ?
(1) $H_2S < H_2O < H_2Se < H_2Te < H_2Po$
(2) $H_2O < H_2S < H_2Se < H_2Te < H_2Po$
(3) $H_2Po < H_2Te < H_2Se < H_2S < H_2O$
(4) $H_2Se < H_2Te < H_2Po < H_2O < H_2S$

NEET(UG) 2019 (ODISHA)

77. Which of the following is paramagnetic ?
(1) N_2 (2) H_2 (3) Li_2 (4) O_2

78. Which of the following is the correct order of dipole moment ?
(1) $NH_3 < BF_3 < NF_3 < H_2O$
(2) $BF_3 < NF_3 < NH_3 < H_2O$
(3) $BF_3 < NH_3 < NF_3 < H_2O$
(4) $H_2O < NF_3 < NH_3 < BF_3$

79. The number of hydrogen bonded water molecule(s) associated with $CuSO_4.5H_2O$ is :-
(1) 3 (2) 1 (3) 2 (4) 5

NEET(UG) 2020

80. Identify a molecule which does not exist.
(1) O_2 (2) He_2 (3) Li_2 (4) C_2

81. Which of the following set of molecules will have zero dipole moment ?
(1) Boron trifluoride, beryllium difluoride, carbon dioxide, 1,4-dichlorobenzene
(2) Ammonia, beryllium difluoride, water, 1,4-dichlorobenzene
(3) Boron trifluoride, hydrogen fluoride, carbon dioxide, 1,3-dichlorobenzene
(4) Nitrogen trifluoride, beryllium difluoride, water, 1,3-dichlorobenzene

NEET(UG) 2020(COVID-19)

82. Among the compounds shown below which one revealed a linear structure ?
(1) NO_2 (2) HOCl
(3) O_3 (4) N_2O

83. Match the compounds of Xe in column I with the molecular structure in column II.

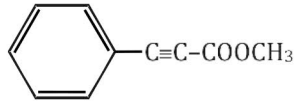
Column–I		Column–II	
(a)	XeF_2	(i)	Square planar
(b)	XeF_4	(ii)	Linear
(c)	XeO_3	(iii)	Square pyramidal
(d)	$XeOF_4$	(iv)	Pyramidal

(1) (a)-(ii) (b)-(i) (c)-(iii) (d)-(iv)
(2) (a)-(ii) (b)-(iv) (c)-(iii) (d)-(i)
(3) (a)-(ii) (b)-(iii) (c)-(i) (d)-(iv)
(4) (a)-(ii) (b)-(i) (c)-(iv) (d)-(iii)

84. Identify the wrongly matched pair.

Molecule	Shape or geometry of molecule
(1) PCl_5	Trigonal planar
(2) SF_6	Octahedral
(3) $BeCl_2$	Linear
(4) NH_3	Trigonal pyramidal

85. How many (i) sp^2 hybridised carbon atoms and (ii) π bonds are present in the following compound ?



(1) 7, 5 (2) 8, 6
(3) 7, 6 (4) 8, 5

NEET(UG) 2021

86. BF_3 is planar and electron deficient compound.
Hybridization and number of electrons around the central atom, respectively are:
(1) sp^3 and 4 (2) sp^3 and 6
(3) sp^2 and 6 (4) sp^2 and 8

87. Match **List - I** with **List - II**.

List-I	List-II
(a) PCl_5	(i) Square pyramidal
(b) SF_6	(ii) Trigonal planar
(c) BrF_5	(iii) Octahedral
(d) BF_3	(iv) Trigonal bipyramidal

Choose the **correct** answer from the options given below.
(1) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)
(2) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)
(3) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)
(4) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

88. Which of the following molecules is non-polar in nature ?
(1) $POCl_3$ (2) CH_2O
(3) $SbCl_5$ (4) NO_2

89. From the following pairs of ions which one is not an iso-electronic pair ?
(1) O^{2-}, F^- (2) Na^+, Mg^{2+}
(3) Mn^{2+}, Fe^{3+} (4) Fe^{2+}, Mn^{2+}

90. The Cl–C–Cl bond angle in 1, 1, 2, 2-tetrachloroethene and tetrachloromethane respectively are
(1) 120° and 109.5° (2) 90° and 109.5°
(3) 109.5° and 90° (4) 109.5° and 120°

91. Match the columns.

List I		List II	
a.	IF_2^-	i.	sp
b.	HCN	ii.	sp^3d
c.	PCl_4^+	iii.	sp^3d^2
d.	XeF_4	iv.	sp^3

(1) a – i, b – iv, c – ii, d – iii
(2) a – ii, b – i, c – iv, d – iii
(3) a – iii, b – ii, c – i, d – iv
(4) a – iv, b – iii, c – ii, d – i

92. Noble gases are named because of their inertness towards reactivity. Identify an incorrect statement about them.
(1) Noble gases are sparingly soluble in water.
(2) Noble gases have very high melting and boiling points.
(3) Noble gases have weak dispersion forces.
(4) Noble gases have large positive values of electron gain enthalpy.

93. The correct sequence of bond enthalpy of 'C-X' bond is
(1) $CH_3–F < CH_3–Cl < CH_3–Br < CH_3–I$
(2) $CH_3–F > CH_3–Cl > CH_3–Br > CH_3–I$
(3) $CH_3–F < CH_3–Cl > CH_3–Br > CH_3–I$
(4) $CH_3–Cl > CH_3–F > CH_3–Br > CH_3–I$

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94. Match List-I with List-II

List- I (Hydrides)	List-II (Nature)
(a) MgH_2	(i) Electron precise
(b) GeH_4	(ii) Electron deficient
(c) B_2H_6	(iii) Electron rich
(d) HF	(iv) Ionic

Choose the correct answer from the options given below :

(1) (a)-(iii), (b) - (i), (c) - (ii), (d)- (iv)
(2) (a)-(i), (b) - (ii), (c) - (iv), (d)- (iii)
(3) (a)-(ii), (b) - (iii), (c) - (iv), (d)- (i)
(4) (a) -(iv), (b) - (i), (c) - (ii), (d)- (iii)

95. Given below are two statements:

Statement I :

The boiling points of the following hydrides of group 16 elements increases in the order - $H_2O < H_2S < H_2Se < H_2Te$.

Statement II:

The boiling points of these hydrides increase with increase in molar mass.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both **Statement I** and **Statement II** are incorrect
(2) **Statement I** is correct but **Statement II** is incorrect
(3) **Statement I** is incorrect but **Statement II** is correct
(4) Both **Statement I** and **Statement II** are correct

96. Which amongst following is incorrect statement ?

(1) C_2 molecule has four electrons in its two degenerate π molecular orbitals.
(2) H_2^+ ion has one electron
(3) O_2^+ ion has diamagnetic.
(4) The bond orders of O_2^+, O_2, O_2^- and O_2^{2-} are 2.5, 2, 1.5 and 1, respectively.

97. Amongst the following which one will have maximum 'lone pair-lone pair' electron repulsions ?

(1) IF_5 (2) SF_4
(3) XeF_2 (4) ClF_3

98. The correct order of bond angles in the following compounds/species is:

(1) $H_2O < NH_3 < NH_4^+ < CO_2$
(2) $H_2O < NH_4^+ < NH_3 < CO_2$
(3) $H_2O < NH_4^+ = NH_3 < CO_2$
(4) $CO_2 < NH_3 < H_2O < NH_4^+$

99. Match List-I with List-II :

	List-I (Molecules)		List-II (Shape)
(a)	NH_3	(i)	Square pyramidal
(b)	ClF_3	(ii)	Trigonal bipyramidal
(c)	PCl_5	(iii)	Trigonal pyramidal
(d)	BrF_5	(iv)	T-shape

Choose the correct answer from the options given below :

(1) (a) – (ii), (b) – (iii), (c) – (iv), (d) – (i)
(2) (a) – (iii), (b) – (iv), (c) – (ii), (d) – (i)
(3) (a) – (iv), (b) – (iii), (c) – (i), (d) – (ii)
(4) (a) – (iii), (b) – (iv), (c) – (i), (d) – (ii)

100. Flourine is a stronger oxidising agent than chlorine because :

(a) F–F bond has a low enthalpy of dissociation.
(b) Flouride ion (F^-) has high hydration enthalpy.
(c) Electron gain enthalpy of flourine is less negative than chlorine.
(d) Flourine has a very small size.

Choose the most appropriate answer from the options given :

(1) (a) and (b) only (2) (a) and (c) only
(3) (a) and (d) only (4) (b) and (c) only

EXERCISE-II (Previous Year Questions)

ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	**2**	**4**	**4**	**2**	**3**	**2**	**1**	**3**	**3**	**2**	**2**	**4**	**1**	**3**	**1**
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	**2**	**4**	**1**	**3**	**3**	**3**	**4**	**2**	**4**	**1**	**1**	**3**	**1**	**2**	**2**
Question	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Answer	**3**	**4**	**3**	**2**	**3**	**3**	**4**	**3**	**3**	**3**	**2**	**3**	**3**	**1**	**1**
Question	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Answer	**4**	**2**	**1**	**1**	**3**	**2**	**4**	**2**	**2**	**1**	**1**	**2**	**1**	**1**	**4**
Question	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Answer	**2,3**	**3**	**1**	**2**	**3**	**2**	**1**	**4**	**2**	**3**	**2**	**3**	**4**	**4**	**2**
Question	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Answer	**3**	**4**	**2**	**2**	**2**	**1**	**4**	**4**	**1**	**3**	**3**	**1**	**3**	**4**	**1**
Question	91	92	93	94	95	96	97	98	99	100					
Answer	**2**	**2**	**2**	**4**	**1**	**3**	**3**	**1**	**2**	**1**					

1. Given below are two statements:

Statement-I : In the periodic table, the highly electronegative Halogens and the highly electropositive alkali metals are separated by the noble gases.

Statement-II : Formation of an anion from a halogen atom and formation of cation from an alkali metal are stabilized by electro static attraction.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I is incorrect and II is correct.
(2) Statement-I and II both are correct.
(3) Statement-I is correct while II is incorrect.
(4) Both Statement-I and II are incorrect.

2. Given below are two statements:

Statement-I : Each covalent bond is formed as a result of unequal sharing of an electron pair between the atoms.

Statement-II : Two or three electron pairs of a multiple bond are treated as single super pair.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I and II both are correct.
(2) Both Statement-I and II are incorrect.
(3) Statement-I is correct while II is incorrect.
(4) Statement-I is incorrect and II is correct.

3. Given below are two statements:

Statement-I : Lewis theory explain the shape of a molecules.

Statement-II : It explain the relative stability and energy of the molecules.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I and II both are correct.
(2) Both Statement-I and II are incorrect.
(3) Statement-I is incorrect and II is correct.
(4) Statement-I is correct while II is incorrect.

4. Given below are two statements:

Statement-I : Most ionic compounds have cations from metallic elements and anion from non-metallic elements.

Statement-II : The ammonium ion NH_4^+ (made up off two non-metallic elements) is not an exception.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I and II both are correct.
(2) Both Statement-I and II are incorrect.
(3) Statement-I is correct while II is incorrect.
(4) Statement-I is incorrect and II is correct.

5. Given below are two statements:

Statement-I : Lattice energy of an ionic solid is defined as the energy required to completes separate one mole of ionic solid in gaseous constituent ions.

Statement-II : Stability of an ionic compound depend on its lattice energy.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I is incorrect and II is correct.
(2) Both Statement-I and II are incorrect.
(3) Statement-I is correct while II is incorrect.
(4) Statement-I and II both are correct.

6. Given below are two statements:

Statement-I : Among the two O–H bonds in H_2O molecule, the energy required to break the first O–H bond and other O–H bond is the same.

Statement-II : In H_2O molecule, electronic environment around oxygen is the same even after breakage of one O–H bond.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I is correct while II is incorrect.
(2) Both Statement-I and II are incorrect.
(3) Statement-I and II both are correct.
(4) Statement-I is incorrect and II is correct.

7. Given below are two statements:

Statement-I : sp Hybridisation is also known as diagonal hybridisation.

Statement-II : Two sp hybrid orbital are oriented in opposite direction forming an angle of 180°.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I and II both are correct.

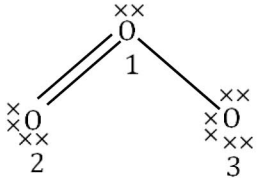
(2) Statement-I is correct while II is incorrect.

(3) Both Statement-I and II are incorrect.

(4) Statement-I is incorrect and II is correct.

8. Given below are two statements:

Statement-I : The correct Lewis structure of O_3 may be drawn as :



Statement-II : In O_3,the formal charge on atom 1, 2 and 3 are +1, 0 and –1 respectively.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I is incorrect and II is correct.

(2) Statement-I is correct while II is incorrect.

(3) Statement-I and II both are correct.

(4) Both Statement-I and II are incorrect.

9. Given below are two statements:

Statement-I : NH_3 molecule is less polar then NF_3 molecule.

Statement-II : 'F' is more electronegative then H element.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both Statement-I and II are incorrect.

(2) Statement-I and II both are correct.

(3) Statement-I is correct while II is incorrect.

(4) Statement-I is incorrect and II is correct.

10. Given below are two statements:

Statement-I : Promotion of electron is an essential condition prior to Hybridisation.

Statement-II : Half filled, full filled and vacant orbital can participate in the process of Hybridisation.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I is incorrect and II is correct.

(2) Statement-I and II both are correct.

(3) Statement-I is correct while II is incorrect.

(4) Both Statement-I and II are incorrect.

11. Given below are two statements:

Statement-I : C_2 molecule has four electrons in it's two degenerate 'π' molecular orbitals

Statement-II : O^+_2 ion is diamagnetic nature.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I and II both are correct.

(2) Statement-I is incorrect and II is correct.

(3) Statement-I is correct while II is incorrect.

(4) Both Statement-I and II are incorrect.

12. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion (A) : LiF is sparingly soluble in water.

Reason (R) : LiF has a very high lattice energy.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) If (A) & (R) both are correct and (R) is the correct explanation of (A).

(2) If (A) & (R) both are correct but (R) is not the correct explanation of (A).

(3) (A) is correct but (R) is incorrect.

(4) (A) & (R) both are incorrect.

13. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion (A) : Ionic compounds tend to be no-volatile.

Reason (R) : Intermolecular forces in these compounds are weak.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) (A) is correct but (R) is incorrect.

(2) If (A) & (R) both are correct but (R) is not the correct explanation of (A).

(3) If (A) & (R) both are correct and (R) is the correct explanation of (A).

(4) (A) & (R) both are incorrect.

14. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion (A) : Bond length of (P–Cl) bonds in gaseous PCl_5 and solid PCl_5 are not equal.

Reason (R) : In solid state two PCl_5 molecules are associated.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) (A) is correct but (R) is incorrect.

(2) If (A) & (R) both are correct and (R) is the correct explanation of (A).

(3) If (A) & (R) both are correct but (R) is not the correct explanation of (A).

(4) (A) & (R) both are incorrect.

15. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion (A) : B_2 molecule is diamagnetic.

Reason (R) : The highest occupied molecular orbital in B_2 molecule is of σ-type.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) If (A) & (R) both are correct but (R) is not the correct explanation of (A).

(2) (A) is correct but (R) is incorrect.

(3) If (A) & (R) both are correct and (R) is the correct explanation of (A).

(4) (A) & (R) both are incorrect.

16. Given below are two statements; labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion (A) : SiF_6^{2-} is known but $SiCl_6^{2-}$ is not known.

Reason (R) : Size of F is small and its lone pair of electron is tightly bonded with orbitals.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) (A) is correct but (R) is incorrect.

(2) If (A) & (R) both are correct but (R) is not the correct explanation of (A).

(3) If (A) & (R) both are correct and (R) is the correct explanation of (A).

(4) (A) & (R) both are incorrect.

17. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion (A) : ClF_3 has bent T-shape structure.

Reason (R) : It has two lone pair arrange at 180° angle.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) (A) & (R) both are incorrect.

(2) If (A) & (R) both are correct and (R) is the correct explanation of (A).

(3) If (A) & (R) both are correct but (R) is not the correct explanation of (A).

(4) (A) is correct but (R) is incorrect.

18. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion (A) : Boiling point of o-nitro phenol is greater than point of p-nitro phenol.

Reason (R) : In o-nitro phenol has only inter molecular H-bonding.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) If (A) & (R) both are correct and (R) is the correct explanation of (A).
(2) If (A) & (R) both are correct but (R) is not the correct explanation of (A).
(3) (A) is correct but (R) is incorrect.
(4) (A) & (R) both are incorrect.

19. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion (A) : AgCl is more covalent than NaCl.

Reason (R) : Polarising Power of Ag^+ is greater than Na^+ ion.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) (A) & (R) both are incorrect.
(2) If (A) & (R) both are correct and (R) is the correct explanation of (A).
(3) If (A) & (R) both are correct but (R) is not the correct explanation of (A).
(4) (A) is correct but (R) is incorrect.

20. Match the column

Column I (Molecule/Ion)		Column II (Hybridisation)	
(i)	SF_4	(a)	sp^3d^2
(ii)	IF_5	(b)	d^2sp^3
(iii)	NO_2^+	(c)	sp^3d
(iv)	NH_4^+	(d)	sp^3
		(e)	sp

(1) i-a, ii-b, iii-c, iv-d
(2) i-c, ii-a, iii-e, iv-d
(3) i-c, ii-d, iii-e, iv-b
(4) i-b, ii-c, iii-d, iv-e

21. Match the column

Column I (Molecule)		Column II (Bond order)	
(i)	NO	(a)	1.5
(ii)	CO	(b)	2.0
(iii)	O_2^-	(c)	2.5
(iv)	O_2	(d)	3.0

(1) i-a, ii-b, iii-c, iv-d
(2) i-b, ii-c, iii-d, iv-a
(3) i-c, ii-d, iii-a, iv-b
(4) i-d, ii-a, iii-b, iv-c

22. Match the column

Column I (Ion)		Column II (Shape)	
(i)	$ICl_2^\ominus$	(a)	Linear
(ii)	$BrF_2^\oplus$	(b)	Pyramidal
(iii)	$ClF_4^\ominus$	(c)	Tetrahedral
(iv)	$AlH_4^\ominus$	(d)	Square planer
		(e)	V shape

(1) i-a, ii-b, iii-c, iv-d
(2) i-a, ii-e, iii-d, iv-c
(3) i-c, ii-d, iii-e, iv-b
(4) i-b, ii-c, iii-d, iv-e

23. Match the column

Column I (Order)		Column II (Properties)	
(i)	$H_2O<H_2S<H_2Se<H_2Te$	(a)	Thermal stability
(ii)	HCl<HBr<HI<Hf	(b)	Acidic strength
(iii)	$NH_3>PH_3>AsH_3>SbH_3$	(c)	Boiling point
(iv)	$CH_4>SiH_4>GeH_4>SnH_4>PbH_4$	(d)	Lewis basic strength

(1) i-b, ii-c, iii-d, iv-a
(2) i-a, ii-b, iii-d, iv-c
(3) i-c, ii-d, iii-a, iv-b
(4) i-d, ii-a, iii-b, iv-c

24. Match the column

Column I (Type's of solid)		Column II (Example)	
(i)	Covalent solid	(a)	Fe(s)
(ii)	Ionic solid	(b)	Diamond
(iii)	Metallic solid	(c)	LiF
(iv)	Molecular solid	(d)	Dry ice

(1) i-a, ii-b, iii-c, iv-d
(2) i-a, ii-b, iii-d, iv-c
(3) i-b, ii-c, iii-a, iv-d
(4) i-b, ii-c, iii-d, iv-a

25. Match the column

Column I (Molecule/Ion)		Column II (Bond angle)	
(i)	NO_2^+	(a)	120°
(ii)	NO_2^-	(b)	118°
(iii)	NO_2	(c)	180°
(iv)	NO_3^-	(d)	134°

(1) i-c, ii-b, iii-d, iv-a
(2) i-a, ii-b, iii-c, iv-d
(3) i-c, ii-d, iii-a, iv-b
(4) i-d, ii-a, iii-b, iv-c

26. Match the column

Column I		Column II	
(i)	ClF_3	(a)	Non planar and non polar
(ii)	XeF_4	(b)	Non planar & polar
(iii)	NF_3	(c)	Planar and polar
(iv)	PCl_5	(d)	Planar and non polar

(1) i-a, ii-b, iii-c, iv-d
(2) i-c, ii-d, iii-b, iv-a
(3) i-c, ii-d, iii-a, iv-b
(4) i-d, ii-a, iii-b, iv-c

27. Match the column

Column I [Molecule]		Column II [Type's of 'π' bond]	
(i)	SO_3	(a)	no π bond
(ii)	XeO_4	(b)	only pπ -pπ
(iii)	C_3O_2	(c)	only pπ -dπ
(iv)	SiO_2	(d)	both pπ -pπ and pπ -dπ

(1) i-a, ii-b, iii-c, iv-d
(2) i-c, ii-d, iii-b, iv-a
(3) i-d, ii-c, iii-b, iv-a
(4) i-d, ii-a, iii-b, iv-c

28. Match the column

Column I		Column II	
(i)	HF(s)	(a)	Linear polymeric structure
(ii)	H_3BO_3(s)	(b)	Zig-Zag structure
(iii)	H_2O(s)	(c)	2-D sheet structure
(iv)	NH_3(s)	(d)	Open cage like structure

(1) i-a, ii-b, iii-c, iv-d
(2) i-b, ii-c, iii-d, iv-a
(3) i-d, ii-c, iii-a, iv-b
(4) i-d, ii-a, iii-b, iv-c

29. Match the column

Column I		Column II	
(i)	$Li^{\oplus}(aq) > Na^{\oplus}(aq) > K^{\oplus}(aq)$	(a)	ionic mobility in aq solution
(ii)	$F^{\ominus} < Cl^{\ominus} < Br^{\ominus} < H^{\ominus}$	(b)	Hydrated radius of ions
(iii)	$Na^{\oplus} < Mg^{+2} < Al^{+3}$	(c)	Polaris ability
(iv)	$Ca^{+2}(aq) < Sr^{+2}(aq) < Ba^{+2}(aq)$	(d)	Polarising power

(1) i-b, ii-a, iii-d, iv-c
(2) i-b, ii-c, iii-d, iv-a
(3) i-c, ii-d, iii-a, iv-b
(4) i-d, ii-a, iii-b, iv-c

30. Which of the following molecule(s) is polar ?
(A) $CHCl_3$ (B) CF_4 (C) O_2F_2 (D) C_2F_2
(1) If A, B and C options are correct.
(2) If A & B both are correct.
(3) If B & D both are correct.
(4) If A & C both are correct.

31. Species having same bond order are –
(A) N_2 (B) N_2^+ (C) N_2^{-2} (D) N_2^-
(1) If A, B and C options are correct.
(2) If A & B both are correct.
(3) If B & D both are correct.
(4) If A & C both are correct.

32. In which of the following molecule/ion hybridisation of central atom is sp^3d.
(A) $I_3^{\ominus}$ (B) $I_3^{\oplus}$ (C) ClF_3 (D) IF_5
(1) If A, B and C options are correct.
(2) If A & B both are correct.
(3) If B & D both are correct.
(4) If A & C both are correct.

33. Which of the following species do not exist ?
(A) PH_5 (B) KHF_2
(C) BF_5^{-2} (D) BeF_4^{-2}
(1) If A, B and C options are correct.
(2) If A & B both are correct.
(3) If B & D both are correct.
(4) If A & C both are correct.

34. Correct order of melting point is/are

(A) LiCl > NaCl (B) $SnCl_2 > SnCl_4$

(C) $MgF_2 > AlF_3$ (D) Diamond > Al_2O_3

(1) If A, B and C options are correct.

(2) If A & B both are correct.

(3) If B & D both are correct.

(4) If A & C both are correct.

35. Which of the following combination leads to formation of π bond (Molecular axis is z axis)

(A) $p_y + p_y$ (B) $d_{yz} + d_{yz}$

(C) $p_x + d_{zx}$ (D) $d_{xy} + d_{yz}$

(1) If A, B and C options are correct.

(2) If A & B both are correct.

(3) If B & D both are correct.

(4) If A & C both are correct.

36. Which of the following molecule exhibit intramolecular hydrogen bonding?

(A) chloral hydrate (B) p-nitrophenol

(C) salicydaldihyde (D) acetic acid

(1) If A, B and C options are correct.

(2) If A & B both are correct.

(3) If B & D both are correct.

(4) If A & C both are correct.

37. Which of the following gives only SO_2 gas on thermal decomposition.

(A) $ZnSO_4$ (B) $CaSO_3$

(C) $Fe_2(SO_4)_3$ (D) $BaSO_3$

(1) If A, B and C options are correct.

(2) If A & B both are correct.

(3) If B & D both are correct.

(4) If A & C both are correct.

38. Which of the following order of solubility in water is correct?

(A) AgF > AgCl > AgBr > AgI

(B) $BeSO_4 > MgSO_4 > CaSO_4 > SrSO_4 > BaSO_4$

(C) LiOH > NaOH > KOH > RbOH > CsOH

(D) $SnCl_4 > SnCl_2$

(1) If A, B and C options are correct.

(2) If A & B both are correct.

(3) If B & D both are correct.

(4) If A & C both are correct.

39. Which of the following gives paramagnetic gas on heating?

(A) $LiNO_3$ (B) $CaCO_3$

(C) $NaNO_3$ (D) NH_4NO_2

(1) If A, B and C options are correct.

(2) If A & B both are correct.

(3) If B & D both are correct.

(4) If A & C both are correct.

EXERCISE-III (Analytical Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	**2**	**4**	**2**	**3**	**4**	**2**	**1**	**3**	**4**	**1**	**3**	**1**	**1**	**3**	**4**
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	**3**	**4**	**4**	**2**	**2**	**3**	**2**	**1**	**3**	**1**	**2**	**3**	**2**	**2**	**4**
Question	31	32	33	34	35	36	37	38	39						
Answer	**3**	**4**	**4**	**3**	**1**	**4**	**3**	**2**	**4**						