INORGANIC
CHEMISTRY

NEET

CRASH COURSE

CHEMICAL BONDING

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SUMMARY

Kösselís first insight into the mechanism of formation of electropositive and electronegative ions related the process to the attainment of noble gas configurations by the respective ions. Electrostatic attraction between ions is the cause for their stability. This gives the concept of **electrovalency.**

The first description of **covalent bonding** was provided by Lewis in terms of the sharing of electron pairs between atoms and he related the process to the attainment of noble gas configurations by reacting atoms as a result of sharing of electrons. The Lewis dot symbols show the number of valence electrons of the atoms of a given element and Lewis dot structures show pictorial representations of bonding in molecules.

An ionic compound is pictured as a three-dimensional aggregation of positive and negative ions in an ordered arrangement called the crystal lattice. In a crystalline solid there is a charge balance between the positive and negative ions. The crystal lattice is stabilized by the **enthalpy of lattice formation.**

While a single covalent bond is formed by sharing of an electron pair between two atoms, multiple bonds result from the sharing of two or three electron pairs. Some bonded atoms have additional pairs of electrons not involved in bonding. These are called lonepairs of electrons. A Lewis dot structure shows the arrangement of bonded pairs and lone pairs around each atom in a molecule. **Important parameters, associated with chemical bonds, like: bond length, bond angle, bond enthalpy, bond order and bond polarity have significant effect on the properties of compounds.**

A number of molecules and polyatomic ions cannot be described accurately by a single Lewis structure and a number of descriptions (representations) based on the same skeletal structure are written and these taken together represent the molecule or ion. This is a very important and extremely useful concept called **resonance**. The contributing structures or canonical forms taken together constitute the resonance hybrid which represents the molecule or ion.

The **VSEPR model** used for predicting the geometrical shapes of molecules is based on the assumption that electron pairs repel each other and, therefore, tend to remain as far apart as possible. According to this model, molecular geometry is determined by repulsions between lone pairs and lone pairs; lone pairs and bonding pairs and bonding pairs and bonding pairs. The order of these repulsions being : lp-lp > lp-bp > bp-bp

The **valence bond (VB) approach** to covalent bonding is basically concerned with the energetics of covalent bond formation about which the Lewis and VSEPR models are silent. Basically the VB theory discusses bond formation in terms of overlap of orbitals. For example the formation of the H_2 molecule from two hydrogen atoms involves the overlap of the 1s orbitals of the two H atoms which are singly occupied. It is seen that the potential energy of the system gets lowered as the two H atoms come near to each other. At the equilibrium inter-nuclear distance (bond distance) the energy touches a minimum. Any attempt to bring the nuclei still closer results in a sudden increase in energy and consequent destabilization of the molecule. Because of orbital overlap the electron density between the nuclei increases which helps in bringing them closer. It is however seen that the actual bond enthalpy and bond length values are not obtained by overlap alone and other variables have to be taken into account.

For explaining the characteristic shapes of polyatomic molecules Pauling introduced the concept of **hybridisation of atomic orbitals**. sp,sp^2, sp^3 hybridizations of atomic orbitals of Be, B,C, N and O are used to explain the formation and geometrical shapes of molecules like $BeCl_2$, BCl_3, CH_4, NH_3 and H_2O. They also explain the formation of multiple bonds in molecules like C_2H_2 and C_2H_4.

The **molecular orbital (MO) theory** describes bonding in terms of the combination and arrangment of atomic orbitals to form molecular orbitals that are associated with the molecule as a whole. The number of molecular orbitals are always equal to the number of atomic orbitals from which they are formed. Bonding molecular orbitals increase electron density between the nuclei and are lower in energy than the individual atomic orbitals. Antibonding molecular orbitals have a region of zero electron density between the nuclei and have more energy than the individual atomic orbitals.

The electronic configuration of the molecules is written by filling electrons in the molecular orbitals in the order of increasing energy levels. As in the case of atoms, the Pauli exclusion principle and Hundís rule are applicable for the filling of molecular orbitals. Molecules are said to be stable if the number of elctrons in bonding molecular orbitals is greater than that in antibonding molecular orbitals.

Hydrogen bond is formed when a hydrogen atom finds itself between two highly electronegative atoms such as F, O and N. It may be intermolecular (existing between two or more molecules of the same or different substances) or intramolecular (present within the same molecule). Hydrogen bonds have a powerful effect on the structure and properties of many compounds.

CHEMICAL BONDING

Q.1 Which of the following shows the highest lattice energy ?
(1) RbF (2) CsF (3) NaF (4) KF

Q.2 Which condition favours the bond formation ?
(1) Maximum attraction and maximum potential energy
(2) Minimum attraction and minimum potential energy
(3) Minimum potential energy and maximum attraction
(4) None of the above

Q.3 The compound completing its octet by transfer of electrons is
(1) MgO (2) H_2S (3) PH_3 (4) CCl_4

Q.4 Correct order of covalent character of alkaline earth metal chloride in
(1) $BeCl_2 < MgCl_2 < CaCl_2 < SrCl_2$ (2) $BeCl_2 < CaCl_2 < SrCl_2 < MgCl_2$
(3) $BeCl_2 > MgCl_2 > CaCl_2 > SrCl_2$ (4) $SrCl_2 > BeCl_2 > CaCl_2 > MgCl_2$

Q.5 Which follows octet rule ?
(1) $FeCl_2$ (2) AgCl (3) $CaCl_2$ (4) CuCl

Q.6 Nitrogen does not form NF_5 because:
(1) Nitrogen is member of V group (2) It contains no empty d-orbital
(3) The bond energy of $N \equiv N$ is very high (4) It's Inert due to presense of triple bond

Q.7 Which compound among the following has least ionic character?
(1) $AlCl_3$ (2) AlI_3 (3) MgI_2 (4) CsI

Q.8 According to Lewis structure the number of lone pair & bond pair of electrons in SO_4^{2-} ion.
(1) 12, 6 (2) 12, 4 (3) 10, 8 (4) 8, 8

Q.9 An ionic bond A^+B^- is most likely to be formed when :
(1) the ionization energy of *A* is high and the electron gain enthalpy of *B* is low
(2) the ionization energy of *A* is low and the electron gain enthalpy of *B* is high
(3) the ionization energy of *A* and the electron gain enthalpy of *B* both are high
(4) the ionization energy of *A* and the electron gain enthalpy of *B* both are low

Q.10 In a triple bond there is sharing of:
(1) 3 electrons (2) 4 electrons (3) Several electrons (4) 6 electrons

Q.11 Example of super octet molecule is :
(1) SF_6 (2) PCl_5 (3) IF_7 (4) All of these

Q.12 Ionic compounds in general possess both:
(1) High melting points and non-directional bonds
(2) High melting points and low boiling points
(3) Directional bonds and low boiling points
(4) High solubilities in polar and non-polar solvents

Q.13 Solid NaCl is a bad conductor of electricity because:
(1) In solid NaCl there are no ions (2) Solid NaCl is covalent
(3) In solid NaCl there is no mobility of ions (4) In solid NaCl there are no electrons

Q.14 Polarization of ions is governed by -
(1) Hybridization (2) VSEPR theory (3) Fajan's rules (4) Pauling rule

Q.15 The number of electrons involved in the bond formation in N_2 molecule is :
(1) 2 (2) 4 (3) 10 (4) 6

Q.16 NH_3 and BF_3 combine readily because of the formation of :
(1) a covalent bond (2) a hydrogen bond (3) a coordinate bond (4) an ionic bond

Q.17 In the compound

$\overset{1}{C}H_2 = \overset{2}{C}H - \overset{3}{C}H_2 - \overset{4}{C}H_2 - \overset{5}{C} \equiv \overset{6}{C}H$, the $C_2 - C_3$ bond formed by the overlapping of :
(1) $sp - sp^2$ (2) $sp^3 - sp^3$ (3) $sp - sp^3$ (4) $sp^2 - sp^3$

Q.18 The type of hybrid orbitals used by chlorine atom in ClO^-, ClO_2^-, ClO_3^- and ClO_4^- is/are:
(1) sp, sp^2, sp^3 and sp^3d (2) sp and sp^3
(3) Only sp^3 (4) Only sp

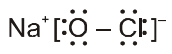
Q.19 Which of the following species are hypervalent ?
1. ClO_4^-, 2. BF_3, 3. SO_4^{2-} , 4. CO_3^{2-}
(1) 1, 2, 3 (2) 1, 3 (3) 3, 4 (4) 1, 2

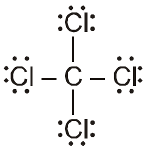
Q.20 Which of the following is true ?

(1) Bond order $\propto \dfrac{1}{\text{bond length}} \propto$ bond energy (2) Bond order $\propto$ bond length $\propto \dfrac{1}{\text{bond energy}}$

(3) Bond order $\propto \dfrac{1}{\text{bond length}} \propto \dfrac{1}{\text{bond energy}}$ (4) Bond order $\propto$ bond length $\propto$ bond energy

Q.21 Which of the following Lewis diagram is incorrect ?

(1) 

(2) 

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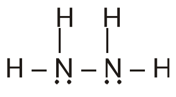
(4) 

Q.22 The boiling point of methanol is greater than of methyl thiol because:

(1) there is intramolecular hydrogen bonding in methanol and intermolecular hydrogen bonding in methyl thiol

(2) there is intermolecular hydrogen bonding in methanol and no hydrogen bonding in methythiol

(3) there is no hydrogen bonding in methanol and intermolecular hydrogen bonding in methylthiol

(4) there is intramolecular hydrogen bonding in methanol and no hydrogen bonding in methythiol

Q.23 Density of ice is less than that of water because of :

(1) presence hydrogen bonding

(2) crystal modification of ice

(3) open porous structure of ice due to hydrogen bonding

(4) different physical states of these

Q.24 Species having zero dipole moment:

(1) XeF_4 (2) SO_2 (3) SF_4 (4) CH_2Cl_2

Q.25 Which of the following has been arranged in increasing order of % p-character?

(1) $sp < sp^2 < sp^3$ (2) $sp^3 < sp^2 < sp$ (3) $sp^2 < sp^3 < sp$ (4) $sp^2 < sp < sp^3$

Q.26 Increasing order of bond length in NO, NO^+ and NO^- is:

(1) $NO > NO^- > NO^+$ (2) $NO^+ < NO < NO^-$

(3) $NO < NO^+ < NO^-$ (4) $NO < NO^+ = NO^-$

Q.27 Which of the following has fractional bond order?

(1) O_2^{2+} (2) O_2^{2-} (3) F_2^{2-} (4) H_2^-

Q.28 In C—C bond C_2H_6 undergoes heterolytic fission, the hybridisation of two resulting carbon atoms is :

(1) sp^2 both (2) sp^3 both (3) sp^2, sp^3 (4) sp, sp^2

Q.29 o-Nitrophenol is more volatile than p-nitrophenol. It is due to :

(1) Intramolecular hydrogen bonding in o-nitrophenol and intermolecular hydrogen bonding in p-nitrophenol

(2) Intermolecular hydrogen bonding in o-nitrophenol and intramolecular hydrogen bonding in p-nitrophenol

(3) More stronger intermolecular hydrogen bonding in o-nitrophenol as compared to p-nitrophenol

(4) More stronger intramolecular hydrogen bonding in o-nitrophenol as compared to p-nitrophenol

Q.30 Which of the following represents correctly the order of filling of the molecular orbitals of B_2, C_2, N_2 ?

(1) $\pi_{2p_x} = \pi_{2p_y} < \sigma_{2p_z} < \pi^*_{2p_y} = \pi^*_{2p_z} < \sigma^*_{2p_z}$

(2) $\sigma_{2p_z} < \pi_{2p_x} = \pi_{2p_y} < \pi^*_{2p_x} =< \pi^*_{2p_y} < \sigma^*_{2p_z}$

(3) $\sigma_{2p_z} = \pi_{2p_x} = \pi_{2p_y} < \pi^*_{2p_x} =< \pi^*_{2p_y} < \sigma^*_{2p_z}$

(4) $\pi_{2p_x} < \pi_{2p_y} < \sigma_{2p_z} > \pi^*_{2p_y} < \pi^*_{2p_z} = \sigma^*_{2p_z}$

Q.31 Which of the following match is not correct ?

(1) ICl_2^- — Linear ion
(2) ICl_4^- — Square planar ion
(3) XeF_2 — Linear molecule
(4) SO_4^{2-} — Trigonal planar ion

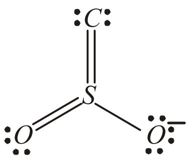
Q.32 Which of the following compounds have bond angle as nearly 90º ?

(1) CH_4
(2) CO_2
(3) H_2O
(4) SF_6

Q.33 In which of the following pairs hybridisation of the central atom is different ?

(1) ClF_3 , ClF_3O
(2) ClF_3O, ClF_3O_2
(3) $[ClF_2O]^+$, $[ClF_4O]^-$
(4) $[ClF_4O]^-$, $[XeOF_4]$

Q.34 The possible structure(s) of monothiocarbonate ion is :

(1)


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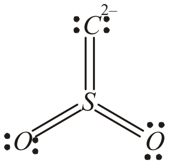

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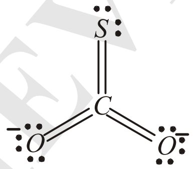

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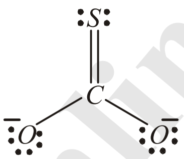
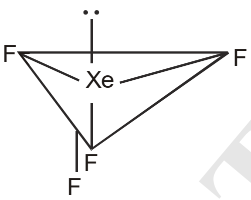


Q.35 Which is the right structure of XeF_4 ?

(1)


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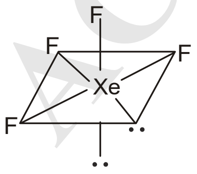

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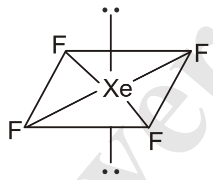

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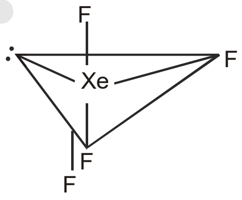


Q.36 The strength of bonds by 2s – 2s, 2p – 2p and 2p – 2s overlapping has the order:

(1) s – s > p – p > s – p
(2) s – s > p – s > p – p
(3) p – p > s – p > s – s
(4) p – p > s – s > p – s

Q.37 Arrange the following in the increasing order of deviation from normal tetrahedral angle :

(1) $P_4 < PH_3 < H_2O$
(2) $PH_3 < H_2O < P_4$
(3) $P_4 < H_2O < PH_3$
(4) $H_2O < PH_3 < P_4$

Q.38 In the protonation of H_2O, change occurs in :

(1) Hybridisation state of oxygen
(2) Shape of molecule
(3) Hybridisation and shape both
(4) None

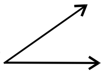
Q.39 The dipole moment of HCl is 1.03 D. If H–Cl bond distance is 1.26 Å, what is the percentage of ionic character in the H–Cl bond -

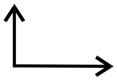
(1) 60%
(2) 39%
(3) 29%
(4) 17%

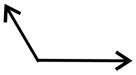
Q.40 Dipole moment is shown by:

(1) 1, 4 - dichlorobenzene
(2) Cis 1, 2 - dichloro ethene
(3) Trans -1, 2 - dichloro ethene
(4) benzene

Q.41 Which has maximum dipole moment ?

(1) 

(2) 

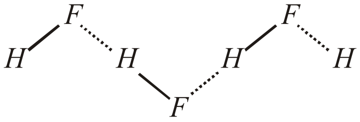
(3) 

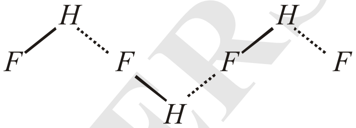
(4) 

Q.42 The H bond in solid HF can be best represented as:

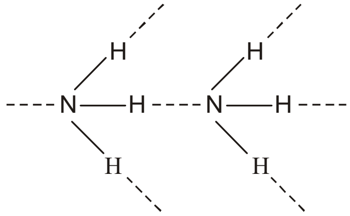
(1) $H - F....H - F....H - F$

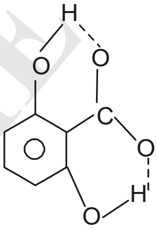
(2) 

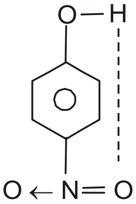
(3) 

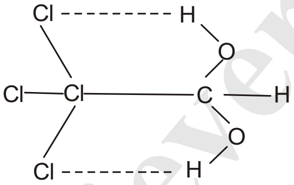
(4) 

Q.43 In which of the following molecule, the shown hydrogen bond is not possible:

(1) 

(2) 

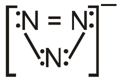
(3) 

(4) 

Q.44 Maximum no. of hydrogen bonds formed by a water molecule in ice is :

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

Q.45 Which among the following resonance structures of N_3^- satisfies the octet rule but is ruled out as a resonance structure?

(I) $[:\ddot{N} = N = \ddot{N}:]^-$ (II) $[:\underset{..}{\ddot{N}} - N \equiv N:]^-$ (III) $[:N \equiv N - \underset{..}{\ddot{N}}:]^-$ (IV) 

(1) IV only (2) I and IV only (3) I only (4) II and III only

Q.46 Which of the following has been arranged in order of decreasing bond length :

(1) P–O > Cl–O > S–O (2) P–O > S–O > Cl–O

(3) S–O > Cl–O> P–O (4) Cl–O > S–O > P–O

Q.47 Which is the true statement about $(SiH_3)_3N$?

(1) It is trigonal planar. (2) It is trigonal pyramidal.

(3) It is stronger lewis base than that of $(CH_3)_3N$. (4) It has a total of 9 sigma bonds.

Q.48 Carbon atoms in the compound $(CN)_4C_2$ are:
(1) sp hybridized (2) sp^2 hybridized
(3) sp and sp^2 hybridized (4) sp, sp^2 and sp^3 hybridized

Q.49 In which of the following set, the values of bond orders will be 2.5 ?
(1) O_2^+, NO, NO^{2+}, CN (2) CN, NO^{2+}, CN^-, F_2
(3) O_2^+ , NO^{2+}, O_2^{2+}, CN^- (4) O_2^{2-}, O_2^-, O_2^+, O_2

Q.50 The correct order of bond angles (smallest first) in H_2S, NH_3, BF_3 and SiH_4 is :
(1) $H_2S < NH_3 < SiH_4 < BF_3$ (2) $NH_3 < H_2S < SiH_4 < BF_3$
(3) $H_2S < SiH_4 < NH_3 < BF_3$ (4) $H_2S < NH_3 < BF_3 < SiH_4$

Q.51 Born Haber cycle is mainly used to determine
(1) Lattice energy (2) Electron affinity
(3) Ionisation energy (4) Electronegativity

Q.52 Which of the following does not show electrical conduction ?
(1) diamond (2) graphite
(3) sodium chloride (fused) (4) potassium

Q.53 Pure phosphoric acid is very viscous because :
(1) it is a strong acid (2) it is tribasic acid (3) it is hygroscopic
(4) it has PO_4^{3-} groups which are bonded by many hydrogen bonds

Q.54 The charge/size ratio of a cation determines its polarzing power. Which one of the following sequences represents the increasing order of the polarizing power of the cationic species, K^+, Ca^{+2}, Mg^{+2}, Be^{+2}
(1) $Be^{+2} < K^+ < Ca^{+2} < Mg^{+2}$ (2) $K^+ < Ca^{+2} < Mg^{+2} < Be^{+2}$
(3) $Ca^{+2} < Mg^{+2} < Be^{+2} < K^+$ (4) $Mg^{+2} < Be^{+2} < K^+ < Ca^{+2}$

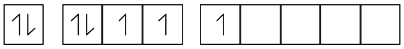
Q.55 Which of the following is least volatile ?
(1) HF (2) HCl (3) HBr (4) HI

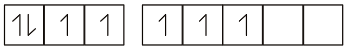
Q.56 The bond in which two atoms are bonded by coulombic attraction force is called
(1) Hydrogen bond (2) Covalent bond (3) Ionic bond (4) Coordinate bond

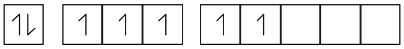
Q.57 Pick out the wrong statement :-
(1) LiF has less solubility in water than LiI
(2) Lattice energy of MgO is greater than Na_2O
(3) LiH is more stable than KH
(4) KO_2 is diamagnetic and colourless

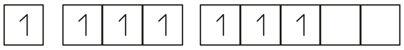
Q.58 Which of the following species is paramagnetic ?
(1) NO^- (2) O_2^{2-} (3) CN^- (4) CO

Q.59 Which of the following configuration shows second excitation state of Iodine:-

(1) 

(2) 

(3) 

(4) 

Q.60 According to Fajan's rules necessary condition to form covalent bond is :

(1) small cation and large anion

(2) small cation and small anion

(3) large cation and large anion

(4) large cation and small anion

Q.61 Which one of the following does not have intermolecular H-bonding ?

(1) H_2O (2) o-nitro phenol (3) HF (4) CH_3COOH

Q.62 Water (H_2O) is liquid while hydrogen sulphide (H_2S) is a gas because :

(1) water has higher molecular weight

(2) hydrogen sulphide is week acid

(3) water molecular associate through hydrogen bonding

(4) sulphur has high electronegativity than oxygen

Q.63 Which is most ionic :

(1) P_2O_5 (2) MnO (3) CrO_3 (4) Mn_2O_7

Q.64 CO_2 is a gas, while SiO_2 is a solid but both are-

(1) Covalent containing π–bond

(2) Molecules having $p\pi - d\pi$ bonding

(3) Acidic

(4) Discrete molecules

Q.65 Which of the following is false ?

(1) Van der Waals forces are responsible for the formation of molecular crystals.

(2) Branching lowers the boiling points of isomeric organic compounds due to reduction in the van der Waals force of attraction.

(3) In graphite, van der Waals forces act between the carbon layers.

(4) Boiling point of NH_3 is greater than SbH_3.

Q.66 The compound containing co-ordinate bond is :

(1) H_2SO_4 (2) O_3 (3) SO_3 (4) All of these

Q.67 The percentage of s–character in the orbital forming P – S bonds in P_4S_3 is :

(1) 25 (2) 33 (3) 75 (4) 50

Q.68 According to Molecular orbital theory which of the following is correct ?

(1) LUMO level for C_2 molecule is σ_{2p_x} orbital

(2) In C_2 molecules both the bonds are π bonds

(3) In C_2^{2-} ion there is one σ and two π bonds

(4) All the above are correct

Q.69 For BF_3 molecule which of the following is true ?

(1) B-atom is sp^2 hybridised.

(2) There is a $P\pi - P\pi$ back bonding in this molecule.

(3) Observed B–F bond length is found to be less than the expected bond length.

(4) All of these

Q.70 Which of the following has been arranged in order of decreasing dipole moment ?

(1) $CH_3Cl > CH_3F > CH_3Br > CH_3I$ (2) $CH_3F > CH_3Cl > CH_3Br > CH_3I$

(3) $CH_3Cl > CH_3Br > CH_3I > CH_3F$ (4) $CH_3F > CH_3Cl > CH_3I > CH_3Br$

Q.71 In which of the following set of compounds/ions has linear geometry ?

(1) CH_4, NH_4^+, BH_4^- (2) CO_3^{2-}, NO_4^-, BF_3 (3) NO_2^+, CO_2, N_3^- (4) $BeCl_2$, BCl_3, CH_4

Q.72 The bond angle in H_2O is nearly 105° whereas bond angle in H_2S is nearly 92°. This is because :

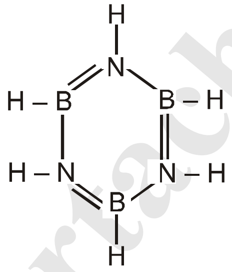
(1) Electronegativity of oxygen is greater than that of sulphur

(2) Oxygen is a gas whereas sulphur is solid

(3) Sulphur contains d-orbitals whereas oxygen does not

(4) The number of lone pairs present on oxygen and sulphur is not equal

Q.73 What are the formal charges on B and N respectively in the given structure?



(1) –1, + 1, (2) + 1, – 1 (3) – 2, + 2 (4) 0, 0

Q.74 Pick out the incorrect statement.

(1) N_2 has greater dissociation energy than N_2^+ (2) O_2 has lower dissociation energy than O_2^+

(3) Bond length in N_2^+ is less than N_2 (4) Bond length in NO^+ is less than in NO.

Q.75 A metal, M foms chlorides in its +2 and +4 oxidation states. Which of the following statements about these chlorides is correct?

(1) MCl_2 is more ionic than MCl_4

(2) MCl_2 is more easily hydrolysed than MCl_4

(3) MCl_2 is more volatile than MCl_4

(4) MCl_2 is more soluble in anhydrous ethanol than MCl_4

ASSERTION AND REASON

Directions : Each of these questions contains an Assertion followed by reason. Read them carefully and answer the question on the basis of following options. You have to select the one that best describes the two statements.

(1) If both assertion and reason are true and reason is the correct explanation of assertion.
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.
(3) If Assertion is true but reason is false.
(4) If both assertion and reason are false.

Q.76 **Assertion :** LiCl exhibits covalent character.
Reason : Lithium is lightest metal.

Q.77 **Assertion :** K_2CO_3 do not gives CO_2 gas on heating.
Reason : Value of ϕ for K^+ is high.

Q.78 **Assertion :** NO^+ is more stable than NO^-.
Reason : NO^+ do not have electrones in antibonding orbitals.

Q.79 **Assertion :** Bond energy of H–H bond is greater than Cl–Cl bond.
Reason : H_2 is more covalent than Cl_2.

Q.80 **Assertion :** p–nitrophenol is more viscous than o-nitrophenol.
Reason : In p-nitrophenol, intermolecular H-bonding occurs.

Q.81 **Assertion :** NF_3 molecule is more polar than NH_3 molecule.
Reason : NF_3 is pyramidal while NH_3 is trigonal planar.

Q.82 **Assertion :** NF_3 molecule is polar.
Reason : N–F bonds are polar.

Q.83 **Assertion :** Nitrogen is inreactive at room temperature but becomes reactive at elevated temperature (on heating or in the presence of catalysts). **[AIIMS-96]**
Reason : In nitrogen molecute, there is extensive delocalization of electrons.

Q.84 **Assertion :** Water is a good solvent for ionic compounds but poor one for covalent compounds.
Reason : Hydration energy of ions releases sufficient to overcome lattice energy and break hydrogen bonds in water while covalent bonded compounds interact so weakly that even van der Waals' forces between molecules of covalent compounds cannot be broken. **[AIIMS-96]**

PREVIOUS YEARS QUESTION

Q.1 Which of the following compounds is not linear ? **[CPMT 1996]**
(1) $SnCl_2$ (2) HCl (3) CO_2 (4) $HgCl_2$

Q.2 Electrovalent compounds are : **[CPMT 1996]**
(1) Good conductor of electricity (2) Polar in nature
(3) Low M.P. and low B.P. (4) Easily available

ANSWER KEY

Q.1	3	Q.2	3	Q.3	1	Q.4	3	Q.5	3	Q.6	2	Q.7	2
Q.8	2	Q.9	2	Q.10	4	Q.11	4	Q.12	1	Q.13	3	Q.14	3
Q.15	4	Q.16	3	Q.17	4	Q.18	3	Q.19	2	Q.20	1	Q.21	3
Q.22	2	Q.23	3	Q.24	1	Q.25	1	Q.26	2	Q.27	4	Q.28	3
Q.29	1	Q.30	1	Q.31	4	Q.32	4	Q.33	3	Q.34	4	Q.35	3
Q.36	3	Q.37	4	Q.38	2	Q.39	4	Q.40	2	Q.41	1	Q.42	3
Q.43	3	Q.44	1	Q.45	1	Q.46	2	Q.47	1	Q.48	3	Q.49	1
Q.50	1	Q.51	1	Q.52	1	Q.53	4	Q.54	2	Q.55	1	Q.56	3
Q.57	4	Q.58	1	Q.59	3	Q.60	1	Q.61	2	Q.62	3	Q.63	2
Q.64	3	Q.65	4	Q.66	4	Q.67	1	Q.68	4	Q.69	4	Q.70	1
Q.71	3	Q.72	1	Q.73	1	Q.74	3	Q.75	1	Q.76	2	Q.77	3
Q.78	3	Q.79	3	Q.80	2	Q.81	4	Q.82	2	Q.83	3	Q.84	1