

Solved Example

Ex.1 The bond order of N_2^- anion is :

- [1] 1 [2] 2 [3] 2.5 [4] 3 **Ans. [3]**

Sol. Out of $15e^-$ in N_2^- , 10 are in bonding MO's and $5e^-$ are in the anti bonding MO's Hence bond order

$$= \frac{1}{2} (10 - 5) = 2.5$$

Ex.2 Bond length of HCl is 1.275 \AA (Charge = 4.8×10^{-10} e.s.u.) if $\mu = 1.02$ D, then HCl is :

- [1] 100% ionic [2] 83% covalent [3] 50% covalent [4] 40% ionic **Ans. [2]**

Sol. % ionic character = $\frac{\text{observed } \mu}{\text{experimental } \mu} \times 100$

$$= \frac{1.02}{1.275 \times 4.8} \times 100$$

$$= 17\% \text{ ionic}$$

$$= 83\% \text{ covalent}$$

Ex.3 The dipole moment of the ammonia molecule is $1.48D$. The length of the dipole is :

- [1] $3.08 \times 10^{-11} \text{ m}$ [2] $5 \times 10^2 \text{ m}$ [3] 308 m [4] None **Ans. [1]**

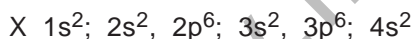
Sol. $M = 1.48 \times 3.33 \times 10^{-30} \text{ cm} = 4.93 \times 10^{-30} \text{ cm}$

$$q = 1.6 \times 10^{-19} \text{ C}$$

$$l = \frac{\mu}{q} = \frac{4.93 \times 10^{-30}}{1.6 \times 10^{-19}} = 3.08 \times 10^{-11} \text{ m} = 0.0308 \text{ nm}$$

The NH_3 molecule can not have the shape of an equilateral triangle because in the case its dipole moment would equal zero. It is actually constructed in the form of a triangular pyramid with the nitrogen atom at its vertex and the hydrogen atoms at the corners of its base.

Ex.4 Two elements X and Y have following electronic configuration :

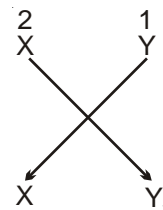


The expected compound formed by combination of X and Y will be expressed as :

- [1] XY_2 [2] X_5Y_2 [3] X_2Y_5 [4] XY_5

Ans. [1]

Sol. Valency of element X is 2 (2 electron in the outermost shell) while that of element Y is (1 electron required in the outermost shell to complete octet). So the formula of the compound between X and Y is XY_2 .



Ex.5 An atom of element A has three electrons in its outer shell and B has six electrons in its outermost shell. The formula of the compound formed between these two will be :

- [1] A_6B_6 [2] A_2B_3 [3] A_3B_2 [4] A_2B **Ans. [2]**

Sol. In this case the valence electron in the atom A is three and hence its valency is generally 3. In the atom B the number of valence electron is six. Hence its valency is usually 2. Hence the formula of the molecule formed from A and B could be A_2B_3 . An example of two such elements are Al and O and the formula of aluminium oxide is Al_2O_3 .

Ex.6 The dipole moment of LiH is $1.964 \times 10^{-29} \text{C} \times \text{m}$ and the interatomic distance between Li and H in this molecule is 1.596\AA . Calculate the percent ionic character in LiH :

- [1] 76.8 [2] 70 [3] 65.5 [4] 72 **Ans. [1]**

Sol. The dipole moment of 100% ionic molecule (Li^+H^-)

= (1 electronic charge) (interatomic distance)

= $(1.602 \times 10^{-19} \text{C}) (1.5963 \times 10^{-10} \text{m}) = 2.557 \times 10^{-29} \text{Cm}$

percentage ionic character = $\frac{\text{Exp. value of dipole moment}}{\text{Theoretical value of dipole moment}}$

$$= \frac{1.964 \times 10^{-29}}{2.557 \times 10^{-29}} = 0.768$$

The bond in LiH is 76.8% ionic.

Ex.7 The total number of valence electrons in 4.2g of N_3^- ion are :

- [1] 2.2 N [2] 4.2 N [3] 1.6 N [4] 3.2 **Ans. [3]**

Sol. 4.2g N_3^- 1.6 N valence electrons.

Ex.8 In which of the following compounds carbon atom undergoes hybridization of more than one type

(i) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ (ii) $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3$

(iii) $\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_3$ (iv) $\text{H}-\text{C}\equiv\text{C}-\text{H}$

- [1] (iii) and (iv) [2] (i) and (iv) [3] (ii) and (iii) [4] Only (ii) **Ans. [3]**

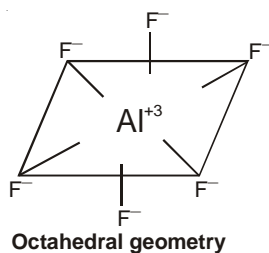
Sol. In (ii) $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3$, the carbon atoms C_1 and C_4 are in sp^3 hybridized while C_2 and C_3 are sp^2 hybridized.

In (iii) $\overset{1}{\text{C}}=\overset{2}{\text{C}}-\overset{3}{\text{C}}-\overset{4}{\text{C}}$, the carbon atoms C_1 and C_2 are in sp^2 while C_3 and C_4 are in sp^3 state of hybridization. In (i) all the carbon atoms are sp^3 hybridized while in (iv) both carbon atoms are in sp state of hybridization.

Ex.9 The geometry of AlF_6^{-3} is as follows :

- [1] Tetrahedral [2] Hexagonal [3] Pyramidal [4] Octahedral **Ans. [4]**

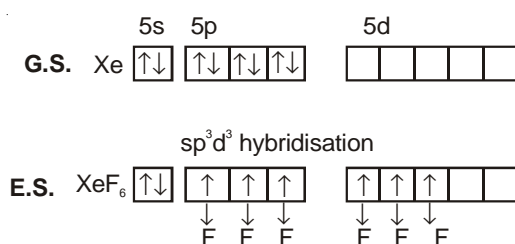
Sol. The geometry of AlF_6^{-3} is octahedral. The type of hybridization is sp^3d^2 . It forms an outer orbital complex. The geometry of AlF_6^{-3} is as follows :



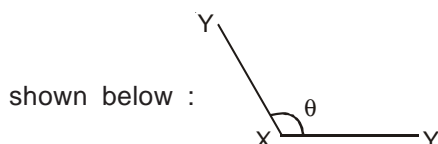
Ex.10 The type of hybridization of Xe in XeF_6 will be the same as that of the central atom in the following molecule :

- [1] PCl_5 [2] SF_6 [3] IF_7 [4] CCl_4 **Ans. [3]**

Sol. The type of hybridisation of Xe in XeF₆ will be sp³d³. The same type of hybridisation is present in IF₇ the geometry of the molecule is pentagonal bipyramidal ;



Ex.11 Which bond angle, θ would result in the maximum dipole moment for the triatomic molecule XY₂



- [1] $\theta = 90^\circ$ [2] $\theta = 120^\circ$ [3] $\theta = 150^\circ$ [4] $\theta = 180^\circ$ **Ans. [1]**

Sol. The value of the resultant increases with decreasing angle θ . The resultant is given by :

$$\mu = \sqrt{\mu_1^2 + \mu_2^2 + 2\mu_1\mu_2 \cos\theta} \quad \mu \text{ is maximum}$$

Value of $\cos\theta$ increases with decreases in angle θ and hence μ (resultant dipole moment) increases.

Ex.12 The order of increasing polarity in HCl, CO₂, H₂O and HF molecules is :

- [1] CO₂, HCl, H₂O, HF [2] HF, H₂O, HCl, CO₂
 [3] CO₂, HCl, HF, H₂O [4] CO₂, HF, H₂O, HCl **Ans. [1]**

Sol. The geometry of CO₂ molecule is linear so the dipole moment of two C–O bonds cancel each other because of opposite directions and CO₂, becomes non polar. In other molecules order of electronegativity of Cl, O and F is Cl < O < F. So polarity order is

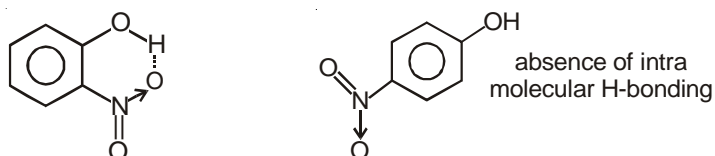
H – F > H – O > H – Cl bonds.

Q.13 Do o-nitrophenol and p-nitrophenol have hydrogen bonding in their molecules ? Explain which of the two has higher boiling point :

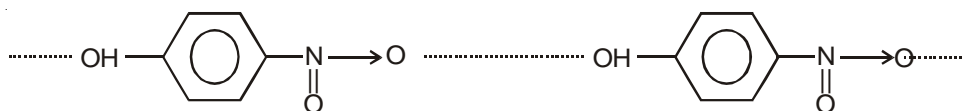
The correct answer is :

- [1] o-Nitrophenol has higher boiling point [2] p-Nitrophenol has higher boiling point
 [3] Both have same boiling point [4] None **Ans. [2]**

Sol. Both have hydrogen bonding. o-Nitrophenol has intramolecular hydrogen bonds. But due to larger distance between –NO₂ and –OH groups in p-nitrophenol, there is no such bonding.



However, there is intermolecular hydrogen bonding in p-nitrophenol and therefore, it exists as associated molecule. In o-nitrophenol, intermolecular hydrogen bonding is possible.



Due to associated nature of p-nitrophenol, it is less volatile and has high boiling point.

Exercise # 1

- Q.1** Which of the following ions does not have pseudo inert gas structure :
- [1] Zn^{2+} [2] Sc^{3+} [3] Ag^+ [4] Cd^{2+}
- Q.2** Amongst the following the molecule that is linear, is :
- [1] CO_2 [2] NO_2 [3] SO_2 [4] SiO_2
- Q.3** The oxide which is most acidic is :
- [1] Bi_2O_3 [2] As_2O_3 [3] P_2O_3 [4] N_2O_3
- Q.4** The compound which has maximum dipole moment is :
- [1] CH_4 [2] $CHCl_3$ [3] CCl_4 [4] CO_2
- Q.5** Which of the following molecules contains covalent, ionic and coordinate bond ?
- [1] NH_4Cl [2] $AlCl_3$ [3] $NaCl$ [4] Cl_2
- Q.6** The order of bond angle in NH_3 , PH_3 and AsH_3 is :
- [1] $NH_3 > PH_3 > AsH_3$ [2] $PH_3 > NH_3 > AsH_3$
 [3] $AsH_3 > PH_3 > NH_3$ [4] $PH_3 = NH_3 < AsH_3$
- Q.7** Which of the following is that molecule whose shape is pyramidal ?
- [1] PCl_3 [2] SO_2 [3] CO_3^{-2} [4] NO_3^-
- Q.8** Which of the following is helpful in making the ionic bond ?
- [1] Small cation [2] Small anion
 [3] Small cation and small anion [4] Low positive charge, large cation and small anion
- Q.9** Out of the following, the most covalent compound is :
- [1] $LiCl$ [2] $LiBr$ [3] LiF [4] LiI
- Q.10** The number of electrons involved in bond formation of N_2 molecule is :
- [1] 2 [2] 4 [3] 6 [4] 10
- Q.11** Which of the following compounds is least ionic :
- [1] $AgCl$ [2] KCl [3] $BaCl_2$ [4] $CaCl_2$
- Q.12** A sp^3 hybrid orbital contains :
- [1] $1/4$ s-character [2] $1/2$ s-character [3] $2/3$ s-character [4] $3/4$ s-character
- Q.13** The bond angle in water molecule is nearly :
- [1] 120° [2] 180° [3] $109^\circ 28'$ [4] $104^\circ 30'$
- Q.14** Variable valency is shown by :
- [1] Typical elements [2] Transition elements [3] Metallic elements [4] Inert elements
- Q.15** Analysis of a compound reveals that it contains oxygen to iodine ratio 80 to 254 g. The atomic mass of iodine is 127 and that of oxygen 16. The formula of the compound is :
- [1] IO [2] I_2O [3] I_5O_2 [4] I_2O_5
- Q.16** Ammonia molecule is formed by the following type of hybrid orbitals :
- [1] dsp^2 [2] sp^3 [3] sp^3d [4] d^2sp

- Q.17** High boiling point of water is due to :
- [1] Weak dissociation of water molecules
 - [2] The presence of hydrogen bond in water molecules
 - [3] High specific heat of water
 - [4] High dielectric constant of water
- Q.18** Chloride of a metal is MCl_2 . The formula of its phosphate will be :
- [1] M_2PO_4
 - [2] $M_3(PO_4)_2$
 - [3] $M(PO_4)_3$
 - [4] MPO_4
- Q.19** Which has highest boiling point ?
- [1] HI
 - [2] HF
 - [3] HBr
 - [4] HCl
- Q.20** Which molecule has linear structure ?
- [1] CO_2
 - [2] NO_2
 - [3] SO_2
 - [4] SiO_2
- Q.21** CO_2 is iso structural with :
- [1] $HgCl_2$
 - [2] $SnCl_2$
 - [3] SO_2
 - [4] NO_2^-
- Q.22** The nature of bonding in graphite is :
- [1] Covalent
 - [2] Ionic
 - [3] Metallic
 - [4] Coordinate
- Q.23** Which has the strongest hydrogen bond ?
- [1] Triethyl amine
 - [2] Ethanol
 - [3] Diethyl ether
 - [4] Acetone
- Q.24** Sulphuric acid contains :
- [1] Only covalent bonds
 - [2] Covalent and ionic bond
 - [3] Covalent and coordinate bonds
 - [4] Covalent, ionic and coordinate bonds
- Q.25** The atomic numbers of three elements L, M and P are Z, Z + 1 and Z + 2 respectively. If P belongs to alkali metal group then the bond present in the compound obtained by the combination of the L and P is :
- [1] Electrovalent
 - [2] Covalent
 - [3] Coordinate
 - [4] Not known
- Q.26** The bond pairs and lone pairs of electrons present in ClF_3 are arranged in the following shape :
- [1] Square pyramidal
 - [2] Trigonal planar
 - [3] T-shaped
 - [4] Octahedral
- Q.27** According to valence bond theory (VBT), O_2 is :
- [1] Paramagnetic
 - [2] Diamagnetic
 - [3] Both of the above
 - [4] None of the above
- Q.28** The central atom of a molecule has 33% s-character. Its geometry will be :
- [1] Planar
 - [2] Pyramidal
 - [3] V-shaped
 - [4] T-shaped
- Q.29** The hydrogen bonding is strongest in :
- [1] $O-H\cdots S$
 - [2] $S-H\cdots O$
 - [3] $F-H\cdots F$
 - [4] $F-H\cdots O$
- Q.30** HCl is a gas where HF is low boiling point liquid. Its reason is :
- [1] H-F bond is a stronger bond
 - [2] H-F bond is a weaker bond
 - [3] HF molecules are associated through hydrogen bonding
 - [4] HF is a weaker acid
- Q.31** The shape of ethylene molecule is :
- [1] Regular tetrahedral
 - [2] Pyramidal
 - [3] Planar
 - [4] Linear

- Q.32** The state of hybridisation of the central metal cation and the geometry of $[\text{Ni}(\text{NH}_3)_4]^{2+}$ ion is :
 [1] dsp^2 and square planar [2] sp^3 and tetrahedral
 [3] sp^3 bipyramidal [4] sp^3 and trigonal
- Q.33** Out of the following compounds which has zero bond order :
 [1] N_2 [2] O_2 [3] F_2 [4] Ne_2
- Q.34** Which one of the following halogens has the highest bond energy ?
 [1] F_2 [2] Cl_2 [3] Br_2 [4] I_2
- Q.35** XeF_6 is :
 [1] Octahedral [2] distorted octahedral [3] Planar [4] Tetrahedral
- Q.36** If a compound has resonance :
 [1] The experimental value of its heat of formation decreases
 [2] The experimental value of its heat of formation increases
 [3] The stability of the compound decreases
 [4] The stability of the compound remains unaffected
- Q.37** In the formation of a chemical bond :
 [1] The potential energy decreases [2] The potential energy increases
 [3] The potential energy remains unaffected [4] Then potential energy first decreases then increases
- Q.38** The maximum number of hydrogen bond formed by a molecule of water in ice is :
 [1] 4 [2] 3 [3] 2 [4] 1
- Q.39** Which one of the following fluorides does not exist ?
 [1] NF_5 [2] PF_5 [3] AsF_5 [4] SbF_5
- Q.40** Which has the maximum number of unpaired electrons ?
 [1] O_2 [2] O_2^+ [3] O_2^- [3] O_2^{2-}
- Q.41** The weakest bond of the following is :
 [1] Ionic bond [2] Covalent bond [3] Hydrogen bond [4] Metallic bond
- Q.42** A molecule is formed by sp^3d^2 hybridisation. Bond angle in it is :
 [1] 90° [2] $109^\circ 28'$ [3] 90° and 120° [4] 120°
- Q.43** When two ice cubes are pressed over each other, they unite to form one cube. Which of the following forces is responsible to hold them together ?
 [1] Hydrogen bond formation [2] van der Waal's force
 [3] Covalent attraction [4] Dipole interaction
- Q.44** The compound with lowest melting point is :
 [1] SnCl_4 [2] KCl [3] AlCl_3 [4] CaCl_2
- Q.45** H_2O is :
 [1] A linear triatomic molecule [2] An angular triatomic molecule
 [3] Both of the above [4] None of the above
- Q.46** Element X is strongly electropositive and element Y is strongly electronegative. Both are univalent. The compound formed would be :
 [1] $\text{X}^+ \text{Y}^-$ [2] $\text{X}^- \text{Y}^+$ [3] $\text{X} - \text{Y}$ [4] $\text{X} \rightarrow \text{Y}$

Q.47 Acetylene molecule contains :

- [1] 5 σ bonds [2] 4 σ and one π bonds
 [3] 3 σ and 2 π bonds [4] 2 σ and 3 π bond

Q.48 PCl_5 exists but NCl_5 does not because :

- [1] Nitrogen atom does not contain empty orbitals
 [2] NCl_5 is unstable
 [3] Nitrogen atom is comparatively smaller in size
 [4] Nitrogen is highly inactive

Q.49 The octet rule is not valid for the molecule :

- [1] CO_2 [2] H_2O [3] CO [4] O_2

Q.50 When NaCl is dissolved in water, the sodium ion becomes :

- [1] Oxidised [2] Reduced [3] Hydrolysed [4] Hydrated

Answer Key - 1

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	1	4	2	1	1	1	4	4	3	1	1	4	2	4	2	2	2	2	1
Qus.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	1	1	2	4	1	3	2	1	3	3	3	1	4	2	2	2	1	1	1	1
Qus.	41	42	43	44	45	46	47	48	49	50										
Ans.	3	1	1	1	2	1	3	1	3	4										

Exercise # 2

- Q.1** The electronic configuration of four elements are given in brackets
 $L(1s^2, 2s^2 2p^1)$; $M(1s^2, 2s^2 2p^5)$; $Q(1s^2, 2s^2 2p^6, 3s^1)$; $R(1s^2, 2s^2 2p^2)$
 The element that would most readily form a diatomic molecule is
 [1] Q [2] M [3] R [4] L
- Q.2** The electronic configuration of four elements L, P, Q and R are given in brackets
 $L(1s^2, 2s^2 2p^4)$; $Q(1s^2, 2s^2 2p^6, 3s^2 3s^5)$; $P(1s^2, 2s^2 2p^6, 3s^1)$; $R(1s^2, 2s^2 2p^6, 3s^2)$
 The formulae of ionic compounds that can be formed between these elements are
 [1] L_2P , RL , PQ and R_2Q [2] LP , RL , PQ and RQ
 [3] P_2L , RL , PQ and RQ_2 [4] LP , R_2L , P_2Q and RQ
- Q.3** In the following which bond will be responsible for maximum value of hydrogen bond
 [1] $O - H$ [2] $N-H$ [3] $S-H$ [4] $F-H$
- Q.4** Which compound is highest covalent
 [1] $LiCl$ [2] LiF [3] $LiBr$ [4] LiI
- Q.5** In $BeCl_2$, which type of hybridization is present in beryllium atom
 [1] sp [2] sp^2 [3] sp^3 [4] sp^3d
- Q.6** In the following metals which one has lowest probable interatomic forces
 [1] Copper [2] Silver [3] Zinc [4] Mercury
- Q.7** Contrary to other hydrogen halides, hydrogen fluoride is a liquid because
 [1] Size of F atom is small [2] HF is weak acid
 [3] HF molecule are hydrogen bonded [4] Fluorine is highly reactive
- Q.8** In the following which molecule or ion possesses electrovalent, covalent and coordinate bond at the same time
 [1] HCl [2] NH_4^+ [3] Cl^- [4] H_2O_2
- Q.9** The nature of bonding in graphite is
 [1] Covalent [2] Ionic [3] Metallic [4] Coordinate
- Q.10** In the following which species does not contain sp^3 hybridization
 [1] NH_3 [2] CH_4 [3] H_2O [4] CO_2
- Q.11** As a result of sp hybridization, we get
 [1] Two mutual perpendicular orbitals [2] Two orbitals at 180°
 [3] Four orbitals in tetrahedral directions [4] Three orbitals in the same plane
- Q.12** The reason for exceptionally high boiling point of water is
 [1] Its high specific heat [2] Its high dielectric constant
 [3] Low ionization of water molecules [4] Hydrogen bonding in the molecules of water
- Q.13** Which one in the following is not the resonance structure of CO_2
 [1] $O = C = O$ [2] $^-O - C \equiv O^+$ [3] $^+O \equiv C - O^-$ [4] $O \equiv C = O$
- Q.14** The bond in the formation of fluorine molecule will be
 [1] Due to s-s overlapping [2] Due to s-p overlapping
 [3] Due to p-p overlapping [4] Due to hybridization

- Q.15** An atom of sodium loses one electron and chlorine atom accepts one electron. This result the formation of sodium chloride molecule. This type of molecule will be
[1] Coordinate [2] Covalent [3] Electrovalent [4] Metallic bond
- Q.16** Silicon carbide (SiC) is
[1] Ionic solid [2] Molecular solid [3] Covalent solid [4] Metallic solid
- Q.17** Which type of overlapping results the formation of a π bond
[1] Axial overlapping of s-s orbitals [2] Lateral overlapping of p-p orbitals
[3] Axial overlapping of p-p orbitals [4] Axial overlapping of s-p orbitals
- Q.18** For the formation of covalent bond, the difference in the value of electronegativities should be
[1] Equal to or less than 1.7 [2] More than 1.7
[3] 1.7 or more [4] None of these
- Q.19** The valency of carbon is four. On what principle it can be explained in a better way
[1] Resonance [2] Hybridization [3] Electron transfer [4] None of the above
- Q.20** Which type of compounds show high melting and boiling points
[1] Electrovalent compounds [2] Covalent compounds
[3] Coordinate compounds
[4] All the three types of compounds have equal melting and boiling points
- Q.21** Each of the following pairs of chemical species will combine. Which of the following combination is best explained by the coordinate covalent bond
[1] $\text{H}_2 + \text{I}_2$ [2] $\text{Mg} + \frac{1}{2} \text{O}_2$ [3] $\text{Cl} + \text{Cl}$ [4] $\text{H}^+ + \text{H}_2\text{O}$
- Q.22** Select the compound from the following which dissolves in water
[1] CCl_4 [2] CS_2 [3] CHCl_3 [4] $\text{C}_2\text{H}_5\text{OH}$
- Q.23** Bond order is a concept in the molecular orbital theory. It depends on the number of electrons in the bonding and anti bonding orbitals. Which of the following statements is true about it ? The bond order
[1] Can have a negative quantity
[2] Has always an integral value
[3] Can assume any positive or integral or fractional value including zero
[4] Is a non zero quantity
- Q.24** Electrovalent compounds do not have
[1] High M.P. and Low B.P. [2] High dielectric constant
[3] High M.P. and High B.P. [4] High polarity
- Q.25** The dipole moment of chlorobenzene is 1.73D. The dipole moment of p-dichlorobenzene is expected to be
[1] 3.46 D [2] 0.00 D [3] 1.73 D [4] 1.00 D
- Q.26** The bond order of NO molecule is
[1] 1 [2] 2 [3] 2.5 [4] 3

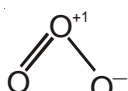

- Q.27** When two atomic orbitals combine they form
[1] One molecular orbital [2] Two molecular orbital
[3] Three molecular orbital [4] Four molecular orbital
- Q.28** The shape of H_3O^+ ion is
[1] Linear [2] Angular [3] Trigonal planar [4] Triangular pyramidal
- Q.29** Compound formed by sp^3d hybridization will have structure
[1] Planar [2] Pyramidal [3] Angular [4] Trigonal bipyramidal
- Q.30** Which of the molecules is of V-shaped
[1] SO_2 [2] C_2H_2 [3] SnCl_4 [4] CO_2
- Q.31** Which of the following statement is not correct
[1] Hybridization is the mixing of atomic orbitals prior to their combining into molecular orbitals
[2] sp^2 hybrid orbitals are formed from two p atomic orbitals and one s atomic orbital
[3] d^2sp^3 hybrid orbitals are directed towards the corners of a regular octahedron
[4] dsp^3 hybrid orbitals are all at 90° to one another
- Q.32** The structure of $[\text{Cu}(\text{H}_2\text{O})_4]^{++}$ ion is
[1] Square planar [2] Tetrahedral [3] Distorted rectangle [4] Octahedral
- Q.33** Molecular orbital theory was developed mainly by
[1] Pauling [2] Pauling and Slater [3] Mulliken [4] Thomson
- Q.34** The bond order of a molecule is given by
[1] The difference between the number of electrons in bonding and anti bonding orbitals
[2] Total number of electrons in bonding and anti bonding orbitals
[3] Twice the difference between the number of electrons in bonding and anti bonding electrons
[4] Half the difference between the number of electrons in bonding and anti bonding electrons
- Q.35** Oxygen molecule is paramagnetic because
[1] Bonding electrons are more than anti bonding electrons
[2] Contains unpaired electrons
[3] Bonding electrons are less than anti bonding electrons
[4] Bonding electrons are equal to anti bonding electrons
- Q.36** The bond order in N_2^+ ion is
[1] 1 [2] 2 [3] 2.5 [4] 3
- Q.37** In which of the following the central atom does not use sp^3 hybrid orbitals in its bonding
[1] BeF_3^- [2] OH_3^+ [3] NH_2^- [4] NF_3
- Q.38** The sp^3d^2 hybridisation of the central atom of a molecule would lead to
[1] Square planar geometry [2] Tetrahedral geometry
[3] Trigonal bipyramidal geometry [4] Octahedral geometry

- Q.39** Which of the following occurs when two hydrogen atoms bond with each others
 [1] Potential energy is lowered [2] Kinetic energy is lowered
 [3] Electronic motion ceases [4] Energy is absorbed
- Q.40** XeF₂ involves hybridisation
 [1] sp³ [2] sp³d [3] sp³d² [4] None of these
- Q.41** A set of molecular orbitals which is degenerate
 [1] π_y2p and π^x2p [2] π_y2p and π_z^x2p [3] π_y2p and π_z2p [4] σ1s and σ2s
- Q.42** Which molecular orbital in N₂ has least energy
 [1] π2p_y [2] σ2p_z [3] σ2s [4] π^x2p_x
- Q.43** Which molecule has the highest bond order
 [1] N₂ [2] Li₂ [3] He₂ [4] O₂
- Q.44** The molecular electronic configuration of H₂⁻ ion is
 [1] (σ1s)² [2] (σ1s)²(σ^x1s)² [3] (σ1s)²(σ^x1s)¹ [4] (σ1s)³
- Q.45** Octahedral molecular shape exists inhybridisation
 [1] sp³d [2] sp³d² [3] sp³d³ [4] None of these
- Q.46** Energy required to dissociate 4gm of gaseous hydrogen into free gaseous atoms is 208 kcal at 25°C. The bond energy of H-H bond will be
 [1] 104 kcal [2] 10.4 kcal [3] 1040 kcal [4] 1.04 kcal

Answer Key - 2

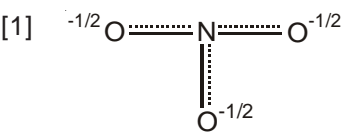
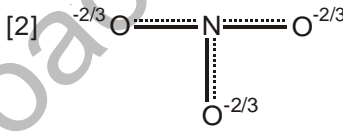
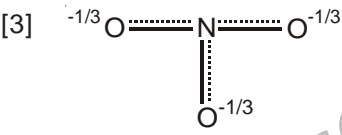
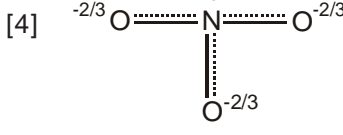

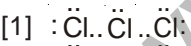
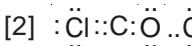
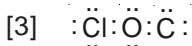
Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	3	4	4	1	4	3	2	1	4	2	4	4	3	3	3	2	1	2	1
Qus.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	4	4	3	1	2	3	2	4	4	1	4	1	3	4	2	3	1	4	1	2
Qus.	41	42	43	44	45	46														
Ans.	3	3	1	3	2	1														

Exercise # 3

- 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
- Q.3** Atomic number of an element is 26. The element shows : [CPMT 1996]
 [1] Ferromagnetism [2] Diamagnetism [3] Paramagnetism [4] None of these
- Q.4** Among the following compounds, the one that is polar and has the central atom with sp^2 hybridisation is : [IIT 1997]
 [1] H_2CO_3 [2] SiF_4 [3] BF_3 [4] HClO_2
- Q.5** Which one of the following is having zero dipole moment : [RPMT 1997]
 [1] CCl_4 [2] CH_3Cl [3] CH_3F [4] CHCl_3
- Q.6** The correct order towards bond angle is : [RPMT 1997]
 [1] $\text{sp} < \text{sp}^2 < \text{sp}^3$ [2] $\text{sp}^2 < \text{sp} < \text{sp}^3$
 [3] $\text{sp}^3 < \text{sp}^2 < \text{sp}$ [4] Bond angle does not depend on hybridisation
- Q.7** Which bond is strongest : [RPMT 1997]
 [1] F-F [2] Br-F [3] Cl-F [4] I-F
- Q.8** Which compound has dipole moment : [RPMT 1997]
 [1] CCl_4 [2] BF_3 [3] CO_2 [4] NH_3
- Q.9** Which has weakest bond : [RPMT 1997]
 [1] Diamond [2] Neon (Solid) [3] KCl [4] Ice
- Q.10** Which has a coordinate bond : [RPMT 1997]
 [1] SO_3^{2-} [2] CH_4 [3] CO_2 [4] NH_3
- Q.11** The geometry and the type of hybrid orbital present about the central atom in BF_3 is : [IIT 98; BHU 01]
 [1] Linear, sp [2] Trigonal planar, sp^2
 [3] Tetrahedral, sp^3 [4] Pyramidal, sp^3
- Q.12** Assertion : The electronic structure of O_3 is  [IIT 1998]
 Reason :  structure is not allowed because octet around O cannot be expanded.
- [1] Both assertion and reason are correct and reason is the correct explanation of assertion
 [2] Both assertion and reason are correct but reason is not the correct explanation of assertion
 [3] Assertion is correct but reason is incorrect
 [4] Assertion is incorrect but reason is correct
- Q.13** Which of the following have both polar and nonpolar bonds : [AIIMS 1997]
 [1] C_2H_6 [2] NH_4Cl [3] HCl [4] AlCl_3
- Q.14** Which of the following is not paramagnetic : [AIIMS 1997]
 [1] S^{-2} [2] N_2^- [3] O_2^- [4] NO

- Q.15** Which one of the following shows bond in silica : [CPMT 1997]
- [1] $\begin{array}{c} | & & | \\ \text{—Si—O—Si—O—Si—} \\ | & & | \end{array}$ [2] Si—C—Si—O—Si [3] Si—C—Si—C—Si [4] Si—Si—Si—Si
- Q.16** The number of electrons shared by each outer most shell of N_2 is : [AFMC 1998]
- [1] 2 [2] 3 [3] 4 [4] 5
- Q.17** Ethanol and dimethyl ether form a pair of functional isomers. The boiling point of ethanol is higher than that of dimethyl ether due to the presence of : [AIIMS 1998]
- [1] Hydrogen bonding in ethanol [2] Hydrogen bonding in dimethyl ether
[3] CH_3 group in ethanol [4] CH_3 group in dimethyl ether
- Q.18** When the hybridisation state of carbon atom changes from sp^3 to sp^2 to sp , the angle between the hybridised orbitals : [AIIMS 1998]
- [1] Decreases gradually [2] Increases gradually
[3] Decreases considerably [4] All of these
- Q.19** The compound containing coordinate bond is : [AFMC 1999]
- [1] O_3 [2] SO_3 [3] H_2SO_4 [4] All of these
- Q.20** CO_3^{2-} anion has which of the following characteristics : [Roorkee 1999]
- [1] Bonds of unequal length [2] sp^2 hybridization of C atom
[3] Resonance stabilization [4] Same bond angles
- Q.21** The correct order of dipole moment is : [Roorkee 1999]
- [1] $\text{CH}_4 < \text{NF}_3 < \text{NH}_3 < \text{H}_2\text{O}$ [2] $\text{NF}_3 < \text{CH}_4 < \text{NH}_3 < \text{H}_2\text{O}$
[3] $\text{NH}_3 < \text{NF}_3 < \text{CH}_4 < \text{H}_2\text{O}$ [4] $\text{H}_2\text{O} < \text{NH}_3 < \text{NF}_3 < \text{CH}_4$
- Q.22** Which of the following hydrides are ionic : [Roorkee 1999]
- [a] CaH_2 [b] BaH_2 [c] SrH_2 [d] BeH_2
- Correct answer is
- [1] a,b,c [2] a,b,c,d [3] b,c [4] b,c,d
- Q.23** Highest melting point would be of : [RPMT 1999]
- [1] He [2] CsCl [3] NH_3 [4] CHCl_3
- Q.24** Maximum covalent character is associated with the compound : [RPMT 1999]
- [1] NaI [2] MgI_2 [3] AlCl_3 [4] AlI_3
- Q.25** According to Fajjan's rule, covalent bond is favoured by : [AIIMS 1999]
- [1] Large cation and small anion [2] Large cation and large anion
[3] Small cation and large anion [4] Small cation and small anion
- Q.26** **Assertion (A)** : A resonance hybrid is always more stable than any of its canonical structures.
Reason (R) : This stability is due to delocalization of electrons [AIIMS 1999]
- [1] Both A and R are true and R is a correct explanation of A
[2] Both A and R are true but R is not a correct explanation of A
[3] A is true but R is false
[4] Both A and R are false
- Q.27** **Assertion (A)** : Bond order can assume any value number including zero [AIIMS 1999]
Reason (R) : Higher the bond order, shorter is bond length and greater is bond energy
- [1] Both A and R are true and R is a correct explanation of the A
[2] Both A and R are true but R is not a correct explanation of the A
[3] A is true but R is false
[4] Both A and R are false

- Q.28 Assertion (A) :** Ortho nitrophenol molecules are associated due to the presence of intermolecular hydrogen bonding while paranitrophenol involves intramolecular, hydrogen bonding
Reason (R) : Ortho nitrophenol is more volatile than the para nitrophenol [AIIMS 1999]
 [1] Both A and R are true and R is a correct explanation of A
 [2] Both A and R are true but R is not a correct explanation of A
 [3] A is true but R is false
 [4] A is false but R is true
- Q.29** Which compound does not possess linear geometry [RPET1999]
 [1] $\text{CH}_2 = \text{CH}_2$ [2] $\text{HC} \equiv \text{CH}$ [3] BeCl_2 [4] CO_2
- Q.30** Which of the following molecule does not show tetrahedral shape [RPET1999]
 [1] CCl_4 [2] SiCl_4 [3] SF_4 [4] CF_4
- Q.31** Which molecule does not show zero dipole moment [RPET1999]
 [1] BF_3 [2] NH_3 [3] CCl_4 [4] CH_4
- Q.32** The shape of CH_3^+ species is [RPET1999]
 [1] Tetrahedral [2] Square planar [3] Trigonal planar [4] Linear
- Q.33** Hybridisation state of chlorine in ClF_3 is [RPET1999]
 [1] sp^3 [2] sp^3d [3] sp^3d^2 [4] sp^3d^3
- Q.34** Pyramidal shape would be of [RPET1999]
 [1] NO_3^- [2] H_2O [3] H_3O^+ [4] NH_4^+
- Q.35** Which of the following exhibits the weakest intermolecular forces [AIIMS1999]
 [1] He [2] HCl [3] NH_3 [4] H_2O
- Q.36** The hybridization of atomic orbitals of nitrogen in NO_2^+ , NO_3^- and NH_4^+ are [IIT 2000]
 [1] sp , sp^3 and sp^2 respectively [2] sp , sp^2 and sp^3 respectively
 [3] sp^2 , sp and sp^3 respectively [4] sp^2 , sp^3 and sp respectively
- Q.37** Molecular shapes of SF_4 , CF_4 and XeF_4 are [IIT 2000]
 [1] The same with 2, 0 and 1 lone pairs of electrons respectively
 [2] The same, with 1, 1 and 1 lone pairs of electrons respectively
 [3] Different, with 0, 1 and 2 lone pairs of electrons respectively
 [4] Different, with 1, 0 and 2 lone pairs of electrons respectively
- Q.38** The dipole moment of diatomic molecule AB is 0.98 D and its experimental value is 1.4 D. The covalent character of molecule is
 [1] 20 [2] 10 [3] 30 [4] 70
- Q.39** In which of the following pairs the two molecules have identical bond order [MPPMT 2000]
 [1] N_2 , O_2^{2+} [2] N_2 , O_2^- [3] N_2^- , O_2 [4] O_2^+ , N_2
- Q.40** Which of the following is not conduct electricity in the fused state [Roorkee 2000]
 [1] BeCl_2 [2] MgCl_2 [3] SrCl_2 [4] BaCl_2
- Q.41** The order of dipole moments of the following molecules is [Roorkee 2000]
 [1] $\text{CHCl}_3 > \text{CH}_2\text{Cl}_2 > \text{CH}_3\text{Cl} > \text{CCl}_4$ [2] $\text{CH}_2\text{Cl}_2 > \text{CH}_3\text{Cl} > \text{CHCl}_3 > \text{CCl}_4$
 [3] $\text{CH}_3\text{Cl} > \text{CH}_2\text{Cl}_2 > \text{CHCl}_3 > \text{CCl}_4$ [4] $\text{CH}_2\text{Cl}_2 > \text{CHCl}_3 > \text{CH}_3\text{Cl} > \text{CCl}_4$
- Q.42** How many π -bonds are there in a nitrogen molecule [RPMT 2000]
 [1] One [2] Two [3] Three [4] Zero

- Q.43** The geometry of the molecule with sp^3d^2 hybridised central atom is [RPMT 2000]
 [1] Square planar [2] Trigonal bipyramidal
 [3] Octahedral [4] Square pyramidal
- Q.44** The bond angle in PH_3 is [RPMT 2000]
 [1] Much less than NH_3 [2] Equal to that of NH_3
 [3] Much greater than NH_3 [4] Slightly greater than NH_3
- Q.45** Choose the correct statement [RPMT 2000]
 [1] Amino polarizations is more pronounced by highly charged cation
 [2] Small cation has minimum capacity to polarize an anion.
 [3] Small anion has maximum polarizability
 [4] None of these
- Q.46** Which type of bonding exists in Li_2O and CaF_2 respectively [RPET 2000]
 [1] Ionic, Ionic [2] Ionic, covalent [3] Covalent, ionic [4] Coordinate, ionic
- Q.47** Nonpolar solvent is [RPET 2000]
 [1] Dimethyl sulphoxide [2] Carbon tetrachloride
 [3] Ammonia [4] Ethyl alcohol
- Q.48** Glycerol has strong intermolecular bonding therefore it is [RPET 2000]
 [1] Sweet [2] Reactive [3] Explosive [4] Viscous
- Q.49** Resonance hybrid of nitrate ion is [RPET 2000]
- [1] 
- [2] 
- [3] 
- [4] 
- Q.50** The electronic configuration of $COCl_2$ is [RPET 2000]
- 
- [1]  [2]  [3]  [4] None of these
- Q.51** Which of the following has tetrahedral structure [CPMT 2000]
 [1] CO_3^{2-} [2] NH_4^+ [3] $K_4[Fe(CN)_6]$ [4] None of these
- Q.52** Which of the following is the correct reducing order of bond-angle [BHU 2000]
 [1] $NH_3 < CH_4 < C_2H_2 < H_2O$ [2] $C_2H_2 > NH_3 > H_2O < CH_4$
 [3] $NH_3 > H_2O > CH_4 < C_2H_2$ [4] $H_2O < NH_3 > CH_4 < C_2H_2$
- Q.53** The correct order of the O–O bond length in O_2 , H_2O_2 and O_3 is [BHU 2000]
 [1] $O_2 > O_3 > H_2O_2$ [2] $O_3 > H_2O_2 > O_2$ [3] $O_2 > H_2O_2 > O_3$ [4] $H_2O_2 > O_3 > O_2$
- Q.54** An atom with atomic number 20 is most likely to combine chemically with the atom whose atomic number is [BHU 2000]
 [1] 11 [2] 14 [3] 16 [4] 10
- Q.55** Bond formed in crystal by anion and cation is [CBSE 2000]
 [1] Ionic [2] Metallic [3] Covalent [4] Dipole

- Q.56** The single, double and triple bond lengths of carbon in carbon dioxide are respectively
 [1] 1.15, 1.22 and 1.10Å [2] 1.22, 1.15 and 1.10Å
 [3] 1.10, 1.15 and 1.22 Å [4] 1.15, 1.10 and 1.22 Å [AIIMS 2000]
- Q.57** Shape of BF_3 molecule is [CPMT 2001]
 [1] Linear [2] Planar [3] Tetrahedral [4] Square pyramidal
- Q.58** The correct order of hybridization of the central atom in the following species NH_3 , $[\text{PtCl}_4]^{2-}$, PCl_5 and BCl_3 is [IIT 2001]
 [1] dsp^2 , dsp^3 , sp^2 and sp^3 [2] sp^3 , dsp^2 , dsp^3 , sp^2
 [3] dsp^2 , sp^2 , sp^3 , dsp^3 [4] dsp^2 , sp^3 , sp^2 , dsp^3
- Q.59** The common features among the species CN^- , CO and NO^+ are [IIT 2001]
 [1] Bond order three and isoelectronic [2] Bond order three and weak field ligands
 [3] bond order two and π -acceptors [4] Isoelectronic and weak field ligands
- Q.60** The number of S–S bonds in sulphur trioxide trimer (S_3O_9) is [IIT 2001]
 [1] Three [2] Two [3] One [4] Zero
- Q.61** Which of the following pairs has same structure [BHU 2001]
 [1] PH_3 and BCl_3 [2] SO_2 and NH_3 [3] PCl_5 and SF_6 [4] NH_4^+ and SO_4^{2-}
- Q.62** Which of the following is a polar compound [AIIMS 2001]
 [1] HF [2] HCl [3] HNO_3 [4] H_2SO_4
- Q.63** The smallest bond angle is found in [AIIMS 2001]
 [1] IF_7 [2] CH_4 [3] BeF_2 [4] BF_3
- Q.64** **Assertion (A)** : Diborane is electron deficient [AIIMS 2001]
Reason (R) : There are no enough valence electrons to form the expected number of covalent bonds
 [1] Both A and R are true and R is a correct explanation of A
 [2] Both A and R are true but R is not a correct explanation of A
 [3] A is true but R is false
 [4] Both A and R are false
- Q.65** The bond order is not three for [CBSE 2001]
 [1] N_2^+ [2] O_2^{2+} [3] N_2 [4] NO^+
- Q.66** Which of the following has $\text{p}\pi\text{-d}\pi$ bonding [CBSE 2002]
 [1] NO_3^- [2] CO_3^{2-} [3] BO_3^{3-} [4] SO_3^{2-}
- Q.67** In H_2O_2 molecule, the angle between the two O–H planes is [CBSE 2002]
 [1] 90° [2] 101° [3] 103° [4] 105°
- Q.68** As the s-character of hybridisation orbital increases, the bond angle [BHU 2002; RPMT 2002]
 [1] Increases [2] Decreases [3] Becomes zero [4] Does not change
- Q.69** Which of the following has the highest dipole moment [AIIMS 2002]
- [1] $\begin{array}{c} \text{H} \\ \diagdown \\ \text{C}=\text{O} \\ \diagup \\ \text{H} \end{array}$ [2] $\begin{array}{cc} \text{H} & \text{CH}_3 \\ | & | \\ \text{C} & = & \text{C} \\ | & | \\ \text{CH}_3 & \text{H} \end{array}$ [3] $\begin{array}{cc} \text{CH}_3 & \text{H} \\ | & | \\ \text{C} & = & \text{C} \\ | & | \\ \text{CH}_3 & \text{H} \end{array}$ [4] $\begin{array}{cc} \text{Cl} & \text{CH}_3 \\ | & | \\ \text{C} & = & \text{C} \\ | & | \\ \text{CH}_3 & \text{Cl} \end{array}$

- Q.70** Which of the following arrangement of molecules is correct on the basis of their dipole moments
 [1] $\text{BF}_3 > \text{NF}_3 > \text{NH}_3$ [2] $\text{NF}_3 > \text{BF}_3 > \text{NH}_3$
 [3] $\text{NH}_3 > \text{BF}_3 > \text{NF}_3$ [4] $\text{NH}_3 > \text{NF}_3 > \text{BF}_3$ [AIIMS 2002]
- Q.71** Which of the following molecule has highest bond energy [AIIMS 2002]
 [1] F – F [2] C – C [3] N – N [4] O – O
- Q.72** Number of sigma bonds in one of its resonance structure of P_4O_{10} is [AIEEE 2002]
 [1] 6 [2] 7 [3] 17 [4] 18
- Q.73** Which of the following statements is true [AIEEE 2002]
 [1] HF is less polar than HBr [2] Absolutely pure water does not contain any ions
 [3] Chemical bond formation take place when forces of attraction overcome the forces of repulsion
 [4] In covalency transference of electron takes place
- Q.74** In which of the following species is the interatomic bond angle is $109^\circ 28'$ [AIEEE 2002]
 [1] NH_4^+ , BF_4^- [2] $(\text{NH}_4)^+$, BF_3 [3] NH_3 , BF_4 [4] $(\text{NH}_2)^-$, BF_3
- Q.75** The energy that opposes dissolution of a solvent is [CPMT 2002]
 [1] Hydration energy [2] Lattice energy [3] Internal energy [4] Bond energy
- Q.76** Which of the following is weakest bond [CPMT 2002]
 [1] Ionic [2] Covalent [3] Metallic [4] van der Waal
- Q.77** The bond angle of water is 104.5° due to [CPMT 2002]
 [1] Repulsion between lone pair and bond pair [2] sp^3 hybridization of O
 [3] Bonding of H_2O [4] Higher electronegativity of O
- Q.78** Which of the following is correct for N_2 triple bond [CPMT 2002]
 [1] 3σ [2] 1π , 2σ [3] 2π , 1σ [4] 3π
- Q.79** Coordinate bond is absent in [RPMT 2002]
 [1] BH_4^- [2] CO_3^{2-} [3] H_3O^+ [4] NH_4^+
- Q.80** The values of electronegativity of atoms A and B are 1.20 and 4.0 respectively. The percentage of ionic character of A–B bond is [MP PET 2003]
 [1] 50% [2] 43% [3] 55.3% [4] 72.24%
- Q.81** The bond energies of H–H and Cl–Cl are 430 kJ mol^{-1} and 242 kJ mol^{-1} respectively, ΔH for HCl is 91 kJ mol^{-1} . The bond energy of HCl will be [MP PET 2003]
 [1] 427 kJ [2] 766 kJ [3] 285 kJ [4] 245 kJ
- Q.82** Which of the following has dsp^2 hybridization [MP PET 2003]
 [1] NiCl_4^{2-} [2] SCl_4 [3] NH_4^+ [4] PtCl_4^{2-}
- Q.83** Which of the following compounds has coordinate (dative) bond [RPET 2003]
 [1] CH_3NC [2] CH_3OH [3] CH_3Cl [4] NH_3
- Q.84** Which of the following have highest melting points [RPET 2003]
 [1] Alkali metals [2] Transitional metals
 [3] Alkaline earth metals [4] All of these

- Q.85** True order of bond angle is [RPET 2003]
 [1] $\text{H}_2\text{O} > \text{H}_2\text{S} > \text{H}_2\text{Se} > \text{H}_2\text{Te}$ [2] $\text{H}_2\text{Te} > \text{H}_2\text{Se} > \text{H}_2\text{S} > \text{H}_2\text{O}$
 [3] $\text{H}_2\text{S} > \text{H}_2\text{O} > \text{H}_2\text{Se} > \text{H}_2\text{Te}$ [4] $\text{H}_2\text{O} > \text{H}_2\text{S} > \text{H}_2\text{Te} > \text{H}_2\text{Se}$
- Q.86** Which of the following has highest melting point [RPET 2003]
 [1] BeCl_2 [2] MgCl_2 [3] CaCl_2 [4] BaCl_2
- Q.87** Which of the following compounds doesn't have linear structure [RPET 2003]
 [1] CO_2 [2] SO_2 [3] BeCl_2 [4] C_2H_2
- Q.88** Which of the following compounds has least dipole moment [RPET 2003]
 [1] PH_3 [2] CHCl_3 [3] NH_3 [4] BF_3
- Q.89** Which of the following statements is not true for ionic compounds [RPET 2003]
 [1] High melting point [2] Least lattice energy
 [3] Least solubility in organic compounds [4] Soluble in water
- Q.90** Which of the following is Lewis acid [RPET 2003]
 [1] BF_3 [2] NH_3 [3] PH_3 [4] SO_2
- Q.91** Water has high boiling point because [CPMT 2003]
 [1] It has higher molecular weight [2] It has more lattice energy
 [3] It is weak acid [4] It associated with hydrogen bonding
- Q.92** H_2O is a liquid while H_2S is gas due to [BHU 2003]
 [1] Covalent bonding [2] Molecular attraction
 [3] H-bonding [4] H-bonding and molecular attraction
- Q.93** Isoelectronic species are [BHU 2003]
 [1] N^{3-} , O^{2-} [2] Na^+ , Ca^{2+} [3] O^{2-} , C^{2-} [4] K^+ , Na^+
- Q.94** H-bonding is maximum in [BHU 2003]
 [1] $\text{C}_6\text{H}_5\text{OH}$ [2] $\text{C}_6\text{H}_5\text{COOH}$ [3] $\text{CH}_3\text{CH}_2\text{OH}$ [4] CH_3COCH_3
- Q.95** Diamond exists as [BHU 2003]
 [1] Planar [2] Octahedral [3] Tetrahedral [4] None of these
- Q.96** CO is isoelectronic with [AFMC 2003]
 [1] NH_3 [2] N_2 [3] O_2 [4] NO_2
- Q.97** The structure of H_2O_2 is [AFMC 2003]
 [1] Planar [2] Non-planar [3] Linear [4] Three dimensional
- Q.98** The correct order of bond angle (smallest first) in H_2S , NH_3 , BF_3 and SiH_4 is- [AIEEE 2004]
 [1] $\text{H}_2\text{S} < \text{NH}_3 < \text{BF}_3 < \text{SiH}_4$ [2] $\text{NH}_3 < \text{H}_2\text{S} < \text{SiH}_4 < \text{BF}_3$
 [3] $\text{H}_2\text{S} < \text{NH}_3 < \text{SiH}_4 < \text{BF}_3$ [4] $\text{H}_2\text{S} < \text{SiH}_4 < \text{NH}_3 < \text{BF}_3$
- Q.99** The bond order in NO is 2.5 while that in NO^+ is 3. Which of the following statements is true for these two species ? [AIEEE 2004]
 [1] Bond length is unpredictable
 [2] Bond length in NO is greater than in NO^+
 [3] Bond length in NO^+ is equal to that in NO
 [4] Bond length in NO^+ is greater than in NO

- Q.100** Which of the following has the regular tetrahedral structure ? [AIEEE 2004]
 [1] $[\text{Ni}(\text{CN})_4]^{-2}$ [2] SF_4 [3] BF_4^- [4] XeF_4
- Q.101** Which of the following molecules has trigonal planer geometry ? [CPMT 2005]
 [1] IF_3 [2] PCl_3 [3] NH_3 [4] BF_3
- Q.102** Which chloride is formed by an element X whose atoms have the electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2$? [VITEEE 2005]
 [1] X_2Cl [2] XCl [3] XCl_2 [4] XCl_3
- Q.103** Which one of the following species is diamagnetic in nature ? [AIEEE 2005]
 [1] H_2 [2] He_2^+ [3] H_2^- [4] H_2^+
- Q.104** Lattice energy of an ionic compound depends upon [AIEEE 2005]
 [1] Size of the ion only [2] Charge on the ion only
 [3] Charge on the ion and size of the ion [4] Packing of ions only
- Q.105** The molecular shapes of SF_4 , CF_4 and XeF_4 are [AIEEE 2005]
 [1] the same with 1, 1 and 1 lone pair of electrons on the central atoms respectively
 [2] the same with 2, 0 and 1 lone pairs of electrons on the central atom, respectively
 [3] different with 1, 0 and 2 lone pairs of electrons on the central atom, respectively
 [4] different with 0, 1 and 2 lone pairs of electrons on the central atom, respectively
- Q.106** The number and type of bonds between two carbon atoms in calcium carbide are [AIEEE 2005]
 [1] $1\sigma, 2\pi$ [2] $1\sigma, 1\pi$ [3] $2\sigma, 2\pi$ [4] $2\sigma, 1\pi$
- Q.107** Which of the following hydrogen bonds is the strongest? [AIEEE 2007]
 [1] $\text{O} - \text{H} \cdots \text{O}$ [2] $\text{O} - \text{H} \cdots \text{F}$ [3] $\text{O} - \text{H} \cdots \text{N}$ [4] $\text{F} - \text{H} \cdots \text{F}$
- Q.108** Which of the following species exhibits the diamagnetic behaviour? [AIEEE 2007]
 [1] O_2 [2] NO [3] O_2^{2-} [4] O_2^+

Answer Key - 3

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	1	2	1	1	1	3	1	4	4	1	2	2	2	1	1	2	1	2	4	2
Qus.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	1	1	2	4	3	1	2	4	1	3	2	3	2	3	1	2	4	3	1	1
Qus.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	4	2	3	1	1	1	2	4	3	1	2	2	4	3	1	2	2	2	1	4
Qus.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Ans.	4	1	1	1	1	4	1	1	1	4	2	4	3	1	2	4	1	3	2	4
Qus.	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Ans.	4	4	1	2	1	4	2	4	2	1	4	3	1	3	3	2	2	3	2	3
Qus.	101	102	103	104	105	106	107	108												
Ans.	4	3	1	3	3	1	4	3												