# ©゙doubtnut 

## CHEMISTRY

# BOOKS - VK JAISWAL CHEMISTRY (HINGLISH) 

## CHEMICAL BONDING (ADVANCED)

1. On decreasing intermoleculer distance below, the optimum distnace (where potential energy is minimum), there is sleep increase in potential energy due to:
A. Increase in force of attraction between electrons and nucleus
B. Increase in stability of bonded atoms
C. Equal probability of fining bonding electrons near to either of
D. Increase in interelectronic and internuclear repulsion

## Answer: D

## - Watch Video Solution

2. Identify the correct sequence of increasing number of $\pi$-bonds in the structure of the following molecules:
(I) $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{6}$ (II) $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{3}$ (III) $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{~S}_{5}$
A. I, II and III
B. II, I and III
C. II, III and I
D. I, III and II

## Answer: C

## - Watch Video Solution

3. $\mathrm{C}_{2} \mathrm{H}_{2}$ is isostructural with
A. $\mathrm{H}_{2} \mathrm{O}_{2}$
B. $\mathrm{NO}_{2}$
C. $\mathrm{SnCl}_{2}$
D. $\mathrm{CO}_{2}$

## Answer: D

## - Watch Video Solution

4. The shapes of nitrite and nitrile respectively are:
A. Linear and angular
B. Angular and linear
C. Both angular
D. Both linear

## Answer: B

## - Watch Video Solution

5. Linear structure is assumed by:
(I) $\mathrm{NCO}^{-}$(II) $\mathrm{CS}_{2}$ (III) $\mathrm{NO}_{2}$ (IV)Solid $\mathrm{BeH}_{2}$
A. all four
B. (II), (III) and (IV)
C. (I), (II) and (III)
D. (II) and (III)

## Answer: C

## D Watch Video Solution

6. Among the oxides of nitrogen $\mathrm{N}_{2} \mathrm{O}, \mathrm{NO}$ and $\mathrm{NO}_{2}$, molecules with unpaired electrons are:
A. $\mathrm{N}_{2} \mathrm{O}$ and NO
B. NO and $\mathrm{NO}_{2}$
C. $\mathrm{N}_{2} \mathrm{O}$ and $\mathrm{NO}_{2}$
D. $\mathrm{NO}_{2}$ and Its dimer

## Answer: B

## - Watch Video Solution

7. Which of the following pair consists of only network solid?
A. $\mathrm{SiO}_{2}, P_{4} O_{10}$
B. $\mathrm{P}_{4} \mathrm{O}_{10}, \mathrm{SO}_{3}$
C. $P_{3} O_{10}, P_{4} O_{6}$
D. Diamond, $\mathrm{SiO}_{2}$

## Answer: D

8. Which of the following ions does not have S-S linkage?
A. $\mathrm{S}_{2} \mathrm{O}_{8}^{2-}$
B. $\mathrm{S}_{2} \mathrm{O}_{6}^{2-}$
C. $\mathrm{S}_{2} \mathrm{O}_{5}^{2-}$
D. $\mathrm{S}_{2} \mathrm{O}_{3}^{2-}$

## Answer: A

## - Watch Video Solution

9. Among $\mathrm{KO}_{2}, \mathrm{KAlO}_{2}, \mathrm{CaO}_{2}$ and $\mathrm{NO}_{2}^{+}$, unpaired electrons is present in :
A. $\mathrm{NO}_{2}^{+}$and $\mathrm{CaO}_{2}$
B. $\mathrm{KO}_{2}$ and $\mathrm{KAlO}_{2}$
C. $\mathrm{KO}_{2}$ only
D. $\mathrm{CaO}_{2}$ only

Answer: C

## - Watch Video Solution

10. Structure of $\mathrm{S}_{2} \mathrm{Cl}_{2}$ is analogous to :
A. $\mathrm{SOCl}_{2}$
B. $\mathrm{CO}_{2}$
C. $\mathrm{H}_{2} \mathrm{~S}$
D. $\mathrm{H}_{2} \mathrm{O}_{2}$

## Answer: D

## - Watch Video Solution

11. Number of $\mathrm{P}-\mathrm{H}, \mathrm{P}-\mathrm{O}-\mathrm{P}, \mathrm{P}-\mathrm{O}-\mathrm{H}$ and $\mathrm{P}=\mathrm{O}$ bonds in sodium dihydrogen pyrophosphate respectively are:
A. $1,1,1,2$
B. $0,1,2,2$
C. $0,1,2,4$
D. $2,0,0,2$

## Answer: C

## - Watch Video Solution

12. Two hybrid orbitals have a bond angle of $120^{\circ}$. The percentage of scharacter in the hybrid orbitals is nearly:
A. $25 \%$
B. $33 \%$
C. $50 \%$
D. $66 \%$

## Answer: B

## - Watch Video Solution

13. The state of hybridisation of central atom in dimer of $\mathrm{BH}_{3}$ and $\mathrm{BeH}_{2}$ IS
A. $s p^{2}, s p^{2}$
B. $s p^{3}, s p^{2}$
C. $s p^{3}, s p^{3}$
D. $s p^{2}, s p^{3}$

## Answer: B

14. In $\mathrm{NO}_{2}$ molecule N atom undergoes in :
A. $s p^{3}$ hybridization
B. $s p^{2}$ hybridization
C. sp hybridization
D. $s p^{2} d$ hybridization

## Answer: B

## - Watch Video Solution

15. The strongest P -O bond is found in the molecules
A. $F_{3} \mathrm{PO}$
B. $\mathrm{Cl}_{3} \mathrm{PO}$
C. $\mathrm{Br}_{3} \mathrm{PO}$
D. $\left(\mathrm{CH}_{3}\right)_{3} \mathrm{PO}$

## - Watch Video Solution

16. $\mathrm{O}_{2} \mathrm{~F}_{2}$ is an unstable yellow coloured solid and $\mathrm{H}_{2} \mathrm{O}_{2}$ is a colourless liquid, both have $\mathrm{O}-\mathrm{O}$ bond and $\mathrm{O}-\mathrm{O}$ bond length in $\mathrm{H}_{2} \mathrm{O}_{2}$ and $\mathrm{O}_{2} \mathrm{~F}_{2}$ respectively is :
A. $1.22 \AA, 1.48 \AA$
B. $1.48 \AA, 1.22 \AA$
C. $1.22 \AA, 1.22 \AA$
D. $1.48 \AA, 1.48 \AA$

## Answer: B

17. The bond length of the S -O bond is maximum in which of the following compounds?
A. $\mathrm{SOCl}_{2}$
B. $\mathrm{SOBr}_{2}$
C. $\mathrm{SOF}_{2}$
D. All have same length

## Answer: B

## - View Text Solution

18. $\angle$ FAsF bond angle in $\mathrm{AsF}_{3} \mathrm{Cl}_{2}$ molecule is :
A. $90^{\circ}$ and $180^{\circ}$
B. $120^{\circ}$
C. $90^{\circ}$
D. $180^{\circ}$

## D Watch Video Solution

19. Which of the following has largest bond angle ?
A. $\mathrm{H}_{2} \mathrm{O}$
B. $\mathrm{F}_{2} \mathrm{O}$
C. $\mathrm{Cl}_{2} \mathrm{O}$
D. $\mathrm{H}_{2} \mathrm{~S}$

## Answer: C

## D Watch Video Solution

20. The boiling points of noble gases are illustrative of the operation of forces of the type :
A. ion-dipole
B. dipole-induced dipoles
C. ion-induced dipole
D. London dipersion forces

## Answer: D

## - Watch Video Solution

21. Among the following, which has the lowest enthalpy of fussion?
A. Flourine
B. Hydrogen
C. Chlorine
D. Helium

## Answer: D

22. Out of the two compounds shown below, the vapour pressure of $B$ at a particular temperature is expected to be :

(A)

(B)
A. higher than that of $A$
B. lower than that of $A$
C. same as that of A
D. can be higher or lower depending upon the size of the vessel

## Answer: A

## - Watch Video Solution

23. The crystal lattice of ice is mostly formed by
A. ionic forces
B. covalent bonds
C. intramolecular H-bonds
D. covalent as well as H -bonds

## Answer: D

## - Watch Video Solution

24. The boiling points of methanol, water and dimethyl ether are respectively $65^{\circ} \mathrm{C}, 100^{\circ} \mathrm{C}$ and $34.5^{\circ} \mathrm{C}$. Which of the following best explains these wide variations in b.p. ?
A. The molecular mass increase from water (18) to methanol(32) to diethyl ether(74)
B. The extent of H -bonding decrease from water too methanol while it is absent in ether
C. The extent of intramolecular H -bondin decrease from ether to methanol to water
D. The density of water is $1.00 \mathrm{~g} \cdot m L^{-1}$, methanol $0.7914 \mathrm{~g} \cdot \mathrm{~mL}{ }^{-1}$ and that of diethyl ether is $0.7137 \mathrm{~g} \cdot m L^{-1}$

## Answer: B

## - Watch Video Solution

25. In ice, the length of H -bonds :
A. is less than that of covalent bonds
B. is greater than that of covalent bonds
C. is same as that of covalent bonds
D. can be less greater or same as that of covalent bonds

## Answer: B

26. The correct order of the strength of H -bonds is :
A. $H \ldots .$. F $>$.... $O>H \ldots . . N$
B. $H . \ldots . N>H \ldots . O>H \ldots . F$
C. $H . \ldots O>H \ldots . N>H . . . F$
D. $H \ldots . F>H \ldots . N>H \ldots O$

## Answer: A

## - Watch Video Solution

27. o-nitrophenol can be easily stream distilled whereas p-nitrophenol cannot be. This is because of :
A. Strong intermolecular hydrogen bonding in o-nitrophenol
B. Strong intramolecular hydrogen bonding in o-nitrophenol
C. Strong intramolecular hydrogen bonding in p-nitrophenol
D. dipole moment of p-nitrophenol is larger than that of o-nitrophenol

## Answer: B

## - Watch Video Solution

28. Which statement is incorrect about ice ?
A. It has open cage like structure
B. It has less density than water
C. Each O atom is surrounded by 4 H atoms
D. Each O atom has four H -bonds around it

## Answer: D

## - Watch Video Solution

29. When ice melts to form liquid water at $0^{\circ} \mathrm{C}$, there is a contraction in volume. This is due to
A. the molecules contracting in size
B. a partial disruption of the hydrogen bonded network of ice on melting
C. the adsorption of heat during the melting point process
D. the dissolving in ait into the water during the melting process

## Answer: B

## - View Text Solution

30. In an ionic compound $A^{+} X^{-}$the degree of covalent bonding is greatest when
A. $A^{+}$and $X^{-}$ion are small
B. $A^{+}$is small and $X^{-}$is large
C. $A^{+}$and $X^{-}$ions are approximately of the same size
D. $X^{-}$is small and $A^{+}$is large

## Answer: B

## D Watch Video Solution

31. In which of the following species the bonds are non-directonal ?
A. $\mathrm{NCl}_{3}$
B. RbCl
C. $\mathrm{BeCl}_{2}$
D. $B C l_{3}$

## Answer: B

## - Watch Video Solution

32. Which of the following when dissolving in water forms a solution which is non-conducting?
A. Green vitriol
B. Chlile or Indian salt petre
C. Alcohol
D. Potash alum

## Answer: C

## ( Watch Video Solution

33. Which of the following statements about LiC and NaCl is wrong?
A. liCl has lower melting points than NaCl
B. LiCl dissolves more in organic solvents whereas NaCl does not
C. LiCl would ionise in water less than NaCl
D. Fused LiCl would be less conducting than fused NaCl

## Answer: C

## D Watch Video Solution

34. Which of the following substance has the highest melting point? .
A. NaCl
B. KCl
C. $M g O$
D. BaO

## Answer: C

## - Watch Video Solution

35. The stability of ionic crystal depends principally on
A. high electron affinity of anion forming species
B. the lattice energy of crystal
C. low I.E of cation forming solid
D. low heat of sublimation of cation forming solid

## Answer: B

## - Watch Video Solution

36. In which of the following solvents, KI has highest solubility?
A. $C_{6} H_{6}(\in=0)$
B. $\left(\mathrm{CH}_{3}\right)_{2} \mathrm{CO}(\in=2)$
C. $\mathrm{CH}_{3} \mathrm{OH}(\in=32)$
D. $\mathbb{C C l}_{4}(\in=0)$

## Answer: C

37. Amongst $\mathrm{LiCl}, \mathrm{RbCl}, \mathrm{BeCl}_{2}$ and $\mathrm{MgCl}_{2}$, the compounds whith the greatrest and the least ionic character respecitely are :
A. LiCl and RbCl
B. RbCl and $\mathrm{BeCl}_{2}$
C. RbCl and $\mathrm{MgCl}_{2}$
D. $\mathrm{MgCl}_{2}$ and $\mathrm{BeCl}_{2}$

## Answer: B

## - Watch Video Solution

38. The compouds with the highest degree of covalency is:
A. NaCl
B. $\mathrm{MgCl}_{2}$
C. AgCl
D. CsCl

## Answer: C

## - Watch Video Solution

39. The salt having the least solubility in water is :
A. $\mathrm{BaCl}_{2}$
B. $\mathrm{Ba}\left(\mathrm{NO}_{3}\right)_{2}$
C. $\mathrm{MgSO}_{4}$
D. $\mathrm{BaSO}_{4}$

## Answer: D

## - View Text Solution

40. The solubility of $\mathrm{Na}_{2}, \mathrm{SO}_{4}, \mathrm{BeSO}_{4}, \mathrm{MgSO}_{4}$ and $\mathrm{BaSO}_{4}$ will follow the order
A. $\mathrm{BaSO}_{4}>\mathrm{BeSO}_{4}>\mathrm{MgSO}_{4}>\mathrm{Na}_{2} \mathrm{SO}_{4}$
B. $\mathrm{Na}_{2} \mathrm{SO}_{4}>\mathrm{BeSO}_{4}>\mathrm{MgSO}_{4}>\mathrm{BaSO}_{4}$
C. $\mathrm{BeSO}_{4}>\mathrm{MgSO}_{4}>\mathrm{BaSO}_{4}>\mathrm{Na}_{2} \mathrm{SO}_{4}$
D. $\mathrm{MgSO}_{4}>\mathrm{BeSO}_{4}>\mathrm{Na}_{2} \mathrm{SO}_{4}>\mathrm{BaSO}_{4}$

## Answer: B

## - Watch Video Solution

41. "Solubility of alkali metal fluorices increases down the group " Select correct explanation for given statement:
A. Hydration energy increase and lattice energy decrease down the group
B. Both energy decrease down the group but decrease in hydration energy is rapid
C. Both energy decrease down the group but decrease in lattice energy is rapid
D. Both energy increase down the group but increase in hydration energy is rapid

## Answer: C

## - Watch Video Solution

42. Covalency favoured in the following case :
A. smaller cation
B. larger anion
C. large charge on cation anions
D. all of these

## Answer: D

43. The melting point of RbBr is $682^{\circ} \mathrm{C}$, while that of NaF is $988^{\circ} \mathrm{C}$. The principla reason that melting point of $N a F$ is much higher than that of $R b B r$ is that :
A. The molar mass of NaF is smaller than that of RbBr
B. the bond of RbBr has more covalent character than the bond in NaF
C. the difference in electronegativity between Rb and Br is maller the difference between Na and F
D. the intermoleculear distance, $r_{c}+r_{a}$ is greater for RbBr than for NaF

## Answer: D

## - Watch Video Solution

44. In which of the following compounds B-F bond length is shortest?
A. $B F_{4}^{-}$
B. $\mathrm{BF}_{3} \rightarrow \mathrm{NH}_{3}$
C. $B F_{3}$
D. $\mathrm{BF}_{3} \rightarrow \mathrm{~N}\left(\mathrm{CH}_{3}\right)_{3}$

## Answer: C

## - Watch Video Solution

45. Which of the following pair of molecules will have permanent dipole moment?
A. $\mathrm{NO}_{2}$ and $\mathrm{CO}_{2}$
B. $\mathrm{NO}_{2}$ and $\mathrm{O}_{3}$
C. $\mathrm{SiF}_{4}$ and $\mathrm{CO}_{2}$
D. $\mathrm{SiF}_{4}$ and $\mathrm{NO}_{2}$

## Answer: B

46. The observed dipole moment of HCl is 1.03 D . If the bond length of HCL is $1.3 \AA$, then the percent ionic character of $\mathrm{H}-\mathrm{Cl}$ bond is
A. $60 \%$
B. $39 \%$
C. 29\%
D. $17 \%$

## Answer: D

## - Watch Video Solution

47. The dipole moment of $\mathrm{o}, \mathrm{p}$ and m -dichlorobenzene will be in the order
B. $p>o>m$
C. $m>o>p$
D. $o>m>p$

## Answer: D

## D Watch Video Solution

48. Which of the following molecule has highest dipole moment?
A. $B F_{3}$
B. $\mathrm{NH}_{3}$
C. $N F_{3}$
D. $B_{2} H_{6}$

## Answer: B

49. In terms of polar character the correct, the correct order is .
A. $\mathrm{NH}_{3}<\mathrm{H}_{2} \mathrm{O}>\mathrm{HF}<\mathrm{H}_{2} \mathrm{~S}$
B. $\mathrm{H}_{2} \mathrm{~S}<\mathrm{NH}_{3}<\mathrm{H}_{2} \mathrm{O}<\mathrm{HF}$
C. $\mathrm{H}_{2} \mathrm{O}<\mathrm{NH}_{3}<\mathrm{H}_{2} \mathrm{~S}<\mathrm{HF}$
D. $\mathrm{HF}<\mathrm{H}_{2} \mathrm{O}<\mathrm{NH}_{3}<\mathrm{H}_{2} \mathrm{O}$

## Answer: B

## - Watch Video Solution

50. The correct order of dipole moment is :
A. $\mathrm{CH}_{4}>\mathrm{NF}_{3}>\mathrm{NH}_{3}>\mathrm{H}_{2} \mathrm{O}$
B. $\mathrm{NF}_{3}>\mathrm{CH}_{4}>\mathrm{NH}_{3}>\mathrm{H}_{2} \mathrm{O}$
C. $\mathrm{NH}_{3}>\mathrm{NF}_{3}>\mathrm{CH}_{4}>\mathrm{H}_{2} \mathrm{O}$
D. $\mathrm{H}_{2} \mathrm{O}>\mathrm{NH}_{3}>\mathrm{NF}_{3}>\mathrm{CH}_{4}$

## - Watch Video Solution

51. The correct order of S-O bond length is :
A. $\mathrm{SO}_{3}^{2-}>\mathrm{SO}_{4}^{2-}>\mathrm{SO}_{3}>\mathrm{SO}_{2}$
B. $\mathrm{SO}_{3}^{2-}>\mathrm{SO}_{4}^{2-}>\mathrm{SO}_{2}>\mathrm{SO}_{3}$
C. $\mathrm{SO}_{4}^{2-}>\mathrm{SO}_{3}^{2-}>\mathrm{SO}_{2}>\mathrm{SO}_{3}$
D. $\mathrm{SO}_{4}^{2-}>\mathrm{SO}_{3}^{2-}>\mathrm{SO}_{3}>\mathrm{SO}_{2}$

## Answer: B

## - Watch Video Solution

52. What is not true about rasonance?
A. The resonating structures are hypothetical
B. The unpaired electrons in various resonating structures are same
C. Hybrid structure is most energetic
D. Hybrid structure is least energetic

## Answer: C

## - Watch Video Solution

53. Which of the following conditions is not correct for resonating structures?
A. The contributing structures must have the same number of unpaired electrons
B. The contributing structures should have almost similar energies
C. The contributing structures should be so written that unlike charges reside on atoms that are far apart
D. The positive charge should be present on the electropositive element and the negative charge on the electronegative element

## Answer: C

## - Watch Video Solution

54. A molecule is described by three Lewis structures having energies $E_{1}$, $E_{2}$, and $E_{3}$, respectively. The energies of these structures follow the order $E_{1}>E_{2}>E_{3}$, respectively. If the experimental energy of the molecules is $E_{0}$, the resonance energy is
A. $\left(E_{1}+E_{2}+E_{3}\right)-E_{0}$
B. $E_{0}-E_{3}$
C. $E_{0}-E_{1}$
D. $E_{0}-E_{2}$

## Answer: B

55. For compounds,

A: Tetracynoethene

B : Carbon dioxide

C: Benzene

D: 1, 3-Butaidene.

Ratio of $\sigma$ and $\pi$ bonds is in order :
A. $A=B<C<D$
B. $A=B<D<C$
C. $A=B=C=D$
D. $C<C<A<B$

## Answer: A

56. In a compound

The number of sigma and pi bonds respectively are : $\mathrm{C} |$| NC |
| :--- | :--- |
| NC |
| $=\mathrm{C} \mid \mathrm{C}_{2} \mathrm{H}_{5}$ |
| $\mathrm{M}(\mathrm{CO})_{3}$ |

A. 19,11
B. 19,5
C. 13, 11
D. 7, 3

## Answer: A

## - Watch Video Solution

57. Which of the following does not contain a coordinate bond?
A. $\mathrm{H}_{3} \mathrm{O}^{+}$
B. $B F_{4}^{-}$
C. $\mathrm{HF}_{2}^{-}$
D. $\mathrm{NH}_{4}^{+}$

## Answer: C

## - Watch Video Solution

58. Which of the following does not contain coordinate bond?
A. $\mathrm{PH}_{4}^{+}$
B. $\mathrm{NO}_{2}$
C. $\mathrm{O}_{3}$
D. $\mathrm{CO}_{3}^{2-}$

## Answer: D

59. Which of the following halides is inert towards hydrolysis at room temperature ?
A. $\mathrm{SiCl}_{4}$
B. $\mathrm{PCl}_{3}$
C. $\mathrm{NCl}_{3}$
D. $N F_{3}$

## Answer: D

## - Watch Video Solution

60. Among the trihalides of nitrogen, which is the least basic ?
A. $N F_{3}$
B. $\mathrm{NCl}_{3}$
C. $\mathrm{NBr}_{3}$
D. $\mathrm{NI}_{3}$

## - Watch Video Solution

61. Increasing order of stability of the +2 oxidation of the ions?
A. $\mathrm{Ca}^{2+}<\mathrm{Ba}^{2+}<\mathrm{Sr}^{2+}$
B. $\mathrm{Pb}^{2+}<\mathrm{Ge}^{2+}<\mathrm{Sn}^{2+}$
C. $\mathrm{Ge}^{2+}<\mathrm{Sn}^{2+}<\mathrm{Pb}^{2+}$
D. $\mathrm{Cu}^{2+}, \mathrm{A} u^{2+}<\mathrm{Ag}^{2+}$

## Answer: C

## Watch Video Solution

62. The number of three centre two electron bonds in a molecule of diborane is $\qquad$ .
A. 0
B. 2
C. 4
D. 6

## Answer: B

## - Watch Video Solution

63. In which of the following compounds octet is complete and incomplete for all atoms :

$$
\begin{aligned}
& \mathrm{Al}_{2} \mathrm{Cl}_{6} \quad \mathrm{Al}_{2}\left(\mathrm{CH}_{3}\right)_{6} \quad \mathrm{AlF}_{3} \text { Dimer of } \mathrm{BeCl}_{2} \text { Dimer of } \mathrm{BeH}_{2} \\
& \text { IC IC IC C C } \\
& \text { B. } \mathrm{Al}_{2} \mathrm{Cl}_{6} \quad \mathrm{Al}_{2}\left(\mathrm{CH}_{3}\right)_{6} \quad \mathrm{AlF}_{3} \text { Dimer of } \mathrm{BeCl}_{2} \text { Dimer of } \mathrm{BeH}_{2} \\
& \begin{array}{lllll}
C & I C & I C & C & I C
\end{array} \\
& \mathrm{Al}_{2} \mathrm{Cl}_{6} \quad \mathrm{Al}_{2}\left(\mathrm{CH}_{3}\right)_{6} \quad \mathrm{AlF}_{3} \text { Dimer of } \mathrm{BeCl}_{2} \text { Dimer of } \mathrm{BeH}_{2} \\
& \begin{array}{lllll}
C & \text { IC } & \text { C } & \text { IC } & \text { IC } \\
\mathrm{Al}_{2} \mathrm{Cl}_{6} & \mathrm{Al}_{2}\left(\mathrm{CH}_{3}\right)_{6} & \mathrm{AlF}_{3} & \text { Dimer of } \mathrm{BeCl}_{2} & \text { Dimer of } \mathrm{BeH}_{2}
\end{array} \\
& \text { IC } \\
& \text { C } \\
& \text { IC IC } \\
& \text { IC }
\end{aligned}
$$

## Answer: C

## - View Text Solution

64. In which of the following metal to metal bond is present ?
A. Cupric chloride
B. Stannous chloride
C. Mercurous chloride
D. Mercuric chloride

## Answer: C

## - Watch Video Solution

65. On decreasing intermoleculer distance below, the optimum distnace
(where potential energy is minimum), there is sleep increase in potential energy due to:
A. Increase in force of attraction between electrons and nucleus
B. Increase in stability of bonded atoms
C. Equal probability of fining bonding electrons near to either of nuclei
D. Increase in interelectronic and internuclear repulsion

## Answer: D

## - View Text Solution

66. Identify the correct sequence of increasing number of $\pi$-bonds in the structure of the following molecules:
(I) $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{6}$ (II) $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{3}$ (III) $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{~S}_{5}$
A. I, II and III
B. II, I and III
C. II, III and I
D. I, III and II

## Answer: C

## D View Text Solution

67. $\mathrm{C}_{2} \mathrm{H}_{2}$ is isostructural with :
A. $\mathrm{H}_{2} \mathrm{O}_{2}$
B. $\mathrm{NO}_{2}$
C. $\mathrm{SnCl}_{2}$
D. $\mathrm{CO}_{2}$

## Answer: D

68. The shapes of nitrite and nitrile respectively are:
A. Lineat and angular
B. Angular and linear
C. Both angular
D. Both linear

## Answer: B

## - View Text Solution

69. Linear structure is assumed by:
(I) NCO (II) $\mathrm{CS}_{2}$ (III) $\mathrm{NO}_{2}$ (IV)Solid $\mathrm{BeH}_{2}$
A. all four
B. (II), (III) and (IV)
C. (I), (II) and (III)
D. (II) and (III)

## Answer: C

70. Among the oxides of nitrogen $\mathrm{N}_{2} \mathrm{O}, \mathrm{NO}$ and $\mathrm{NO}_{2}$, molecules with unpaired electrons are:
A. $\mathrm{N}_{2} \mathrm{O}$ and NO
B. NO and $\mathrm{NO}_{2}$
C. $\mathrm{N}_{2} \mathrm{O}$ and $\mathrm{NO}_{2}$
D. $\mathrm{NO}_{2}$ and Its dimer

## Answer: B

## - Watch Video Solution

71. Which of the following pair consists of only network solid?
A. $\mathrm{SiO}_{2}, \mathrm{P}_{4} \mathrm{O}_{10}$
B. $\mathrm{P}_{4} \mathrm{O}_{10}, \mathrm{SO}_{3}$
C. $P_{3} O_{10}, P_{4} O_{6}$
D. Diamond, $\mathrm{SiO}_{2}$

## Answer: D

## - Watch Video Solution

72. Which of the following ions does not have S-S linkage?
A. $\mathrm{S}_{2} \mathrm{O}_{8}^{2-}$
B. $\mathrm{S}_{2} \mathrm{O}_{6}^{2-}$
C. $\mathrm{S}_{2} \mathrm{O}_{5}^{2-}$
D. $\mathrm{S}_{2} \mathrm{O}_{3}^{2-}$

## Answer: A

## - Watch Video Solution

73. Among $\mathrm{KO}_{2}, \mathrm{KAlO}_{2}, \mathrm{CaO}_{2}$ and $\mathrm{NO}_{2}^{+}$, unpaired electrons is present in :
A. $\mathrm{NO}_{2}^{+}$and $\mathrm{CaO}_{2}$
B. $\mathrm{KO}_{2}$ and $\mathrm{KAlO}_{2}$
C. $\mathrm{KO}_{2}$ only
D. $\mathrm{CaO}_{2}$ only

## Answer: C

## - Watch Video Solution

74. Structure of $\mathrm{S}_{2} \mathrm{Cl}_{2}$ is analogous to :
A. $\mathrm{SOCl}_{2}$
B. $\mathrm{CO}_{2}$
C. $\mathrm{H}_{2} \mathrm{~S}$
D. $\mathrm{H}_{2} \mathrm{O}_{2}$

## Answer: D

75. Number of P-H, P-O-P, P-O-H and P-O bonds in sodium dihydrogen pyrophosphate respectively are:
A. $1,1,1,2$
B. $0,1,2,2$
C. $0,1,2,4$
D. 2, 0, 0, 2

## Answer: C

## - Watch Video Solution

76. Two hybrid orbitals have a bond angle of $120^{\circ}$. The percentage of $\mathrm{s}-$ character in the hybrid orbitals is nealy:
A. 0.25
B. 0.33
C. 0.5
D. 0.66

## Answer: B

## - Watch Video Solution

77. The state of hybridisation of central atom in dimer of $\mathrm{BH}_{3}$ and $\mathrm{BeH}_{2}$ IS
A. $s p^{2}, s p^{2}$
B. $s p^{3}, s p^{2}$
C. $s p^{3}, s p^{3}$
D. $s p^{2}, s p^{3}$

## Answer: B

78. In $\mathrm{NO}_{2}$ molecule N atom undergoes in :
A. $s p^{3}$ hybridization
B. $s p^{2}$ hybridization
C. sp hybridization
D. $s p^{2} d$ hybridization

## Answer: B

79. The strongest $\mathrm{P}-\mathrm{O}$ bond is found in the molecules
A. $F_{3} \mathrm{PO}$
B. $\mathrm{Cl}_{3} \mathrm{PO}$
C. $\mathrm{Br}_{3} \mathrm{PO}$
D. $\left(\mathrm{CH}_{3}\right)_{3} \mathrm{PO}$

## D Watch Video Solution

80. $\mathrm{O}_{2} \mathrm{~F}_{2}$ is an unstable yellow change solid and $\mathrm{H}_{2} \mathrm{O}_{2}$ is a colourless liquid, both have $\mathrm{O}-\mathrm{O}$ bond and $\mathrm{O}-\mathrm{O}$ bond length in $\mathrm{H}_{2} \mathrm{O}_{2}$ and $\mathrm{O}_{2} \mathrm{~F}_{2}$ respectively is :
A. $1.22 \AA, 1.48 \AA$
B. $1.48 \AA, 1.22 \AA$
C. $1.22 \AA, 1.22 \AA$
D. $1.48 \AA, 1.48 \AA$

## Answer: B

81. The bond length of the S-O bond is maximum in which of the following compounds?
A. $\mathrm{SOCl}_{2}$
B. $\mathrm{SOBr}_{2}$
C. $\mathrm{SOF}_{2}$
D. All have same length

## Answer: B

## - View Text Solution

82. $\angle F A s F$ bond angle in $\mathrm{AsF}_{3} \mathrm{Cl}_{2}$ molecule is :
A. $90^{\circ}$ and $180^{\circ}$
B. $120^{\circ}$
C. $90^{\circ}$
D. $180^{\circ}$

## - Watch Video Solution

83. Which of the following has largest bond angle ?
A. $\mathrm{H}_{2} \mathrm{O}$
B. $\mathrm{F}_{2} \mathrm{O}$
C. $\mathrm{Cl}_{2} \mathrm{O}$
D. $\mathrm{H}_{2} \mathrm{~S}$

## Answer: C

## - Watch Video Solution

84. The boiling points of noble gases are illustrative of the operation of forces of the type :
A. ion-dipole
B. dipole-induced dipoles
C. ion-induced dipole
D. London dipersion forces

## Answer: D

## D Watch Video Solution

85. Among the following, which has the lowest enthalpy of fussion?
A. Flourine
B. Hydrogen
C. Chlorine
D. Helium

## Answer: D

86. Out of the two compounds shown below, the vapour pressure of $B$ at a particular temperature is expected to be :

(A)

(B)
A. higher than that of $A$
B. lower than that of $A$
C. same as that of $A$
D. can be higher or lower depending upon the size of the vessel

## Answer: A

## - View Text Solution

A. ionic forces
B. covalent bonds
C. intramolecular H-bonds
D. covalent as well as H -bonds

## Answer: D

## - Watch Video Solution

88. The boiling points of methanol, water and dimethyl ether are respectively $65^{\circ} \mathrm{C}, 100^{\circ} \mathrm{C}$ and $34.5^{\circ} \mathrm{C}$. Which of the following best explains these wide variations in b.p. ?
A. The molecular mass increase from water (18) to methanol(32) to diethyl ether(74)
B. The extent of H -bonding decrease from water too methanol while it is absent in ether
C. The extent of intramolecular H -bondin decrease from ether to methanol to water
D. The density of water is $1.00 \mathrm{~g} \cdot m L^{-1}$, methanol $0.7914 \mathrm{~g} \cdot \mathrm{~mL}{ }^{-1}$ and that of diethyl ether is $0.7137 \mathrm{~g} \cdot \mathrm{~mL}^{-1}$

## Answer: B

## - Watch Video Solution

89. In ice, the length of H -bonds :
A. is less than that of covalent bonds
B. is greater than that of covalent bonds
C. is same as that of covalent bonds
D. can be less greater or same as that of covalent bonds

## Answer: B

90. The correct order of the strength of H -bonds is :
A. $H \ldots . F>H \ldots . O>H \ldots . . N$
B. $H . \ldots . N>H \ldots . O>H . . . F$
C. $H . . . O>H \ldots . N>H \ldots . F$
D. $H \ldots . F>H \ldots . N>H \ldots . O$

## Answer: A

## - Watch Video Solution

91. o-nitrophenol can be easily stream distilled whereas p-nitrophenol cannot be. This is because of :
A. Strong intermolecular hydrogen bonding in o-nitrophenol
B. Strong intramolecular hydrogen bonding in o-nitrophenol
C. Strong intramolecular hydrogen bonding in p-nitrophenol
D. dipole moment of p-nitrophenol is larger than that of o-nitrophenol

## Answer: B

## - View Text Solution

92. What is not true about ice ?
A. It has open cage like structure
B. It has less density than water
C. Each O atom is surrounded by 4 H atoms
D. Each O atom has four H -bonds around it

## Answer: D

## - Watch Video Solution

93. When ice melts to form liquid water at $0^{\circ} \mathrm{C}$, there is a contraction in volume. This is due to
A. the molecules contracting in size
B. a partial disruption of the hydrogen bonded network of ice on melting
C. the adsorption of heat during the melting point process
D. the dissolving in ait into the water during the melting process

## Answer: B

## - View Text Solution

94. In an ionic compound $A^{+} X^{-}$the degree of covalent bonding is greatest when
A. $A^{+}$and $X^{-}$ion are small
B. $A^{+}$is small and $X^{-}$is large
C. $A^{+}$and $X^{-}$ions are approximately of the same size
D. $X^{-}$is small and $A^{+}$is large

## Answer: B

## - Watch Video Solution

95. In which of the following species the bonds are non-directonal ?
A. $\mathrm{NCl}_{3}$
B. RbCl
C. $\mathrm{BeCl}_{2}$
D. $\mathrm{BCl}_{3}$

## Answer: B

96. Which of the following when dissolving in water forms a solution which is non-conducting?
A. Green vitriol
B. Chlile or Indian salt petre
C. Alcohol
D. Potash alum

## Answer: C

## - Watch Video Solution

97. Which of the following statements about LiC and NaCl is wrong?
A. liCl has lower melting points than NaCl
B. LiCl dissolves more in organic solvents whereas NaCl does not
C. LiCl would ionise in water less than NaCl
D. Fused LiCl would be less conducting than fused NaCl

## Answer: C

## D Watch Video Solution

98. Which of the following substance has the highest melting point? .
A. NaCl
B. KCl
C. $M g O$
D. BaO

## Answer: C

## - Watch Video Solution

99. The stability of ionic crystal depends principally on
A. high electron affinity of anion forming species
B. the lattice energy of crystal
C. low I.E of cation forming solid
D. low heat of sublimation of cation forming solid

## Answer: B

## - Watch Video Solution

100. In which of the following solvents, KI has highest solubility?
A. $C_{6} H_{6}(\in=0)$
B. $\left(\mathrm{CH}_{3}\right)_{2} \mathrm{CO}(\in=2)$
C. $\mathrm{CH}_{3} \mathrm{OH}(\in=32)$
D. $\mathrm{CCl}_{4}(\in=0)$

## Answer: C

101. Amongst $\mathrm{LiCl}, \mathrm{RbCl}, \mathrm{BeCl}_{2}$ and $\mathrm{MgCl}_{2}$, the compounds whith the greatrest and the least ionic character respecitely are :
A. LiCl and RbCl
B. RbCl and $\mathrm{BeCl}_{2}$
C. RbCl and $\mathrm{MgCl}_{2}$
D. $\mathrm{MgCl}_{2}$ and $\mathrm{BeCl}_{2}$

## Answer: B

## Watch Video Solution

102. The compouds with the highest degree of covalency is:
A. NaCl
B. $\mathrm{MgCl}_{2}$
C. AgCl
D. CsCl

## Answer: C

## - Watch Video Solution

103. The salt having the least solubility in water is:
A. $\mathrm{BaCl}_{2}$
B. $\mathrm{Ba}\left(\mathrm{NO}_{3}\right)_{2}$
C. $\mathrm{MgSO}_{4}$
D. $\mathrm{BaSO}_{4}$

## Answer: D

## D View Text Solution

104. The solubility of $\mathrm{Na}_{2}, \mathrm{SO}_{4}, \mathrm{BeSO}_{4}, \mathrm{MgSO}_{4}$ and $\mathrm{BaSO}_{4}$ will follow the order
A. $\mathrm{BaSO}_{4}>\mathrm{BeSO}_{4}>\mathrm{MgSO}_{4}>\mathrm{Na}_{2} \mathrm{SO}_{4}$
B. $\mathrm{Na}_{2} \mathrm{SO}_{4}>\mathrm{BeSO}_{4}>\mathrm{MgSO}_{4}>\mathrm{BaSO}_{4}$
C. $\mathrm{BeSO}_{4}>\mathrm{MgSO}_{4}>\mathrm{BaSO}_{4}>\mathrm{Na}_{2} \mathrm{SO}_{4}$
D. $\mathrm{MgSO}_{4}>\mathrm{BeSO}_{4}>\mathrm{Na}_{2} \mathrm{SO}_{4}>\mathrm{BaSO}_{4}$

## Answer: B

## - Watch Video Solution

105. "Solubility of alkali metal fluorices increases down the group " Select correct explanation for given statement:
A. Hydrogen energy increase and lattice energy decrease down the group
B. Both energy decrease down the group but decrease in hydration energy is rapid
C. Both energy decrease down the group but decrease in lattice energy is rapid
D. Both energy increase down the group but increase in hydration energy is rapid

## Answer: C

## - Watch Video Solution

106. Covalency favoured in the following case :
A. smaller cation
B. larger anion
C. large charge on cation anions
D. all of these

## Answer: D

107. The melting points RbBr is $682^{\circ} \mathrm{C}$, while that of NaF is $988^{\circ}$. The principal reason of this fact is :
A. The molar mass of NaF is smaller than that of RbBr
B. the bond of RbBr has more covalent character than the bond in NaF
C. the difference in electronegativity between Rb and Br is maller the difference between Na and F
D. the intermoleculear distance, $r_{c}+r_{a}$ is greater for RbBr than for

## NaF

## Answer: D

## - View Text Solution

108. In which of the following compounds B-F bond length is shortest?
A. $B F_{4}^{-}$
B. $\mathrm{BF}_{3}{ }_{\mathrm{r}} \mathrm{NH}_{3}$
C. $B F_{3}$
D. $\mathrm{BF}_{3} \overline{\mathrm{r}} N\left(\mathrm{CH}_{3}\right)_{3}$

## Answer: C

## - Watch Video Solution

109. Which of the following pair of molecules will have permanent dipole moment?
A. $\mathrm{NO}_{2}$ and $\mathrm{CO}_{2}$
B. $\mathrm{NO}_{2}$ and $\mathrm{O}_{3}$
C. $\mathrm{SiF}_{4}$ and $\mathrm{CO}_{2}$
D. $\mathrm{SiF}_{4}$ and $\mathrm{NO}_{4}$

## Answer: B

110. The dipole moment of HCl is 1.03 D , if $\mathrm{H}-\mathrm{Cl}$ bond distance is $1.26 \AA$, what is the percentage of ionic character in the $\mathrm{H}-\mathrm{Cl}$ bond?
A. 0.6
B. 0.39
C. 0.29
D. 0.17

## Answer: D

## - View Text Solution

111. The dipole moment of $\mathrm{o}, \mathrm{p}$ and m -dichlorobenzene will be in the order
A. $o>p>m$
B. $p>o>m$
C. $m>o>p$
D. $o>m>p$

## Answer: D

## - Watch Video Solution

112. Which of the following molecule has highest dipole moment?
A. $B F_{3}$
B. $\mathrm{NH}_{3}$
C. $N F_{3}$
D. $B_{2} H_{6}$

## Answer: B

## - Watch Video Solution

113. In terms of polar of the following order is correct ?
A. $\mathrm{NH}_{3}<\mathrm{H}_{2} \mathrm{O}>\mathrm{HF}<\mathrm{H}_{2} \mathrm{~S}$
B. $\mathrm{H}_{2} \mathrm{~S}<\mathrm{NH}_{3}<\mathrm{H}_{2} \mathrm{O}<\mathrm{HF}$
C. $\mathrm{H}_{2} \mathrm{O}<\mathrm{NH}_{3}<\mathrm{H}_{2} \mathrm{~S}<\mathrm{HF}$
D. $\mathrm{HF}<\mathrm{H}_{2} \mathrm{O}<\mathrm{NH}_{3}<\mathrm{H}_{2} \mathrm{O}$

## Answer: B

## D View Text Solution

114. The correct order of the dipole moment is:
A. $\mathrm{CH}_{4}>\mathrm{NF}_{3}>\mathrm{NH}_{3}>\mathrm{H}_{2} \mathrm{O}$
B. $\mathrm{NF}_{3}>\mathrm{CH}_{4}>\mathrm{NH}_{3}>\mathrm{H}_{2} \mathrm{O}$
C. $\mathrm{NH}_{3}>\mathrm{NF}_{3}>\mathrm{CH}_{4}>\mathrm{H}_{2} \mathrm{O}$
D. $\mathrm{H}_{2} \mathrm{O}>\mathrm{NH}_{3}>\mathrm{NF}_{3}>\mathrm{CH}_{4}$

## D View Text Solution

115. The correct order of $\mathrm{S}-\mathrm{O}$ bond length is :
A. $\mathrm{SO}_{3}^{2-}>\mathrm{SO}_{4}^{2-}>\mathrm{SO}_{3}>\mathrm{SO}_{2}$
B. $\mathrm{SO}_{3}^{2-}>\mathrm{SO}_{4}^{2-}>\mathrm{SO}_{2}>\mathrm{SO}_{3}$
C. $\mathrm{SO}_{4}^{2-}>\mathrm{SO}_{3}^{2-}>\mathrm{SO}_{2}>\mathrm{SO}_{3}$
D. $\mathrm{SO}_{4}^{2-}>\mathrm{SO}_{3}^{2-}>\mathrm{SO}_{3}>\mathrm{SO}_{2}$

## Answer: B

## - View Text Solution

116. What is not true about rasonance?
A. The resonating structures are hypothetical
B. The unpaired electrons in various resonating structures are same
C. Hybrid structure is most energetic
D. Hybrid structure is least energetic

## Answer: C

## - Watch Video Solution

117. Which of the following conditions is not correct for resonating structures?
A. The contributing structures must have the same number of unpaired electrons
B. The contributing structures should have almost similar energies
C. The contributing structures should be so written that unlike charges reside on atoms that are far apart
D. The positive charge should be present on the electropositive element and the negative charge on the electronegative element

## Answer: C

## - Watch Video Solution

118. A molecule may be represented by three structures having energies $E_{1}, E_{2}$ and $E_{3}$, respetively. The energies of these structures follow the order $E_{2}<E_{2}<E_{1}$, respectively. If the experimantal bond energy of the molecule is $E_{0}$, the resonance energy is :
A. $\left(E_{1}+E_{2}+E_{3}\right)-E_{0}$
B. $E_{0}-E_{3}$
C. $E_{0}-E_{1}$
D. $E_{0}-E_{2}$

## Answer: B

119. A:tetracyanomethane B:carbondioxide

## C:Benzene C:1,3-But-di-ene

Ratio of $\sigma$ and $\pi$ bonds is in order:
A. $A=B<C<D$
B. $A=B<D<C$
C. $A=B=C=D$
D. $C<C<A<B$

## Answer: A

## - Watch Video Solution

120. In a compound

The number of sigma and pi bonds respectively are : $\mathrm{C} \left\lvert\, \begin{array}{cc}\mathrm{NC} \\ \mid & \mathrm{NCO} \\ \mathrm{C} \mid \mathrm{C}_{2} \mathrm{H}_{5}\end{array}\right.$
A. 19,11
B. 19, 5
C. 13,11
D. 7,3

## Answer: A

## D Watch Video Solution

121. Which of the following does not contain a coordinate bond?
A. $\mathrm{H}_{3} \mathrm{O}^{+}$
B. $B F_{4}^{-}$
C. $H F_{2}^{-}$
D. $\mathrm{NH}_{4}^{+}$

## Answer: C

122. Which of the following molecules does not have co-ordinate bond?
A. $\mathrm{PH}_{4}^{+}$
B. $\mathrm{NO}_{2}$
C. $O_{3}$
D. $\mathrm{CO}_{3}^{2-}$

## Answer: D

## - View Text Solution

123. Which of the following halides is inert towards hydrolysis at room temperature ?
A. $\mathrm{SiCl}_{4}$
B. $\mathrm{PCl}_{3}$
C. $\mathrm{NCl}_{3}$
D. $\mathrm{NF}_{3}$

## Answer: D

## - Watch Video Solution

124. Amongst the following trihalides, which one is least basic?
A. $N F_{3}$
B. $\mathrm{NCl}_{3}$
C. $\mathrm{NBr}_{3}$
D. $\mathrm{NI}_{3}$

## Answer: A

## - View Text Solution

125. Increasing order of stability of the +2 oxidation of the ions?
A. $\mathrm{Ca}^{2+}<\mathrm{Ba}^{2+}<\mathrm{Sr}^{2+}$
B. $\mathrm{Pb}^{2+}<\mathrm{Ge}^{2+}<\mathrm{Sn}^{2+}$
C. $\mathrm{Ge}^{2+}<\mathrm{Sn}^{2+}<\mathrm{Pb}^{2+}$
D. $\mathrm{Cu}^{2+}, \mathrm{AA}^{2+}<\mathrm{Ag}^{2+}$

## Answer: C

## - View Text Solution

126. The number of three centre two electron bonds in a molecule of diborane is:
A. 0
B. 2
C. 4
D. 6
127. In which of the following compounds octet is complete and incomplete for all atoms :
A. ${ } \mathrm{Al}_{2} \mathrm{Cl}_{6} \quad \mathrm{Al}_{2}\left(\mathrm{CH}_{3}\right)_{6} \quad \mathrm{AlF}_{3}$ Dimer of $\mathrm{BeCl}_{2}$ Dimer of $\mathrm{BeH}_{2}$ IC IC IC C C
B. $\mathrm{Al}_{2} \mathrm{Cl}_{6} \mathrm{Al}_{2}\left(\mathrm{CH}_{3}\right)_{6} \mathrm{AlF}_{3}$ Dimer of $\mathrm{BeCl}_{2}$ Dimer of $\mathrm{BeH}_{2}$ C IC IC C IC
C. $\mathrm{Al}_{2} \mathrm{Cl}_{6} \quad \mathrm{Al}_{2}\left(\mathrm{CH}_{3}\right)_{6} \quad \mathrm{AlF}_{3}$ Dimer of $\mathrm{BeCl}_{2}$ Dimer of $\mathrm{BeH}_{2}$ C IC IC IC IC
D. $\mathrm{Al}_{2} \mathrm{Cl}_{6} \mathrm{Al}_{2}\left(\mathrm{CH}_{3}\right)_{6} \mathrm{AlF}_{3}$ Dimer of $\mathrm{BeCl}_{2}$ Dimer of $\mathrm{BeH}_{2}$ IC C IC IC IC

## Answer: C

## - View Text Solution

128. In Which of the following metal to metal bond is present?
A. Cupric chloride
B. Stannous chloride
C. Mercurous chloride
D. Mercutic chloride

## Answer: C

## - View Text Solution

Level 2

1. Consider the given figure showing the formation of $\mathrm{H}_{2}^{+}$ion depending on intermuclear distance versus potential energy of the system.

A. Curve-1 represents the most stable state of the system for $\mathrm{H}_{2}^{+}$
B. Curve-2 represents the most stable state of the system for $\mathrm{H}_{2}^{+}$
C. Curve-1 indicates that the molecular hydrogen ion is formed
D. Curve-2 represents the energy level of the antibonding region

## Answer: B

## - Watch Video Solution

2. Which of the following molecule is having non-polar as well as polar bonds but the molecule as a whole is polar-
A. $S_{2} F_{2}$
B. $\mathrm{N}_{2} \mathrm{O}_{4}$
C. $\mathrm{Si}_{2} \mathrm{H}_{6}$
D. $I_{2} \mathrm{Cl}_{6}$

## Answer: A

## D Watch Video Solution

3. Choose the correct statement regarding $\mathrm{SeOCl}_{2}$ molecule :
A. It does not contain plane of symmtry
B. Cl-S-Cl' bond angle is greater than 'Cl-Se-O' bond angle
C. Lone pair has greater than 33.\% s-character
D. Central atom used one d-ordital in bonding

## Answer: D

4. In which species $X-O$ bond order is 1.5 and contains $p \pi-d \pi$ bond(s)
A. $\mathrm{IO}_{2} \mathrm{~F}_{2}$
B. $\mathrm{HCOO}^{-}$
C. $\mathrm{SO}_{3}^{2-}$
D. $\mathrm{XeO}_{2} \mathrm{~F}_{2}$

## Answer: A

## - Watch Video Solution

5. Which of the following species has polar and non-polar bonds but molecule as a whole is non-plonar?
A. $\mathrm{S}_{2} \mathrm{O}_{3}^{2-}$
B. $(S C N)_{2}$
C. $\mathrm{Be}_{2} \mathrm{Cl}_{4}$
D. $\mathrm{Si}_{2} \mathrm{H}_{6}$

## Answer: D

## - Watch Video Solution

6. The incorrect statement (s) regarding ${ }^{-}(C) X_{3}$
A. If electronegativity of surrounding element $X$ is less than 2.5 , then
central carbon atom used almost $33 \%$ s-character in their hybrid
bonding orbital
B. If electronegativity of surrounding element X is less than 2.5 , then
central carbon atom used almost $25 \%$ s-character in their hybrid
bonding orbital
C. If $X$ is $F$, then species should be polar and pyramidal
D. If X is H , then species should be polar and planar

## Answer: D

## - Watch Video Solution

7. Consider following compounds,
(i) $\mathrm{H}_{3} \mathrm{X}-\mathrm{HCS}$ (ii) $\mathrm{H}_{3} \mathrm{Y}-\mathrm{NCS}$ (iii) $\left(\mathrm{H}_{3} \mathrm{Y}\right)_{2} \mathrm{O}$ (iv) $\left(\mathrm{H}_{2} \mathrm{X}\right)_{2} \mathrm{O}$

The incorrect statement regarding given compounds is :
A. If Y is carbon in compounds (ii) and (iii), then both are bent
B. If X is silicon in compounds (i) and (iv), then both are linear
C. If $X$ is carbon and $Y$ is silicon, the compound (i) is more basic than compound (ii)
D. If $X$ is silicon and $Y$ is carbon, then $X-O-X$ bond angle compounds (iii) is greater than $\mathrm{Y}-\mathrm{O}-\mathrm{Y}$ bond angle in compounds (iv)

## Answer: B

## - Watch Video Solution

8. The incorrect statement about carbene $\left(\mathrm{CH}_{2}\right)$ is :
A. In singler carbene, carbon is $s p^{2}$-hybridized whereas in triplet carbene, carbon is sp-hybridized
B. Triplet carbene is less stable than singlet carbene
C. Stability order of singlet halocarbenes is: $\mathrm{CHF}>\mathrm{CHCl}>\mathrm{CHBr}$
D. None of the above

## Answer: B

## - Watch Video Solution

9. The lowest $\mathrm{O}-\mathrm{O}$ bond length in the following molecule is :
A. $\mathrm{O}_{2} \mathrm{~F}_{2}$
B. $\mathrm{O}_{2}$
C. $\mathrm{H}_{2} \mathrm{O}_{2}$
D. $O_{3}$

## Answer: B

## - Watch Video Solution

10. Out of $\mathrm{CHCl}_{3}, \mathrm{CH}_{4}$ and $\mathrm{SF}_{4}$ the molecules having regular geometry are
A. $\mathrm{CHCl}_{3}$ only
B. $\mathrm{CHCl}_{3}$ and $\mathrm{SF}_{4}$
C. $\mathrm{CH}_{4}$
D. $\mathrm{CH}_{4}$ and $\mathrm{SF}_{4}$

## Answer: B

## - Watch Video Solution

11. When iodine is dissolved in aqueous potassium iodine, the shape of the species formed is:
A. linear
B. angular
C. triangular
D. see-saw

## Answer: A

## - Watch Video Solution

12. Which of the following set of species have planar structure?
A. $I_{3}^{-}, \mathrm{CH}_{3}, \mathrm{Cl}_{3}^{-}, \mathrm{SiF}_{6}^{2-}$
B. $I_{3}^{+}, \mathrm{ICl}_{4}^{-}, \mathrm{Al}_{2} \mathrm{Cl}_{6}, \mathrm{TeCl}_{4}$
C. $\mathrm{SCl}_{2}, \mathrm{~N}_{2} \mathrm{O}_{5}, S F_{4}$
D. $\mathrm{I}_{2} \mathrm{Cl}_{6}, \mathrm{XeF}_{2}, \mathrm{BrF}_{4}^{-}, \mathrm{XeF}_{5}^{-}$

## Answer: D

## - Watch Video Solution

13. Which of the following compounds have the same no. of lone pairs with their central atom?
(I) $\mathrm{XeF}_{5}^{-}$(II) $\mathrm{BrF}_{3}$ (III) $\mathrm{XeF}_{2}$ (IV) $\mathrm{H}_{3} \mathrm{~S}^{+}$(V) Triple methylene
A. (IV) and (V)
B. (I) and (III)
C. (I) and (II)
D. II, IV and V

## Answer: C

14. Given the correct order of initials $T$ or $F$ for following statements. Use T if statements is true and $F$ it it is false:
(I) $\left(\mathrm{CH}_{3}\right)_{2} P\left(\mathrm{CF}_{3}\right)_{3}$ is non-palar and $\left(\mathrm{CH}_{3}\right)_{3} P\left(\mathrm{CF}_{3}\right)_{2}$ is polar molecule (II) $\mathrm{CH}_{3} \hat{P} \mathrm{CH}_{3}$ bond angle are equal in $\left(\mathrm{CH}_{3}\right)_{3} P\left(\mathrm{CF}_{3}\right)_{2}$ molecule
(III) $P F_{3}$ will be more soluble in polar solvent than $\mathrm{SiF}_{4}$
A. TTF
B. FFT
C. FFF
D. FTT

## Answer: D

## - Watch Video Solution

15. The correct sequence of polarity of the following molecule
(1) Benzene (2)Inorganic Benzene (3) $\mathrm{PCl}_{3} \mathrm{~F}_{2}(4) \mathrm{PCl}_{2} \mathrm{~F}_{3}$
16. Which among the followiing molecules is not perfect flat?
A. $B_{3} N_{3} H_{6}$
B. $\mathrm{C}_{3} \mathrm{~N}_{3}\left(\mathrm{NH}_{2}\right)_{3}$
C. $\mathrm{SO}_{3}$
D. $C_{3} N_{3}\left(N_{3}\right)_{3}$

## Answer: D

## - Watch Video Solution

17. Which of the following structure(s) is /are non-planar?
A. $\mathrm{Na}_{3} \mathrm{~B}_{3} \mathrm{O}_{6}$
B. $\mathrm{I}_{2} \mathrm{Cl}_{6}$
C. Sheet silicate
D. Inorganic graphite layer

## Answer: C

## - Watch Video Solution

18. Nodal planes of $\pi$-bonds in $\mathrm{CH}_{2}=C=C=\mathrm{CH}_{2}$ are located in,
A. All are in molecular plane
B. Two in molecular plane and one in a plane perpendicular to molecular plane which contains C-C sigma-bond
C. On is molecular plane and two in plane perpendicular to molecular plane which contains C-C sigma-bonds
D. Two in molecular plane and one in a perpendicular to molecular plane which bisects C-C sigma-bonds at right angle.

## Answer: B

19. Which of the following have $\mathrm{X}-\mathrm{O}-\mathrm{X}$ linkage ?
(where X is central atom):
(i) $\mathrm{Cr}_{2} \mathrm{O}_{7}^{2-}$ (ii) $\mathrm{S}_{2} \mathrm{O}_{3}^{2-}$ (iii) pyrosilicate (iv) Hyponitrous acid
A. (i) and (iii)
B. (iii) and (iv)
C. (i), (iii) and (iv)
D. (i) and (ii)

## Answer: A

## - Watch Video Solution

20. Select the correct statements:
A. $\mathrm{HSO}_{5}^{-}$ion has one S-O-H linkage
B. Number of B-O-B linkage in Borax is equal to number of P-O-P
linkage in $\mathrm{P}_{4} \mathrm{O}_{10}$
C. Hybridization of both sulphur in $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{8}$ (pyrosulphurous acid) is same but oxidation state of both sulphur are different
D. Tetra-polyphosphoric acid has four P-O-P and no P-P linkage

## Answer: C

## - Watch Video Solution

21. Oxidation state of ' S ' in peroxodisulphuric acid and sodium tetrathionate:

$$
\text { A. }+6,+5,0
$$

B. $+6,+6,+6$
C. $+6,+4,+2$
D. $+6,+2,0$

## D Watch Video Solution

22. Structure of $\mathrm{Na}_{2}\left[\mathrm{~B}_{4} \mathrm{O}_{5}(\mathrm{OH})_{4}\right] \cdot \mathrm{SH}_{2} \mathrm{O}$ contains
A. two triangular and two tetrahedral units
B. three triangular and one tetrahedral units
C. all tetrahedral units
D. all triangular units

## Answer: A

## - Watch Video Solution

23. Which of the following molecular species in not linear?
A. $(C N)_{2}$
B. $O C N^{-}$
C. $\mathrm{XeF}_{2}$
D. $\mathrm{XeF}_{4}$

## Answer: D

## - Watch Video Solution

24. Incorrect match is :

## Electron geometry Possible molecular shape from

(a) Tetrahedron respective electron geometry
(b) Trigonal bipyramidal
Bent
(c) Octahedron

- Triangular planar
(d) Pentagonal bipyramidal
Square pyramidal
Pentagonal planar


## - Watch Video Solution

25. Consider the following reactions:
$M X_{4}+X_{2}^{\prime} \rightarrow M X_{4} X_{2}{ }^{\prime}$
If atomic number of M is 52 and X and $\mathrm{X}^{\prime}$ are halogens and $\mathrm{X}^{\prime}$ is more
electonegative than X . The choose correct statemetn regarding given information:
A. Both X ' atoms occupy axial positions which are formed by overlaping of $p$ and $d$-orbitals only
B. All $\mathrm{M}-\mathrm{X}$ bond lengths are identical in both $M X_{4}$ and $M X_{4} X^{\prime}{ }_{2}$ compounds
C. Central atom 'M' does not use any valence non-axial set of d-orbitals in hybridization of final product
D. Hybridization of central atom ' $M$ ' remains same in both reactant and final product

## Answer: C

## - Watch Video Solution

26. Select the Incorrect statements:

|  | Statement | Shape | Example |
| :--- | :--- | :--- | :--- |
| (a) | Bond pair has $\gg 5 \%$ <br> p-character | HF |  |
| (b) | Reduction in axial bond angle <br> is more than that of in <br> equatorial bond angle | $\mathrm{SF}_{4}$ |  |
| (c) | Two axial d-orbitals and one <br> non-axial d-orbital are used in <br> hybridization | $\mathrm{XeF}_{5}^{-}$ |  |
| (d) | Two p-orbitals are used in <br> hybridization | $\mathrm{SnCl}_{2}$ |  |

## - Watch Video Solution

27. In which of the following species, d-obitals having $x z$ an $y z$ two nodal planes involved in hybridization of central atoms?
A. $\mathrm{IO}_{2} \mathrm{~F}_{2}^{-}$
B. $\mathrm{ClF}_{4}^{-}$
C. $\mathrm{IF}_{7}$
D. None of these

## Answer: C

28. The correct order of increasing s character (in percentage) in the hybrid orbitals in below molecules / ions is (assume all hybrid orbitals are exactly equivalent) :
$\mathrm{CO}_{3}{ }^{2-}{ }^{-} \mathrm{XeF}_{4}{ }_{4} \mathrm{II}_{3}^{-}{ }^{\text {III }} \mathrm{NCl}_{3} \mathrm{IV} \mathrm{BeCl}_{2}(\mathrm{~g}) \mathrm{V}$
A. II $<$ III $<$ IV $<$ I $<V$
B. II $<$ IV $<$ III $<V<I$
C. III $<$ II $<$ I $<V<$ IV
D. II $<$ IV $<$ III $<$ I $<V$

## Answer: A

## - Watch Video Solution

29. The shape of $\mathrm{MnO}_{4}^{-}$ion and the hybridisation of Mn in $\mathrm{MnO}_{4}^{-}$is
A. tetrahedral, $s p^{3}$
B. tetrahedral, $d^{3} s$
C. square planar , $d s p^{2}$
D. square planar , $s p^{3}$

## Answer: B

## - Watch Video Solution

30. Which one of the following molecule will have all equal $X-F$ bonds length? (where $\mathrm{X}=$ Central atom)
A. $\mathrm{SOCl}_{2} \mathrm{~F}_{2}$
B. $\mathrm{SeF}_{4}$
C. $\mathrm{PBr}_{2} \mathrm{~F}_{3}$
D. $I F_{7}$
31. Consider the following information ( $\mathrm{F}=\mathrm{F}$ or Cl )

| Molecule | $\mathbf{P}-\boldsymbol{X}$ (axial) bond length | $\mathbf{P}-\boldsymbol{X}$ (Equitorial) bond length |
| :---: | :---: | :---: |
| $\mathrm{PF}_{5}$ | $a$ | $b$ |
| $\mathrm{PF}_{4} \mathrm{CH}_{3}$ | $c$ | $d$ |
| $\mathrm{PF}_{3}\left(\mathrm{CH}_{3}\right)_{2}$ | $e$ | $f$ |
| $\mathrm{PCl}_{5}$ | $g$ | $h$ |

According to given information choose the incorrect order of bond length :
A. $g>a>d>b$
B. $g>e>f>b$
C. $f>d>a>b$
D. $c>f>d>b$

## Answer: C

32. In which of the following cases $C$ - $C$ bond length will be highest?
A. $\mathrm{CH}_{3}-\mathrm{CF}_{3}$
B. $\mathrm{FCH}_{2}-\mathrm{CH}_{2} \mathrm{~F}$
C. $\mathrm{F}_{2} \mathrm{CH}-\mathrm{CHF}_{2}$
D. $\mathrm{CF}_{3}-\mathrm{CF}_{3}$

## Answer: B

## - Watch Video Solution

33. In which of the following cases $C$ - $C$ bond length will be highest?
(I) In $N_{2} F_{4}$, d-orbitals are contracted by electronegative flourine atoms, but d-orbitals contraction is not possible by H -atoms in $\mathrm{N}_{2} \mathrm{H}_{4}$
(II) The $N-N$ bond energy in $N_{2} F_{4}$ is more than $N-N$ bond energy in $\mathrm{N}_{2} \mathrm{H}_{4}$
(III) The $N-N$ bond length in $N_{2} F_{4}$ is more than that of in $N_{2} F_{4}$
(IV) The $\mathrm{N}-\mathrm{N}$ bond length in $\mathrm{N}_{2} \mathrm{~F}_{4}$ is less than that of in $\mathrm{N}_{2} \mathrm{H}_{4}$ choose the correct codes:
A. I, II and III
B. I and III
C. II and IV
D. II and III

## Answer: B

## - View Text Solution

34. The correct order of equatorial FSF bond angle in the following compound.
(I)SF ${ }_{4}$ (II) OSF $_{4}$ (III) $\mathrm{H}_{2} \mathrm{CSF}_{4}$
A. $I I I>I I>I$
B. $I>$ III $>$ II
C. I $>$ II $>$ III
D. II $>$ III $>$ I

## D Watch Video Solution

35. Incorrect orders of bond angle is :
A. $\mathrm{Ocl}_{2}>\mathrm{SF}_{2}>\mathrm{AsH}_{2}>\mathrm{H}_{2} \mathrm{Se}$
B. $\mathrm{NH}_{3}>\mathrm{PF}_{3}>\mathrm{PH}_{3}>\mathrm{H}_{2} \mathrm{~S}$
C. $\mathrm{XeO}_{4}>\mathrm{ClO}_{4}^{-}>\mathrm{SO}_{4}^{-}>\mathrm{CF}_{4}$
D. $\mathrm{N}\left(\mathrm{SiH}_{3}\right)_{3}>\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}>\mathrm{OMe}_{2}$

## Answer: C::D

## - View Text Solution

36. Minimum $F-S-F$ bond angle present in :
A. $S S F_{2}$
B. $S F_{6}$
C. $S F_{2}$
D. $F_{3} S S F$

## Answer: D

## - Watch Video Solution

37. The correct order of increasing bond angle is
A. $\mathrm{OF}_{2}<\mathrm{ClO}_{2}<\mathrm{H}_{2} \mathrm{O}<\mathrm{Cl}_{2} \mathrm{O}$
B. $\mathrm{OF}_{2}<\mathrm{H}_{2} \mathrm{O}<\mathrm{Cl}_{2} \mathrm{O}<\mathrm{ClO}_{2}$
C. $\mathrm{OF}_{2}<\mathrm{H}_{2} \mathrm{O}<\mathrm{ClO}_{2}<\mathrm{Cl}_{2} \mathrm{O}$
D. $\mathrm{ClO}_{2}<\mathrm{OF}_{2}<\mathrm{H}_{2} \mathrm{O}<\mathrm{Cl}_{2} \mathrm{O}$

## Answer: B

38. The correct order for bond angles is :
A. $\left.\mathrm{NO}_{2}^{-}>\mathrm{NO}_{2}^{+}>\mathrm{NO}_{2}\right)$
B. $\mathrm{NO}_{2}^{+}>\mathrm{NO}_{2}^{+}>\mathrm{NO}_{2}$
C. $\mathrm{NO}_{2}>\mathrm{NO}_{2}^{+}>\mathrm{NO}_{2}^{-}$
D. $\mathrm{NO}_{2}^{+}>\mathrm{NO}_{2}>\mathrm{NO}_{2}^{-}$

## Answer: D

## - Watch Video Solution

39. Which one is correct for bond angle?
A. $P F_{3}>\mathrm{PCl}_{3}$
B. $\mathrm{OCl}_{2}=\mathrm{ClO}_{2}$
C. $\mathrm{NF}_{3}>\mathrm{NH}_{3}$
D. $\mathrm{PCl}_{3}>\mathrm{PF}_{3}$

## Answer: D

## - Watch Video Solution

40. In molecules of the type $A X_{2} I_{n}$ (where L represents lone pair and n is its number) there exists a bond between element A and x . The $\angle X A X$ bond angle
A. Always decrease if n increase
B. Always increase if n increase
C. Will be maximum for $n=3$
D. generally decrease if n decrease

## Answer: C

## - Watch Video Solution

41. Which of the following solid has maximum melting points?
A. NaCl
B. Ice
C. Dry ice
D. $\mathrm{SiO}_{2}$

## Answer: D

## - Watch Video Solution

42. The melting points of $\mathrm{AlF}_{3}$ is $104^{\circ}$ and that of $\mathrm{SiF}_{4}$ is $-77^{\circ}$ (it sublimes) because:
A. there is a very large difference in the ionic character of the Al-F and

Si-F bonds
B. in $A l F_{3}, A l^{3+}$ interacts very strongly with the neighbouring $F^{-}$ions
to given a three dimenstional structure but in $\mathrm{SiF}_{4}$ no such
interaction is possible
C. the silicon ion in the tetrahedral $\mathrm{SiF}_{4}$ molecules is not shielded effectively from the flouride ions whereas in $\mathrm{AlF}_{3}$, the $\mathrm{Al}^{3+}$ ion is shielded on all sides
D.the attractive forces between the $\mathrm{SiF}_{4}$ molecules are strong whereas those between the $\mathrm{AlF}_{3}$ molecules are weak

## Answer: B

## - Watch Video Solution

43. The correct order of boiling point is:
A. $T_{2}<D_{2}>H_{2}$
B. n-pentane < neo-pentane
C. $\mathrm{Xe}<\mathrm{Ar}<\mathrm{He}$
D. m-nitrophenol > o-nitrophenol

## Answer: D

$$
K_{a_{1}}\left(-H^{+}\right) \quad K_{a_{2}}\left(-H^{+}\right)
$$

44. Cis butene dioic acid $\leftarrow X_{1}^{-} \quad \leftrightarrow \quad X_{2}^{-}$

$$
K_{a_{1}}\left(-H^{+}\right) \quad K_{a_{2}}\left(-H^{+}\right)
$$

Trans-butene dioic acid $\quad \stackrel{\leftarrow}{*} \quad Y_{1}^{-} \quad \stackrel{\rightarrow}{\leftrightarrow} \quad Y_{2}^{-}$
The incorrect statement regarding above information is:
A. $X_{2}^{2-}$ species is more basic than $Y_{2}^{2-}$ species
B. $X_{1}^{-}$species is more basic than $Y_{1}^{-}$species
C. $K_{a_{1}}$ is greater than $K_{a_{1}}^{\prime}$
D. $K_{a_{2}}$ is greater than $K_{a_{2}}^{\prime}$

## Answer: B

## D Watch Video Solution

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

(b)

B.
C.

D. None

## Answer: C

## D Watch Video Solution

46. The H -Bonds in solid HF can be best represented as :
A. $H-F \ldots . H-F \ldots H-F$
B.
(b) ${ }^{4}$ T $_{F}{ }^{H} \backslash_{F}{ }^{H} \backslash_{F}{ }^{H} \backslash_{F}$
(c) $H^{\mathrm{F}}{ }^{\mathrm{H}} \backslash_{\mathrm{F}} \mathrm{H}^{\mathrm{P}}$
C.
(d)

D.

## Answer: C

## - Watch Video Solution

47. The type of molecular forces of attraction present in the following compounds is :
A. Intermolecular H-bonding
B. Intramolecular H-bonding
C. van der waal's force
D. All of these

## Answer: D

48. Which of the following interaction lies in the range of $8-42 \mathrm{kH} / \mathrm{mol}$ ?
A. $\mathrm{H}_{2} . \mathrm{H}_{2} \mathrm{O}$
B. HCl . HCl
C. $F^{-} . . . H F$
D. $\mathrm{HCN} . . . \mathrm{NH}_{3}$

## Answer: D

## - Watch Video Solution

49. The incorrect order is :
A. Covalent character : $\mathrm{PbCl}_{4}>\mathrm{CaCl}_{2}>\mathrm{SrCl}_{2}>\mathrm{BaCl}_{2}$
B. Thermal stability : $\mathrm{PbF}_{4}>\mathrm{PbCl}_{4}>\mathrm{PbBr}_{4}>\mathrm{PbI}_{4}$
C. Melting point : $\mathrm{KF}>\mathrm{KCl}>\mathrm{KBr}>\mathrm{KI}$
D. Boiling point : $\mathrm{CHCl}_{3}>\mathrm{CH}_{3} \mathrm{Cl}>\mathrm{CCl}_{4}$

## Answer: D

## D Watch Video Solution

50. If $C d I_{2}$ is pink in colour, the $C d C l_{2}$ will be '____ coloured.
A. Yellow
B. Red
C. Blue
D. connot be predicted

## Answer: D

## - Watch Video Solution

51. Which order are correct?
(I) Thermal stability : $\mathrm{BeSO}_{4}<\mathrm{MgSO}_{4}<\mathrm{CaSO}_{4}<\mathrm{SrSO}_{4}<\mathrm{BaSO}_{4}$
(II) Basic nature : $\mathrm{ZnO}>\mathrm{BeO}>\mathrm{MgO}>\mathrm{CaO}$
(III) Solubility in water: $\mathrm{LiOH}>\mathrm{NaOH}>\mathrm{KOH}>\mathrm{RbOH}>\mathrm{CsOH}$ (IV)Melting point : $\mathrm{NaCl}>\mathrm{KCl}>\mathrm{RbCl}>\mathrm{CaCl}>\mathrm{LiCl}$
A. (I), (IV)
B. (I), (II) and (IV)
C. (II), (III)
D. All correct

## Answer: A

## - View Text Solution

52. The correct solubility order is/are
(I) $\mathrm{CaCO}_{3}>\mathrm{SrCO}_{3}>\mathrm{BaCO}_{3}(\mathrm{II}) \mathrm{Li}_{2} \mathrm{CO}_{3}<\mathrm{Na}_{2} \mathrm{CO}_{3}>\mathrm{K}_{2} \mathrm{CO}_{3}$
(III) $\mathrm{K}_{2} \mathrm{CO}_{3}<\mathrm{Rb}_{2} \mathrm{CO}_{3}<\mathrm{Cs}_{2} \mathrm{CO}_{3}$ (IV) $\mathrm{Na}_{2} \mathrm{CO}_{3}>\mathrm{K}_{2} \mathrm{CO}_{3}>\mathrm{Rb}_{2} \mathrm{CO}_{3}$
A. II, IV
B. I, IV
C. II, III, IV

## D. I, II, III

## Answer: D

## - View Text Solution

53. On heating to $400-500^{\circ} \mathrm{C}$, relatively unstable hydrides and carbonates decompose. Which of the following will decompose when heated to $400-500^{\circ} \mathrm{C}$
A. II, III
B. I, II, III
C. I, III
D. III, IV

## Answer: A

## - Watch Video Solution

54. Both $\mathrm{N}\left(\mathrm{SiH}_{3}\right)_{3}$ and $\mathrm{NH}\left(\mathrm{SiH}_{3}\right)_{2}$ compounds have trigonal planar skeleton. Incorrect statement about both compounds is :
A. SiNSi bond angle in $\mathrm{NH}\left(\mathrm{SiH}_{3}\right)_{2}>\mathrm{SiNSi}$ bond angle in $\left.\mathrm{N}\left(\mathrm{SiH}_{3}\right)_{3}\right)$
B. $\mathrm{N}-\mathrm{Si}$ bond length in $\mathrm{NH}\left(\mathrm{SiH}_{3}\right)_{2}>\mathrm{N}-\mathrm{Si}$ bond length in
$\left.N\left(\mathrm{SiH}_{3}\right)_{3}\right)$
C. $\mathrm{N}-\mathrm{Si}$ bond length in $\mathrm{NH}\left(\mathrm{SiH}_{3}\right)_{2}<\mathrm{N}-\mathrm{Si}$ bond length in $\left.N\left(\mathrm{SiH}_{3}\right)_{3}\right)$
D. Back bonding strength in $\mathrm{NH}\left(\mathrm{SiH}_{3}\right)_{2}>$ Back bonding strength in $\left.N\left(\mathrm{SiH}_{3}\right)_{3}\right)$

## Answer: B

## - Watch Video Solution

55. The incorrect statement regarding $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ and $\mathrm{OCl}_{2}$ molecule is/are
A. The strength of back bonding is more in $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ molecule than $\mathrm{Ocl}_{2}$ molecule
B. $\mathrm{Si}-\mathrm{O}-\mathrm{Si}$ bond angle in $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ is greater than $\mathrm{Cl}-\mathrm{O}-\mathrm{Cl}$ bond angle in $\mathrm{OCl}_{2}$
C. The nature of back in both molecules is $2 p_{x}-3 d_{\pi}$
D. Hybridisation of central O-atom in both molecules is same

## Answer: D

## - View Text Solution

56. Among following molecule $N-S i$ bond length is shortest:
A. $N\left(\mathrm{SiH}_{3}\right)_{3}$
B. $\mathrm{NH}\left(\mathrm{SiH}_{3}\right)_{2}$
C. $\mathrm{NH}_{2}\left(\mathrm{SiH}_{3}\right)$
D. All have equal $N-S i$ bond length

## Answer: C

## - Watch Video Solution

57. Which of the following molecule has weakest $(p \pi-d \pi)$ back bonding?
A. $\mathrm{OCl}_{2}$
B. $N\left(\mathrm{SiH}_{3}\right)_{3}$
C. $\mathrm{SiF}_{3}$
D. $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$

## Answer: A

## - View Text Solution

58. "hybridization of central atom does not always change due to back bonding". This statement is valid for which of the following compounds?
(i) $\mathrm{Cl}_{3}^{-}$(ii) $\mathrm{Cl}_{2}$ (iii) $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ (iv)N $\left(\mathrm{SiH}_{3}\right)_{3}$
A. (i) and (ii)
B. (i) and (iii)
C. (ii) and (iii)
D. All

## Answer: A

## - Watch Video Solution

59. The geometry with respect ot the central atom of the following molecules are
$N\left(\mathrm{SiH}_{3}\right)_{3}, \mathrm{Me}_{3} \mathrm{~N},\left(\mathrm{SiH}_{3}\right)_{3} P$
A. planar, pyramidal, planar
B. planar, pyramidal, pyramidal
C. pyramidal, pyramidal, pyramidal
D. pyramidal, planar, pyramidal

## - Watch Video Solution

60. Incorrect statement regarding $\mathrm{BF}_{3} \mathrm{NH}_{3}$ molecule is :
A. FBF bond angle $<120^{\circ}$
B. HNH bond angle $>109^{\circ} 28^{\prime}$
C. Exhibits intermolecular H-bond
D. hybridization of N -atom is $s p^{3}$

## Answer: D

## - Watch Video Solution

61. In which of the following molecules $\mu$ (oberved) is found to be greater than $\mu$ (theoretical):
A. $\mathrm{CHCl}_{3}$
B.
(b)

C.
(c)

D.

## Answer: D

## D View Text Solution

62. Among the following, the molecule with the highest dipole moment is
A. $\mathrm{CH}_{3} \mathrm{Cl}$
B. $\mathrm{CH}_{2} \mathrm{Cl}_{2}$
C. $\mathrm{CHCl}_{3}$
D. $\mathrm{CCl}_{4}$

## Answer: A

## - Watch Video Solution

63. Which of the following compounds has dipole moment approximately equal to that of chlorobenzene?
A. o-dichlorobenzene
B. m-dichlorobenzene
C. p-dichlorobenzene
D. p-chloronitrobenzene

## Answer: B

## - Watch Video Solution

64. Which of the following bonds have lowest bond energy?
A. $C-C$
B. $N-N$
C. $H$ - $H$
D. $\mathrm{O}-\mathrm{O}$

## Answer: D

## - Watch Video Solution

65. The bond having the minimum bond energy is :
A. $C-C$
B. $\mathrm{O}-\mathrm{O}$
C. $S-S$
D. $P-P$

## Answer: B

## D Watch Video Solution

66. Arrange in increasing order of extent of hydrolysis $\left[\mathrm{CCl}_{4}, \mathrm{MgCl}_{2}, \mathrm{AlCl}_{3}, \mathrm{PCl}_{5}, \mathrm{SiCl}_{4}\right]$.
A. $\mathrm{CCl}_{4}<\mathrm{MgCl}_{2}<\mathrm{AlCl}_{3}<\mathrm{SiCl}_{4}<\mathrm{PCl}_{5}$
B. $\mathrm{CCl}_{4}<\mathrm{AlCl}_{3}<\mathrm{MgCl}_{2}<\mathrm{PCl}_{5}<\mathrm{SiCl}_{4}$
C. $\mathrm{CCl}_{4}<\mathrm{SiCl}_{4}<\mathrm{PCl}_{5}<\mathrm{AlCl}_{3}<\mathrm{MgCl}_{2}$
D. $\mathrm{CCl}_{4}<\mathrm{PCl}_{5}<\mathrm{SiCl}_{4}<\mathrm{AlCl}_{3}<\mathrm{MgCl}_{2}$

## Answer: A

## - Watch Video Solution

67. Inorganic benzene reacts with HCl to form a compounds $\mathrm{B}_{3} \mathrm{~N}_{3} \mathrm{H}_{9} \mathrm{Cl}_{3}$. The protonation occurs at:
A. B-atom
B. N -atom
C. First at B -atom than rearranges into N -atom
D. first at N -atom then rearranges into B -atom

## Answer: B

## - Watch Video Solution

68. Select the correct statements about hydrolysis of $\mathrm{BCl}_{3}$ and $\mathrm{NCl}_{3}$ :
A. $\mathrm{NCl}_{3}$ is hydrolysed and gives HOCl but $\mathrm{BCl}_{3}$ is not hydrolysed
B. Both $\mathrm{NCl}_{3}$ and $\mathrm{BCl}_{3}$ on hydrolysis gives HCl
C. $\mathrm{NCl}_{3}$ on hydrolysis give HOCl but $\mathrm{BCl}_{3}$ gives HCl
D. Both $\mathrm{NCl}_{3}$ and $\mathrm{BCl}_{3}$ on hydrolysis gives HOCl

## Answer: C

69. The incorrect statement regarding molecular orbital (s) is :
A. If there is a nodal plane perpendicular to the intermoleculear axis and lying between the nuclei of bonded atoms then corresponding orbitals is antibonding M.O.
B. If a nodal plane lies in the inter-nuclear axis, then corresponing orbitals is (pi) bonding M.O.
C. The $\sigma$ - bonding molecular orbital does not contain nodal planes containing the internuclear axis
D. The $\delta$-bonding molecular orbitals possesses three nodal planes containing the internuclear axis

## Answer: D

70. Which of the following species absorb maximum energy in its HOMO - LUMO electronic transition?
A. $O_{2}$
B. $N_{2}^{-}$
C. $C_{2}$
D. $N_{2}$

## Answer: D

## - Watch Video Solution

71. If $P$ to $T$ are second period $p$-block elements then which of the following graph show corrrect relation between valence electrons in $P_{2} \rightarrow T_{2}$
(a) $\qquad$


## Answer: A

## - View Text Solution

72. Which of the following facts given is not correct?
(I) Bond length order, $\mathrm{H}_{2}^{-}-\mathrm{H}_{2}^{+}>\mathrm{H}_{2}$
(II) $\mathrm{O}_{2}^{+}, \mathrm{NO}, \mathrm{N}_{2}^{-}$have same bond order of $2 \frac{1}{2}$
(II) Bond order can assume any value including zero upto four
(IV) $\mathrm{NO}_{3}^{-}$and $\mathrm{BO}_{3}^{-}$have same order for $\mathrm{X}-\mathrm{O}$ bond (where X is central atom)
A. I, II and III
B. I and IV
C. II and IV
D. I and II

## Answer: B

## - View Text Solution

73. $N_{2}$ and $O_{2}$ are converted into mono-cations, $N_{2}^{+}$and $O_{2}^{+}$respectively.

Which of the following is wrong?
A. In $N_{2}^{+}$, the N-N bond weakens
B. In $\mathrm{O}_{2}^{+}$, the O-O bond order increase
C. In $\mathrm{O}_{2}^{+}$, the paramagnetism decrease
D. $N_{2}^{+}$becomes diamagnetic

## Answer: D

## - Watch Video Solution

74. In which of the following ionixation processes, the bond order has increased and the magnetic behaviour has changed ?
A. $C_{2}^{+} \rightarrow C_{2}$
B. $\mathrm{NO}^{-} \rightarrow \mathrm{NO}$
C. $\mathrm{O}_{2} \rightarrow \mathrm{O}_{2}^{+}$
D. $N_{2} \rightarrow N_{2}^{+}$

## Answer: A

## - Watch Video Solution

75. H.O.M.O (Highest Occupied Molecular Orbital ) of CO molecular is :
A. Non-bonding M.O. with slight antiboding character
B. Non-bonding M.O. with slight boding character
C. Pure non-bonding M.O.
D. None of above

## Answer: A

## - Watch Video Solution

76. The structure of $B_{3} N_{3} H_{6}$ is as follows:


How may derivations structures of $B_{3} N_{3} H_{4} X_{2}$ can be derived from the basic structure, by the replacement of two hydrogen atoms?
A. 2
B. 3
C. 4
D. 5

## Answer: C

## D Watch Video Solution

77. Correctly match is:
A. $d_{x^{2}-y^{2}}$ atomic orbital -one nodal plane
B. $p_{y}$ atomic orbital -Two nodal planes
C. $\sigma_{p_{x}}-\psi($ gerade $)$
D. $\Pi_{p_{y}}-\psi$ (ungerade)

## Answer: C

Watch Video Solution
78. Select correct statement (s) :
A. Acidic strength of $\mathrm{HBr}>\mathrm{HCl}$ but reverse is true for their reducing property
B. Basic strength of $\mathrm{PH}_{3}>\mathrm{AsH}_{3}$ but reverse is true for their bond angle
C. Dipole moment of $\mathrm{CH}_{3} \mathrm{Cl}>\mathrm{CH}_{3} \mathrm{~F}$ but reverse is true for their $\mathrm{H} \hat{C} H$ bond angle
D. $K_{a_{1}}$ of fumaric acid is higher than maleic acid but reverse is true for their $K_{a_{2}}$

## Answer: C

## D View Text Solution

79. Consider the given figure showing the formation of $H_{2}^{+}$ion dependin on internuclear distance versus potential energy of the system


Which is correct statement :
A. Curve-1 represents the most stable state of the system for $\mathrm{H}_{2}^{+}$
B. Curve-2 represents the most stable state of the system for $\mathrm{H}_{2}^{+}$
C. Curve-1 indicates that the molecular hydrogen ion is formed
D. Curve-2 represents the energy level of the antibonding region

## Answer: B

## - View Text Solution

80. Molecule having non-polar as well as polar bonds but the molecule as a whole is polar
A. $S_{2} F_{2}$
B. $\mathrm{N}_{2} \mathrm{O}_{4}$
C. $\mathrm{Si}_{2} \mathrm{H}_{6}$
D. $I_{2} \mathrm{Cl}_{6}$

## Answer: A

## - View Text Solution

81. Choose the correct statement regarding $\mathrm{SeOCl}_{2}$ molecule :
A. It does not contain plane of symmtry
B. $\mathrm{Cl}-\mathrm{S}-\mathrm{Cl}$ ' bond angle is greater than ' $\mathrm{Cl}-\mathrm{Se}-\mathrm{O}$ ' bond angle
C. Lone pair has greater than 33.\% s-character
D. Central atom used one d-ordital in bonding

## Answer: D

## - View Text Solution

82. In which species, X-O bond order is 1.5 and contains $p \pi-d \pi$ bond(s)
A. $\mathrm{IO}_{2} \mathrm{~F}_{2}$
B. $\mathrm{HCOO}^{-}$
C. $\mathrm{SO}_{3}^{2-}$
D. $\mathrm{XeO}_{2} \mathrm{~F}_{2}$

## Answer: A

## - View Text Solution

83. Which of the following species has polar and non-polar bonds but molecule as a whole is non-plonar?
A. $\mathrm{S}_{2} \mathrm{O}_{3}^{2-}$
B. $(S C N)_{2}$
C. $\mathrm{Be}_{2} \mathrm{Cl}_{4}$
D. $\mathrm{Si}_{2} \mathrm{H}_{6}$

## Answer: D

## - View Text Solution

84. The incorrect statement (s) regarding ${ }^{-}(C) X_{3}$
A. If electronegativity of surrounding element $X$ is less than 2.5 , then central carbon atom used almost $33 \%$ s-character in their hybrid bonding orbital
B. If electronegativity of surrounding element $X$ is less than 2.5 , then central carbon atom used almost $25 \%$ s-character in their hybrid bonding orbital
C. If $X$ is $F$, then species should be polar and pyramidal
D. If X is H , then species should be polar and planar

## Answer: D

## - View Text Solution

85. Consider following compounds,
(i) $\mathrm{H}_{3} \mathrm{X}-\mathrm{HCS}$ (ii) $\mathrm{H}_{3} \mathrm{Y}-\mathrm{NCS}$ (iii) $\left(\mathrm{H}_{3} \mathrm{Y}\right)_{2} \mathrm{O}$ (iv) $\left(\mathrm{H}_{2} \mathrm{X}\right)_{2} \mathrm{O}$

The incorrect statement regarding given compounds is :
A. If $Y$ is carbon in compounds (ii) and (iv), then both are bent
B. If X is silicon in compounds (i) and (iii), then both are linear
C. If $X$ is carbon and $Y$ is silicon, the compound (i) is more basic than compound (ii)
D. If $X$ is silicon and $Y$ is carbon, then $X-O-X$ bond angle compounds (iii) is greater than $\mathrm{Y}-\mathrm{O}-\mathrm{Y}$ bond angle in compounds (iv)

## Answer: B

## D View Text Solution

86. The incorrect statement about carbene $\left(\mathrm{CH}_{2}\right)$ is :
A. In singler carbene, carbon is $s p^{2}$-hybridized whereas in triplet carbene, carbon is sp-hybridized
B. Triplet carbene is less stable than singlet carbene
C. Stability order of singlet halocarbenes is: $\mathrm{CHF}>\mathrm{CHCl}>\mathrm{CHBr}$
D. None of the above

## Answer: B

## - Watch Video Solution

87. The lowest O-O bond length in the following molecule is :
A. $O_{2} F_{2}$
B. $\mathrm{O}_{2}$
C. $\mathrm{H}_{2} \mathrm{O}_{2}$
D. $\mathrm{O}_{3}$

## Answer: B

## - Watch Video Solution

88. Out of $\mathrm{CHCl}_{3}, \mathrm{CH}_{4}$ and $\mathrm{SF}_{4}$ the molecules do not having regular geometry are:
A. $\mathrm{CHCl}_{3}$ only
B. $\mathrm{CHCl}_{3}$ and $\mathrm{SF}_{4}$
C. $\mathrm{CH}_{4}$
D. $\mathrm{CH}_{4}$ and $\mathrm{SF}_{4}$

## Answer: B

89. When iodine is dissolved in aqueous potassium iodide, the shape of the species formed is:
A. linear
B. angular
C. triangular
D. see-saw

## Answer: A

## - Watch Video Solution

90. Which of the following set of species have planar structure?
A. $I_{3}^{-}, \mathrm{CH}_{3}, \mathrm{Cl}_{3}^{-}, \mathrm{SiF}_{6}^{2-}$
B. $\mathrm{I}_{3}^{+}, \mathrm{ICl}_{4}^{-}, \mathrm{Al}_{2} \mathrm{Cl}_{6}, \mathrm{TeCl}_{4}$
C. $\mathrm{SCl}_{2}, \mathrm{~N}_{2} \mathrm{O}_{5}, \mathrm{SF}_{4}$
D. $\mathrm{I}_{2} \mathrm{Cl}_{6}, \mathrm{XeF}_{2}, \mathrm{BrF}_{4}^{-}, \mathrm{XeF}_{5}^{-}$

## Answer: D

## - Watch Video Solution

91. Which of the following compounds have the same no. of lone pairs with their central atom?
(I) $\mathrm{XeF}_{5}^{-}$(II) $\mathrm{BrF}_{3}$ (III) $\mathrm{XeF}_{2}$ (IV) $\mathrm{H}_{3} \mathrm{~S}^{+}$(V) Triple methylene
A. (IV) and (V)
B. (I) and (III)
C. (I) and (II)
D. II, IV and V

## Answer: C

92. Given the correct order of initials T or F for following statements. Use $T$ if statements is true and $F$ it it is false:
(I) $\left(\mathrm{CH}_{3}\right)_{2} P\left(\mathrm{CF}_{3}\right)_{3}$ is non-palar and $\left(\mathrm{CH}_{3}\right)_{3} P\left(\mathrm{CF}_{3}\right)_{2}$ is polar molecule (II) $\mathrm{CH}_{3} \hat{\mathrm{P}} \mathrm{CH}_{3}$ bond angle are equal in $\left(\mathrm{CH}_{3}\right)_{3} P\left(\mathrm{CF}_{3}\right)_{2}$ molecule
(III) $P F_{3}$ will be more soluble in polar solvent than $\mathrm{SiF}_{4}$
A. TTF
B. FFT
C. FFF
D. FTT

## Answer: D

## - Watch Video Solution

93. The correct sequence of polarity of the following molecule
(3) $\mathrm{PCl}_{3} \mathrm{~F}_{2}(4) \mathrm{PCl}_{2} \mathrm{~F}_{3}$

## - View Text Solution

94. Which among the followiing molecules is not perfect flat?
A. $B_{3} N_{3} H_{6}$
B. $\mathrm{C}_{3} \mathrm{~N}_{3}\left(\mathrm{NH}_{2}\right)_{3}$
C. $\mathrm{SO}_{3}$
D. $C_{3} N_{3}\left(N_{3}\right)_{3}$

## Answer: B

## - Watch Video Solution

95. Which of the following structure(s) is /are non-planar?
A. $\mathrm{Na}_{3} \mathrm{~B}_{3} \mathrm{O}_{6}$
B. $\mathrm{I}_{2} \mathrm{Cl}_{6}$
C. Sheet silicate
D. Inorganic graphite layer

## Answer: C

## - Watch Video Solution

96. Nodal planes of $\pi$-bonds in $\mathrm{CH}_{2}=\mathrm{C}=\mathrm{C}=\mathrm{CH}_{2}$ are located in,
A. All are in molecular plane
B. Two in molecular plane and one in a plane perpendicular to molecular plane which contains C-C sigma-bond
C. On is molecular plane and two in plane perpendicular to molecular plane which contains C-C sigma-bonds
D. Two in molecular plane and one in a perpendicular to molecular plane which bisects C-C sigma-bonds at right angle.

## Answer: B

## D Watch Video Solution

97. Which of the following have X-O-X linkage ?
(where X is central atom):
(i) $\mathrm{Cr}_{2} \mathrm{O}_{7}^{2-}$ (ii) $\mathrm{S}_{2} \mathrm{O}_{3}^{2-}$ (iii) pyrosilicate (iv) Hyponitrous acid
A. (i) and (iii)
B. (iii) and (iv)
C. (i), (iii) and (iv)
D. (i) and (ii)

## Answer: A

## - Watch Video Solution

98. Select the correct statements:
A. $\mathrm{HSO}_{5}^{-}$ion has one S-O-H linkage
B. Number of B-O-B linkage in Borax is equal to number of P-O-P
linkage in $\mathrm{P}_{4} \mathrm{O}_{10}$
C. Hybridization of both sulphur in $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{8}$ (pyrosulphurous acid) is same but oxidation state of both sulphur are different
D. Tetra-polyphosphoric acid has four P-O-P and no P-P linkage

## Answer: C

## - View Text Solution

99. Oxidation state of ' S ' in peroxodisulphuric acid and sodium tetrathionate:
A. $+6,+5,0$
B. $+6,+6,+6$
C. $+6,+4,+2$
D. $+6,+2,0$

## Answer: A

## - Watch Video Solution

100. Structure of $\mathrm{Na}_{2}\left[\mathrm{~B}_{4} \mathrm{O}_{5}(\mathrm{OH})_{4}\right] \cdot 8 \mathrm{H}_{2} \mathrm{O}$ contains
A. two triangular and two tetrahedral units
B. three triangular and one tetrahedral units
C. all tetrahedral units
D. all triangular units

## Answer: A

## - Watch Video Solution

101. Which of the following molecular species is not linear?
A. $(C N)_{2}$
B. $O C N^{-}$
C. $\mathrm{XeF}_{2}$
D. $\mathrm{XeF}_{2}$

## Answer: D

## - Watch Video Solution

102. Incorrect match is :

## Electron geometry

(a) Tetrahedron
-

## -

- 
- 

Possible molecular shape from respective electron geometry Bent
Triangular planar
Square pyramidal
Pentagonal planar

## - <br> Watch Video Solution

103. Consider the following reactions:
$M X_{4}+X_{2}^{\prime} \rightarrow M X_{4} X_{2}{ }^{\prime}$

If atomic number of M is 52 and X and $\mathrm{X}^{\prime}$ are halogens and $\mathrm{X}^{\prime}$ is more electonegative than X . The choose correct statemetn regarding given information:
A. Both $X^{\prime}$ atoms occupy axial positions which are formed by overlaping of $p$ and $d$-orbitals only
B. All $\mathrm{M}-\mathrm{X}$ bond lengths are identical in both $M X_{4}$ and $M X_{4} X^{\prime}{ }_{2}$ compounds
C. Central atom ' $M$ ' does not use anyone valence non-axial set of $d$ orbitals in hybridization of final product
D. Hybridization of central atom ' $M$ ' remains same in both reactant and final product

## Answer: C

## - Watch Video Solution

104. Select the correct statements:

|  | Statement | Shape | Example |
| :---: | :---: | :---: | :---: |
| (a) | $\begin{aligned} & \text { Bond pair has > } \\ & \text { p-character } \end{aligned}$ | $8$ | HF |
| (b) | Reduction in axial bond angle is more than that of in equatorial bond angle | $\%$ | SF4 |
| (c) | Two axial $d$-orbitals and one non-axial $d$-orbital are used in hybridization | $\%$ | $\mathrm{XeF}_{5}^{-}$ |
| (d) | Two $p$-orbitals are used in hybridization | $\ell$ | $\mathrm{SnCl}_{2}$ |

## View Text Solution

105. In which of the following species, d-obitals having xz an yz two nodal planes involved in hybridization of central atoms?
A. $\mathrm{IO}_{2} \mathrm{~F}_{2}^{-}$
B. $\mathrm{ClF}_{4}^{-}$
C. $\mathrm{IF}_{7}$
D. None of these

## Answer: C

106. The correct order of increasing s-character (in percentage) in the hybrid orbitals of following molecules/ions is: (I) $\mathrm{CO}_{3}^{2-}$ (II) $\mathrm{XeF}_{4}$ (III) $I_{3}^{-}$(IV) $\mathrm{NCl}_{3}(\mathrm{~V}) \mathrm{BeCl}_{2}$
A. II $<$ III $<$ IV $<$ I $<V$
B. II $<$ IV $<$ III $<V<I$
C. III $<$ II $<$ I $<V<I V$
D. II $<$ IV $<$ III $<$ I $<V$

## Answer: A

## - View Text Solution

107. The shapes of $\mathrm{MnO}_{4}^{-}$ion and the hybridization of Mn in $\mathrm{MnO}_{4}^{-}$is :
A. tetrahedral, $s p^{3}$
B. tetrahedral, $d^{3} s$
C. square planar , $d s p^{2}$
D. square planar , $s p^{3}$

## Answer: B

## - View Text Solution

108. Which one of the following molecule will have all equal $X-F$ bonds length? (where $\mathrm{X}=$ Central atom)
A. $\mathrm{SOCl}_{2} \mathrm{~F}_{2}$
B. $\mathrm{SeF}_{4}$
C. $\mathrm{PBr}_{2} \mathrm{~F}_{3}$
D. $I F_{7}$

## Answer: A

109. Consider the following information ( $\mathrm{F}=\mathrm{F}$ or Cl )

| Molecule | $\mathbf{P}-\mathbf{X}$ (axial) bond length | $\mathbf{P}-\mathbf{X ( E q u i t o r i a l ) ~ b o n d ~ l e n g t h ~}$ |
| :---: | :---: | :---: |
| $\mathrm{PF}_{5}$ | $a$ | $b$ |
| $\mathrm{PF}_{4} \mathrm{CH}_{3}$ | $c$ | $d$ |
| $\mathrm{PF}_{3}\left(\mathrm{CH}_{3}\right)_{2}$ | $e$ | $f$ |
| $\mathrm{PCl}_{5}$ | $g$ | $h$ |

According to given information choose the incorrect order of bond length :
A. $g>a>d>b$
B. $g>e>f>b$
C. $f>d>a>b$
D. $c>f>d>b$

## Answer: C

## D View Text Solution

110. In which of the following cases $C-C$ bond length will be highest?
A. $\mathrm{CH}_{3}-\mathrm{CF}_{3}$
B. $\mathrm{FCH}_{2}-\mathrm{CH}_{2} \mathrm{~F}$
C. $\mathrm{F}_{2} \mathrm{CH}-\mathrm{CHF}_{2}$
D. $\mathrm{CF}_{3}-\mathrm{CF}_{3}$

## Answer: B

## - View Text Solution

111. In which of the following cases $C-C$ bond length will be highest?
(I) In $N_{2} F_{4}$, d-orbitals are contracted by electronegative flourine atoms, but d-orbitals contraction is not possible by H -atoms in $\mathrm{N}_{2} \mathrm{H}_{4}$
(II) The $N-N$ bond energy in $N_{2} F_{4}$ is more than $N-N$ bond energy in $\mathrm{N}_{2} \mathrm{H}_{4}$
(III) The $N-N$ bond length in $N_{2} F_{4}$ is more than that of in $N_{2} F_{4}$
(IV) The $N-N$ bond length in $N_{2} F_{4}$ is less than that of in $N_{2} H_{4}$ choose the correct codes:
A. I, II and III
B. I and III
C. II and IV
D. II and III

## Answer: B

## - View Text Solution

112. The correct order of equatorial FSF bond angle in the folllowing compound.
(I)SF ${ }_{4}$ (II) OSF $_{4}$ (III) $\mathrm{H}_{2} \mathrm{CSF}_{4}$
A. III $>$ II $>$ I
B. $I>$ III $>$ II
C. $I>$ II $>$ III
D. $I I>$ III $>$ I

## Answer: D

113. Incorrect orders of bond angle is :
A. $\mathrm{Ocl}_{2}>\mathrm{SF}_{2}>\mathrm{AsH}_{2}>\mathrm{H}_{2} \mathrm{Se}$
B. $\mathrm{NH}_{3}>\mathrm{PF}_{3}>\mathrm{PH}_{3}>\mathrm{H}_{2} \mathrm{~S}$
C. $\mathrm{XeO}_{4}>\mathrm{ClO}_{4}^{-}>\mathrm{SO}_{4}^{-}>\mathrm{CF}_{4}$
D. $N\left(\mathrm{SiH}_{3}\right)_{3}>\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}>\mathrm{OMe}_{2}$

## Answer: C::D

## - View Text Solution

114. Minimum $F-S-F$ bond angle present in :
A. $\mathrm{SSF}_{2}$
B. $S F_{6}$
C. $S F_{2}$

## D. $F_{3} S S F$

## Answer: D

## - View Text Solution

115. The correct order of increasing bond angle is
A. $\mathrm{OF}_{2}<\mathrm{ClO}_{2}<\mathrm{H}_{2} \mathrm{O}<\mathrm{Cl}_{2} \mathrm{O}$
B. $\mathrm{OF}_{2}<\mathrm{H}_{2} \mathrm{O}<\mathrm{Cl}_{2} \mathrm{O}<\mathrm{ClO}_{2}$
C. $\mathrm{OF}_{2}<\mathrm{H}_{2} \mathrm{O}<\mathrm{ClO}_{2}<\mathrm{Cl}_{2} \mathrm{O}$
D. $\mathrm{ClO}_{2}<\mathrm{OF}_{2}<\mathrm{H}_{2} \mathrm{O}<\mathrm{Cl}_{2} \mathrm{O}$

## Answer: B

## - View Text Solution

116. The correct order of bond anlge is :
A. $\left.\mathrm{NO}_{2}^{-}>\mathrm{NO}_{2}^{+}>\mathrm{NO}_{2}\right)$
B. $\mathrm{NO}_{2}^{+}>\mathrm{NO}_{2}^{+}>\mathrm{NO}_{2}$
C. $\mathrm{NO}_{2}>\mathrm{NO}_{2}^{+}>\mathrm{NO}_{2}^{-}$
D. $\mathrm{NO}_{2}^{+}>\mathrm{NO}_{2}>\mathrm{NO}_{2}^{-}$

## Answer: D

## - View Text Solution

117. Which one is correct for bond angle?
A. $\mathrm{PF}_{3}>\mathrm{PCl}_{3}$
B. $\mathrm{OCl}_{2}=\mathrm{ClO}_{2}$
C. $\mathrm{NF}_{3}>\mathrm{NH}_{3}$
D. $\mathrm{PCl}_{3}>\mathrm{PF}_{3}$

## Answer: D

118. In molecules of the type $A X_{2} I_{n}$ (where $L$ represents lone pair and n is its number) there exists a bond between element A and X . The $\angle X A X$ bond angle
A. Always decrease if n increase
B. Always increase if n increase
C. Will be maximum for $n=3$
D. generally decrease if n decrease

## Answer: C

## - View Text Solution

119. Which of the following solid has maximum melting points?
A. NaCl
B. Ice
C. Dry ice
D. $\mathrm{SiO}_{2}$

## Answer: D

## - View Text Solution

120. The melting points of $A l F_{3}$ is $104^{\circ}$ and that of $S i F_{4}$ is $-77^{\circ}$ (it sublimes) because:
A. there is a very large difference in the ionic character of the Al-F and

Si-F bonds
B. in $A l F_{3}, \mathrm{Al}^{3+}$ interacts very strongly with the neighbouring $F^{-}$ions
to given a three dimenstional structure but in $\mathrm{SiF}_{4}$ no such interaction is possible
C. the silicon ion in the tetrahedral $\mathrm{SiF}_{4}$ molecules is not shielded
effectively from the flouride ions whereas in $\mathrm{AlF}_{3}$, the $\mathrm{Al}^{3+}$ ion is
shielded on all sides
D. the attractive forces between the $\mathrm{SiF}_{4}$ molecules are strong whereas those between the $\mathrm{AlF}_{3}$ molecules are weak

## Answer: B

## - View Text Solution

121. The correct order of boiling point is:
A. $T_{2}<D_{2}>H_{2}$
B. n-pentane < neo-pentane
C. $\mathrm{Xe}<\mathrm{Ar}<\mathrm{He}$
D. m-nitrophenol > o-nitrophenol

## Answer: D

$$
K_{a_{1}}\left(-H^{+}\right) \quad K_{a_{2}}\left(-H^{+}\right)
$$

122. Cis butene dioic acid $\leftarrow X_{1}^{-} \leftrightarrow X_{2}^{-}$

$$
K_{a_{1}}\left(-H^{+}\right) \quad K_{a_{2}}\left(-H^{+}\right)
$$

Trans-butene dioic acid $\quad \leftarrow Y_{1}^{-} \leftrightarrow Y_{2}^{-}$
The incorrect statement regarding above information is:
A. $X_{2}^{2-}$ species is more basic than $Y_{2}^{2-}$ species
B. $X_{1}^{-}$species is more basic than $Y_{1}^{-}$species
C. $K_{a_{1}}$ is greater than $K_{a_{1}}^{\prime}$
D. $K_{a_{2}}$ is greater than $K_{a_{2}}^{\prime}$

## Answer: B

## - View Text Solution

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

(b)

B.

D. None

## Answer: C

## - View Text Solution

124. The H -bonds in solid HF can be best represented as :
A. $H-F \ldots . H-F \ldots H-F$
B.

(c) $\mathrm{H}^{\mathrm{F}} \underset{{ }_{-}}{\mathrm{H}} \mathrm{H}^{\mathrm{P}}$
C.

D.

## Answer: C

## D View Text Solution

125. The type of molecular forces of attraction present in the following compounds is :

A. Intermolecular H -bonding
B. Intramolecular H -bonding
C. van der waal's force
D. All of these

Answer: D
126. Which of the following interaction lies in the range of $8-42 \mathrm{kH} / \mathrm{mol}$ ?
A. $\mathrm{H}_{2} . \mathrm{H}_{2} \mathrm{O}$
B. HCl . HCl
C. $F^{-} \ldots H F$
D. $\mathrm{HCN} . . . \mathrm{NH}_{3}$

## Answer: D

## - View Text Solution

127. The incorrect order is:
A. Covalent character : $\mathrm{PbCl}_{2}>\mathrm{CaCl}_{2}>\mathrm{SrCl}_{2}>\mathrm{BaCl}_{2}$
B. Thermal stability : $\mathrm{PbF}_{4}>\mathrm{PbCl}_{4}>\mathrm{PbBr}_{4}>\mathrm{PbI}_{4}$
C. Melting point : $\mathrm{KF}>\mathrm{KCl}>\mathrm{KBr}>\mathrm{KI}$
D. Boiling point : $\mathrm{CHCl}_{3}>\mathrm{CH}_{3} \mathrm{Cl}>\mathrm{CCl}_{4}$

Answer: D

## - View Text Solution

128. If $\mathrm{CdI}_{2}$ is pink in colour,then the $\mathrm{CdCl}_{2}$ will be ' $\qquad$ ' coloured.
A. Yellow
B. Red
C. Blue
D. connot be predicted

## Answer: D

## - Watch Video Solution

129. Which order are correct?
(I) Thermal stability : $\mathrm{BeSO}_{4}<\mathrm{MgSO}_{4}<\mathrm{CaSO}_{4}<\mathrm{SrSO}_{4}<\mathrm{BaSO}_{4}$
(II) Basic nature: $\mathrm{ZnO}>\mathrm{BeO}>\mathrm{MgO}>\mathrm{CaO}$
(III) Solubility in water: $\mathrm{LiOH}>\mathrm{NaOH}>\mathrm{KOH}>\mathrm{RbOH}>\mathrm{CsOH}$
(IV)Melting point : $\mathrm{NaCl}>\mathrm{KCl}>\mathrm{RbCl}>\mathrm{CaCl}>\mathrm{LiCl}$
A. (I), (IV)
B. (I), (II) and (IV)
C. (II), (III)
D. All correct

## Answer: A

## D View Text Solution

130. The correct solubility order is/are
(I) $\mathrm{CaCO}_{3}>\mathrm{SrCO}_{3}>\mathrm{BaCO}_{3}$ (II) $\mathrm{Li}_{2} \mathrm{CO}_{3}<\mathrm{Na}_{2} \mathrm{CO}_{3}>\mathrm{K}_{2} \mathrm{CO}_{3}$
(III) $K_{2} \mathrm{CO}_{3}<\mathrm{Rb}_{2} \mathrm{CO}_{3}<\mathrm{Cs}_{2} \mathrm{CO}_{3}$ (IV) $\mathrm{Na}_{2} \mathrm{CO}_{3}>\mathrm{K}_{2} \mathrm{CO}_{3}>\mathrm{Rb}_{2} \mathrm{CO}_{3}$
A. II, IV
B. I, IV
C. II, III, IV
D. I, II, III

## Answer: D

## - View Text Solution

131. On heating to $400-500^{\circ} \mathrm{C}$, relatively unstable hydrides and carbonates decompose. Which of the following will decompose when heated to $400-500^{\circ} \mathrm{C}$
A. II, III
B. I, II, III
C. I, III
D. III, IV

## D Watch Video Solution

132. Both $\mathrm{N}\left(\mathrm{SiH}_{3}\right)_{3}$ and $\mathrm{NH}\left(\mathrm{SiH}_{3}\right)_{2}$ compounds have trigonal planar skeleton. Incorrect statement about both compounds is :
A. SiNSi bond angle in $\mathrm{NH}\left(\mathrm{SiH}_{3}\right)_{2}>\mathrm{SiNSi}$ bond angle in $\left.\mathrm{N}\left(\mathrm{SiH}_{3}\right)_{3}\right)$
B. $\mathrm{N}-\mathrm{Si}$ bond length in $\mathrm{NH}\left(\mathrm{SiH}_{3}\right)_{2}>\mathrm{N}-\mathrm{Si}$ bond length in $\left.N\left(\mathrm{SiH}_{3}\right)_{3}\right)$
C. $\mathrm{N}-\mathrm{Si}$ bond length in $\mathrm{NH}\left(\mathrm{SiH}_{3}\right)_{2}<\mathrm{N}-\mathrm{Si}$ bond length in $\left.N\left(\mathrm{SiH}_{3}\right)_{3}\right)$
D. Back bonding strength in $\mathrm{NH}\left(\mathrm{SiH}_{3}\right)_{2}>$ Back bonding strength in $\left.N\left(\mathrm{SiH}_{3}\right)_{3}\right)$

## Answer: B

133. The incorrect statement regarding $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ and $\mathrm{OCl}_{2}$ molecule is/are
A. The strength of back bonding is more in $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ molecule than $\mathrm{Ocl}_{2}$ molecule
B. $\mathrm{Si}-\mathrm{O}-\mathrm{Si}$ bond angle in $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ is greater than $\mathrm{Cl}-\mathrm{O}-\mathrm{Cl}$ bond angle in $\mathrm{OCl}_{2}$
C. The nature of back in both molecules is $2 p_{x}-3 d_{\pi}$
D. Hybridisation of central O-atom in both molecules is same

## Answer: D

## - View Text Solution

134. Among following molecule $N-S i$ bond length is shortest:
A. $N\left(\mathrm{SiH}_{3}\right)_{3}$
B. $\mathrm{NH}\left(\mathrm{SiH}_{3}\right)_{2}$
C. $\mathrm{NH}_{2}\left(\mathrm{SiH}_{3}\right.$
D. All have equal $N-S i$ bond length

## Answer: C

## - Watch Video Solution

135. Which of the following molecule has weakest $(p \pi-d \pi)$ back bonding?
A. $\mathrm{OCl}_{2}$
B. $N\left(\mathrm{SiH}_{3}\right)_{3}$
C. $\mathrm{SiF}_{3}$
D. $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$

## Answer: A

136. "hybridization of central atom does not always change due to back bonding". This statement is valid for which of the following compounds?
(i) $\mathbb{C l}_{3}^{-}$(ii) $\mathbb{C l}_{2}$ (iii) $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ (iv) $N\left(\mathrm{SiH}_{3}\right)_{3}$
A. (i) and (ii)
B. (i) and (iii)
C. (ii) and (iii)
D. All

## Answer: A

## - Watch Video Solution

137. The geometry with respect to the central atom of the following molecules are:
$N\left(\mathrm{SiH}_{3}\right)_{3}: \mathrm{Me}_{3} \mathrm{~N}:\left(\mathrm{SiH}_{3}\right)_{3} P$
A. planar, pyramidal, planar
B. planar, pyramidal, pyramidal
C. pyramidal, pyramidal, pyramidal
D. pyramidal, planar, pyramidal

## Answer: B

## - View Text Solution

138. Incorrect statement regarding $\mathrm{BF}_{3} \mathrm{NH}_{3}$ molecule is :
A. FBF bond angle < $120^{\circ}$
B. HNH bond angle > $109^{\circ} 28^{\prime}$
C. Exhibits intermolecular H-bond
D. hybridization of N -atom is $s p^{3}$

## Answer: D

139. In which of the following molecules $\mu$ (oberved) is found to be greater than $\mu$ (theoretical):
A. $\mathrm{CHCl}_{3}$
(b)

B.
(c)

C.
(d)

D.

## Answer: D

- View Text Solution

140. Among the following, the molecule with the highest dipole moment is :
A. $\mathrm{CH}_{3} \mathrm{Cl}$
B. $\mathrm{CH}_{2} \mathrm{Cl}_{2}$
C. $\mathrm{CHCl}_{3}$
D. $\mathrm{CCl}_{4}$

## Answer: A

## - Watch Video Solution

141. Which of the following compounds has dipole moment approximately equal to that of chlorobenzene?
A. O-dichlorobenzene
B. m-dichlorobenzene
C. p-dichlorobenzene
D. p-chloronitrobenzene

## Answer: B

## - Watch Video Solution

142. Which of the following bonds have lowest bond energy?
A. $C-C$
B. $N-N$
C. $H-H$
D. $O-O$

## Answer: D

## - Watch Video Solution

143. The bond having the minimum bond energy is :
A. $C-C$
B. $\mathrm{O}-\mathrm{O}$
C. $S$ - S
D. $P-P$

## Answer: B

## - Watch Video Solution

144. The correct increasing order of extent of hydrolysis is
A. $\mathrm{CCl}_{4}<\mathrm{MgCl}_{2}<\mathrm{AlCl}_{3}<\mathrm{SiCl}_{4}<\mathrm{PCl}_{5}$
B. $\mathrm{CCl}_{4}<\mathrm{AlCl}_{3}<\mathrm{MgCl}_{2}<\mathrm{PCl}_{5}<\mathrm{SiCl}_{4}$
C. $\mathrm{CCl}_{4}<\mathrm{SiCl}_{4}<\mathrm{PCl}_{5}<\mathrm{AlCl}_{3}<\mathrm{MgCl}_{2}$
D. $\mathrm{CCl}_{4}<\mathrm{PCl}_{5}<\mathrm{SiCl}_{4}<\mathrm{AlCl}_{3}<\mathrm{MgCl}_{2}$

## Answer: A

145. Inorganic benzene reacts with HCl to form a compounds $\mathrm{B}_{3} \mathrm{~N}_{3} \mathrm{H}_{9} \mathrm{Cl}_{3}$. The protonation occurs at:
A. B-atom
B. N -atom
C. First at B -atom than rearranges into N -atom
D. first at N -atom then rearranges into B -atom

## Answer: B

## - Watch Video Solution

146. Select the correct statements about hydrolysis of $B C l_{3}$ and $\mathrm{NCl}_{3}$ :
A. $\mathrm{NCl}_{3}$ is hydrolysis and gives HOCl but $\mathrm{BCl}_{3}$ is not hydrolysed
B. Both $\mathrm{NCl}_{3}$ and $\mathrm{BCl}_{3}$ on hydrolysis gives HCl
C. $\mathrm{NCl}_{3}$ on hydrolysis give HOCl but $\mathrm{BCl}_{3}$ gives HCl
D. Both $\mathrm{NCl}_{3}$ and $\mathrm{BCl}_{3}$ on hydrolysis gives HOCl

## Answer: C

## - Watch Video Solution

147. The incorrect statement regarding molecular orbital (s) is :
A. If there is a nodal plane perpendicular to the intermoleculear axis
and lying between the nuclei of bonded atoms then corresponding
orbitals is antibonding M.O.
B. If a nodal plane lies in the inter-nuclear axis, then corresponing orbitals is (pi) bonding M.O.
C. The $\sigma$-bonding molecular orbital does not contains the internuclear axis
D. The $\delta$-bonding molecular orbitals possesses three nodal planes containing the internuclear axis

## Answer: D

## D View Text Solution

148. Which of the following species absorb maximum energy in its HOMO - LUMO electronic transition?
A. $\mathrm{O}_{2}$
B. $N_{2}^{-}$
C. $C_{2}$
D. $N_{2}$

## Answer: D

## - Watch Video Solution

149. If $P$ to $T$ are second period $p$-block elements then which of the following graph show corrrect relation between valence electrons in
$P_{2} \rightarrow T_{2}$
(a)

Valence electron
A.
(b)

B.
(c)

C.
(d)

D.

## Answer: A

150. Which of the following facts given is not correct?
(I) Bond length order, $\mathrm{H}_{2}^{-}-\mathrm{H}_{2}^{+}>\mathrm{H}_{2}$
(II) $\mathrm{O}_{2}^{+}, \mathrm{NO}, \mathrm{N}_{2}^{-}$have same bond order of $2 \frac{1}{2}$
(II) Bond order can assume any value including zero upto four
(IV) $\mathrm{NO}_{3}^{-}$and $\mathrm{BO}_{3}^{-}$have same order for $\mathrm{X}-\mathrm{O}$ bond (where X is central atom)
A. I, II and III
B. I and IV
C. II and IV
D. I and II

## Answer: B

## - View Text Solution

151. $N_{2}$ and $\mathrm{O}_{2}$ are converted to monocations $\mathrm{N}_{2}^{+}$and $\mathrm{O}_{2}^{+}$respectively, which is wrong statement:
A. $\ln N_{2}^{+}$, the N-N bond weakens
B. In $\mathrm{O}_{2}^{+}$, the O-O bond order increase
C. In $\mathrm{O}_{2}^{+}$, the paramagnetism decrease
D. $N_{2}^{+}$becomes diamagnetic

## Answer: D

## - View Text Solution

152. In which of the following transformations, the bond order has increased and the magnetic behaviour has changed?
A. $C_{2}^{+} \rightarrow C_{2}$
B. $\mathrm{NO}^{-} \rightarrow \mathrm{NO}$
C. $O_{2} \rightarrow O_{2}^{+}$
D. $N_{2} \rightarrow N_{2}^{+}$
153. H.O.M.O(Highest Occupied Molecular Orbital ) of CO molecular is :
A. Non-bonding M.O. with slight antiboding character
B. Non-bonding M.O. with slight boding character
C. Pure non-bonding M.O.
D. None of above

## Answer: A

## - View Text Solution

154. The structure of $B_{3} N_{3} H_{6}$ is as follows:


How may derivations structures of $B_{3} N_{3} H_{4} X_{2}$ can be derived from the basic structure, by the replacement of two hydrogen atoms?
A. 2
B. 3
C. 4
D. 5

## Answer: C

## D View Text Solution

155. Correctly match is:
A. $d_{x^{2}-y^{2}}$ atomic orbital -one nodal plane
B. $p_{y}$ atomic orbital -Two nodal planes
C. $\sigma_{p_{x}}-\psi($ gerade $)$
D. $P_{p_{y}}-\psi$ (ungerade)

## Answer: C

## - View Text Solution

156. Select correct statement (s) :
A. Acidic strength of $\mathrm{HBr}>\mathrm{HCl}$ but reverse is true for their reducing property
B. Basic strength of $\mathrm{PH}_{3}>\mathrm{AsH}_{3}$ but reverse is true for their bond angle
C. Dipole moment of $\mathrm{CH}_{3} \mathrm{Cl}>\mathrm{CH}_{3} \mathrm{~F}$ but reverse is true for their $\mathrm{H} \hat{C} H$ bond angle
D. $K_{a_{1}}$ of fumaric acid is higher than maleic acid but reverse is true for their $K_{a_{2}}$

## Answer: C

## D View Text Solution

## Level 3

1. Colour of compounds occurs due to phenomenon of polarisation, charge transfer, $\mathrm{d}-\mathrm{d}$ transition and H.O.M.O.L.U.M.O transition. Most of the
transition metal transition metal complex compound are coloured either due to d -d electrons transition or charge transfer and ionic compounds are coloured due to polarisation of anion. Q . Which of the following is correct about $\quad \mathrm{KFe}^{I I}\left[\mathrm{FeIII}\left(\mathrm{CN}_{6}\right)\right]$ and $\mathrm{KFe}^{I I I}\left[\mathrm{FeII}\left(\mathrm{CN}_{6}\right)\right]$ complex compounds?
A. Both are blue coloured compounds because colour arises due to dd electrons transition in Fe cation present outside the complex ion.
B. Both are blue coloured compounds because colour arises due to transfer of electron between $F e^{I I}$ and $F e^{I I I}$ cation
C. Both are blue coloured compounds because in complexes $\mathrm{Fe}^{I I}$ cation shows same d-d transition bond
D. Complex (I) has blue colour becouse (II) has brown colour

## Answer: B

## - Watch Video Solution

2. Colour of compounds occurs due to phenomenon of polarisation, charge transfer, d-d transition and H.O.M.O.L.U.M.O transition. Most of the transition metal transition metal complex compound are coloured either due to $d$-d electrons transition or charge transfer and ionic compounds are coloured due to polarisation of anion. Q . If $\mathrm{MCl}_{4}$ salt is white, then comment on colour of its iodine salt.
A. Coloured
B. White
C. May be or coloured
D. Black

## Answer: C

## - View Text Solution

3. Colour of compounds occurs due to phenomenon of polarisation, charge transfer, d -d transition and H.O.M.O.L.U.M.O transition. Most of the transition metal transition metal complex compound are coloured either
due to d-d electrons transition or charge transfer and ionic compounds are coloured due to polarisation of anion. Q. Choose incorrect statement.
A. Halogens are coloured due to HOMO-LUMO transition
B. During charge transfer, oxidation state of atoms changes
C. Higher the polarisation, more is colour intensity
D. Comple compound having no unpaired electron can not undergo dd transition and therefore it is colourless

## Answer: D

## - View Text Solution

4. Hydrogen bond is the given to the relatively weak secondry interaction between a hydrogen atom bound to an electronegative atom and another atom which is also generally electronegative and which has one or more lone pairs and can thus acts as a base. We can give the follwoing generalized representation of hydrogen bond.
$\delta-\quad \delta+$
X - H ...Y

Bond dissociation energy of H -bond ranges from 8 and $42 \mathrm{~kJ} / \mathrm{ol}$, and the most commonly encountred hydrogen bonds are $O-H \ldots O, N-H . . . O$ and $F-H . . E$.
Q. Among molecules of HCl , which of the following forces are present.
A. Interaction between two HCl molecules is found to be greater than $8 \mathrm{~kJ} / \mathrm{mol}$
B. Weak dipole-dipole interaction
C. Weak ion-dipole interactions
D. All of above

## Answer: B

## - Watch Video Solution

5. Hydrogen bond is the given to the relatively weak secondry interaction between a hydrogen atom bound to an electronegative atom and
another atom which is also generally electronegative and which has one or more lone pairs and can thus acts as a base. We can give the follwoing generalized representation of hydrogen bond.
$\delta-\quad \delta+$
X - H ...Y

Bond dissociation energy of H -bond ranges from 8 and $42 \mathrm{~kJ} / \mathrm{ol}$, and the most commonly encountred hydrogen bonds are $O-H \ldots . . O, N-H \ldots O$ and $F-H . . E$.
Q.Which of the following interaction has energy between $8-42 \mathrm{~kJ} / \mathrm{mol}$ ?
A. $\mathrm{Na}^{+}: \mathrm{CCl}_{4}$
B. $\mathrm{CHCl}_{3}: \mathrm{Br}^{-}$
C. $\mathrm{C}_{6} \mathrm{H}_{6}: \mathrm{CCl}_{4}$
D. $\mathrm{H}_{2} \mathrm{O}: \mathrm{HCN}$

## Answer: D

## - Watch Video Solution

6. The intermolecular forces of attraction (i.e., H -bonding and van der waal's forces) exist among polar and non-polar species which effect melting point, boiling point, solubility and viscosity of covalent compounds :
Q. Melting and boling points of halogen increase down the group due to
A. Increase in London dispersion forces
B. Increase in extent of polarity
C. Increase in Molecular mass
D. Both (a) and (b)

## Answer: D

## - Watch Video Solution

7. The intermolecular forces of attraction (i.e., H -bonding and van der waal's forces) exist among polar and non-polar species which effect melting point, boiling point, solubility and viscosity of covalent

## compounds :

Q.The type of molecular force of attraction present in the following compounds is

A. Intermolecular H-bonding
B. Intramolecular H-bonding
C. van der waal's force
D. All of these

## Watch Video Solution

8. The intermolecular forces of attraction (i.e., H -bonding and van der waal's forces) exist among polar and non-polar species which effect melting point, boiling point, solubility and viscosity of covalent compounds :
Q. Select the incorrect order of boiling point between the following compounds:
A. $\mathrm{N}_{3} \mathrm{H}<\mathrm{CH}_{3} \mathrm{~N}_{3}$
B. $\mathrm{Me}_{2} \mathrm{SO}_{4}<\mathrm{H}_{2} \mathrm{SO}_{4}$
C. $\mathrm{Me}_{3} \mathrm{BO}_{3}<\mathrm{B}(\mathrm{OH})_{3}$
D. $B F_{3}<B I_{3}$

## Answer: A

## - Watch Video Solution

9. There are five species P, Q, R, S and T. Spectroscopical analysis shows that $P, Q$ and $R$ are homonuclear diatomic species and have their bond order $2.5,1.5$ and 2.5 respectively and rest two species S and T are heteronuclear diatomic species and have bond order 3 and 2 respectively. All homonuclear diatomic species are paramagnetic and all heteronuclear species are diamagnetic in nature. $\mathrm{P}, \mathrm{R}, \mathrm{S}$ and T are monocovalent positive ion and $Q$ is monovalent negative ion:
Q. According to given information the incorrect match is :
A. $P=N_{2}^{+}$
B. $R=O_{2}^{+}$
C. $S=\mathrm{CO}^{+}$
D. $T=C N^{+}$

## Answer: C

## - Watch Video Solution

10. There are five species P, Q, R, S and T. Spectroscopical analysis shows that $P, Q$ and $R$ are homonuclear diatomic species and have their bond order $2.4,1.5$ and 2.5 respectively and rest two species S and T are heteronuclear diatomic species and have bond order 3 and 2 respectively. All homonuclear diatomic species are paramagnetic and all heteronuclear species are diamagnetic in nature. $\mathrm{P}, \mathrm{R}, \mathrm{S}$ and T are monocovalent positive ion and $Q$ is monovalent negative ion:
Q. The correct statement is :
A. If $P$ is having 13 electrons then removal of one electron retains its magnetic behaviour
B. If $Q$ is having 17 electrons then addition of one electron retains its magnetic behaviour
C. If $R$ is having 15 electrons then addition of one electron retains its magnetic behaviour
D. If T is having 12 electrons then addition of one electron retains its magnetic behaviour

## Answer: C

## - Watch Video Solution

11. There are five species P, Q, R, S and T. Spectroscopical analysis shows that $P, Q$ and $R$ are homonuclear diatomic species and have their bond order $2.5,1.5$ and 2.5 respectively and rest two species S and T are heteronuclear diatomic species and have bond order 3 and 2 respectively. All homonuclear diatomic species are paramagnetic and all heteronuclear species are diamagnetic in nature. P, R, S and T are monocovalent positive ion and $Q$ is monovalent negative ion:
Q. The incorrect statements is :
A. If $R$ has 15 electrons then bond order of $R$ is greater than its parent molecule
B. If $Q$ has 17 electrons then bond order of $Q$ is less than its parent molecule
C. If $P$ has 13 electrons then bond order of $P$ is greater than its parent molecule
D. On addition of two electrons in P (having 13 electrons) the bond order remains same

## Answer: C

## - Watch Video Solution

12. 

| Compound, $M X_{n}$ type $(n=2$ <br> or 3 or 4) | Value of $\cos \theta(\theta=$ bond angle between <br> equivalent hybrid orbitals $)$ |
| :---: | :---: |
| $P$ | -0.241 |
| $Q$ | 0.292 |
| $R$ | -0.5 |
| $S$ | -0.325 |
| $T$ | -0.469 |

In all expected compounds each central atom only uses its $s$ and $p$ orbitals in hybridization. The relationship between bond angle ' $\theta$ ' and decimal fraction of $s$ and $p$ character present in the equivalent orbitals is given by :
$\cos \theta=\frac{S}{S-1}=\frac{P-1}{P}, \mathrm{~s}=$ decimal fraction of s -character in the equivalent hybrid orbital and $\mathrm{P}=$ decimal fraction of p -character in the equivalent hybrid orbital.

Q. If the value n is 2 for compound $T$, then number of lone pair present at central atom of compound T will be :
A. 0
B. 1
C. 2
D. 3
13. The comcept of redistribution of energy in different orbitals of an atom associated with different energies to give new orbitals of equal (or somethimes it may be non-equal) energy oriented in space in definite directions is called hybridization and formed new orbitals are called hybrid orbitals. The bonds formed by such orbitals are called hybrid bonds. The process of mixing of orbitals itself requires some energy. Thus, some additional energy, is needed for the hybridisation (mixing) of atomic orbitals.
Q. Select from each set the molecule or ion having the smallest bond angle :
(i) $\mathrm{H}_{2} \mathrm{Se}, \mathrm{H}_{2} \mathrm{Te}$ and $\mathrm{PH}_{3}$
(ii) $\mathrm{NO}_{2}^{-}$and $\mathrm{NH}_{2}^{-}$
(iii) $\mathrm{POF}_{3}$ and $\mathrm{POCl}_{3}(X-P-X$ angle)
(iv) $\mathrm{OSF}_{2} \mathrm{Cl}_{2}$ and $\mathrm{SF}_{2}\left(\mathrm{CH}_{3}\right)_{2}$ ( $\mathrm{F}-\mathrm{S}-\mathrm{F}$ angle)
A. $\mathrm{H}_{2} \mathrm{Se}, \mathrm{NH}_{2}^{-} \mathrm{POF}_{3}$ and $\mathrm{OSF}_{2} \mathrm{Cl}_{2}$
B. $\mathrm{H}_{2} \mathrm{Te}, \mathrm{NO}_{2}^{-}, \mathrm{POF}_{3}$ and $\mathrm{SF}_{2}\left(\mathrm{CH}_{3}\right)_{2}$
C. $\mathrm{PH}_{3}, \mathrm{NH}_{2}^{-}, \mathrm{POCl}_{3}$ and $\mathrm{SF}_{2}\left(\mathrm{CH}_{3}\right)_{2}$
D. $\mathrm{H}_{2} \mathrm{Te}, \mathrm{NH}_{2}^{-}, \mathrm{POF}_{3}$ and $\mathrm{SF}_{2}\left(\mathrm{CH}_{3}\right)_{2}$

## Answer: D

## - View Text Solution

14. The comcept of redistribution of energy in different orbitals of an atom associated with different energies to give new orbitals of equal (or somethimes it may be non-equal) energy oriented in space in definite directions is called hybridization and formed new orbitals are called hybrid orbitals. The bonds formed by such orbitals are called hybrid bonds. The process of mixing of orbitals itself requires some energy. Thus, some additional energy, is needed for the hybridisation (mixing) of atomic orbitals.
Q. Which of the following statement is correct?
A. In $B r F_{3}$, maximum three halogen atoms can lie in same plane
B. In $\mathrm{CH}_{2} \mathrm{SF}_{2}\left(\mathrm{CH}_{3}\right)_{2}$ molecule all hydrogen atoms which bonded to $s-s p^{2}$ overlapping, lie in equitorial plane
C. In $\mathrm{OSCl}_{4}, \mathrm{Cl}-\mathrm{S}-\mathrm{Cl}$ equitorial bond angle is greater than $120^{\circ}$
D. Molecules $\mathrm{IOF}_{5}$ and $\mathrm{XeO}_{2} \mathrm{~F}_{4}$ have similar shape but have different number of lone pairs in whole molecule

## Answer: B

## - Watch Video Solution

15. The comcept of redistribution of energy in different orbitals of an atom associated with different energies to give new orbitals of equal (or somethimes it may be non-equal) energy oriented in space in definite directions is called hybridization and formed new orbitals are called hybrid orbitals. The bonds formed by such orbitals are called hybrid bonds. The process of mixing of orbitals itself requires some energy. Thus, some additional energy, is needed for the hybridisation (mixing) of atomic orbitals.
Q. In neutral moleule $\mathrm{XeO}_{n_{1}} F_{n_{2}}$, central atom has no lone pair and ratio of $n_{2}$ $\overline{n_{1}}$ is two, then which of the following orbitals does not participate in $n_{1}$ bonding ( $n_{1}$ and $n_{2}$ are natural numbers):
A. $d_{x^{2}}$
B. $p_{x}$
C. $d_{x^{2}-y^{2}}$
D. None of these

## Answer: D

## D Watch Video Solution

16. Drago suggested an emprical rule which is compatible with the energetics of hybridization. It will occupy a stereochemically inactive sorbital, and the bonding will be through p-orbitals and bond angles will be nearly $90^{\circ}$ if the electronegativity of the surrounding atoms is $\leq 2.5$.
Q. In which of the following molecule central atom has higher $\% \mathrm{~s}$ character in its bond pair:
A. $\mathrm{AsH}_{3}$
B. $\mathrm{GeH}_{3}$
C. $P_{4}$
D. $\mathrm{H}_{2} \mathrm{Se}$

## Answer: B

## - View Text Solution

17. Drago suggested an emprical rule which is compatible with the energetics of hybridization. It will occupy a stereochemically inactive sorbital, and the bonding will be through p-orbitals and bond angles will be nearly $90^{\circ}$ if the electronegativity of the surrounding atoms is $\leq 2.5$.
Q. Correct order of bond angle is :

$$
\text { A. } \mathrm{PH}_{4}^{+}>\mathrm{OF}_{2}>\mathrm{SF}_{2}>\mathrm{SbH}_{3}>\mathrm{H}_{2} \mathrm{Te}
$$

B. $\mathrm{OF}_{2}>\mathrm{SF}_{2}>\mathrm{PH}_{4}^{+}>\mathrm{SbH}_{3}>\mathrm{H}_{2} \mathrm{Te}$
C. $\mathrm{PH}_{4}^{+}>\mathrm{SF}_{2}>\mathrm{OF}_{2}>\mathrm{SbH}_{3}>\mathrm{H}_{2} \mathrm{Te}$
D. $\mathrm{SF}_{2}>\mathrm{OF}_{2}>\mathrm{PH}_{4}^{+}>\mathrm{SbH}_{3}>\mathrm{H}_{2} \mathrm{Te}$

## Answer: A

## - View Text Solution

18. According to hybridisation theory, the \% s-character in $s p, s p^{2}$ and $s p^{3}$ hybrid orbitals is 50, 33.3 and 25 respectively, but this is not true for all the species. When $\theta$ is the bond angle between equivalent hybrid orbitals then $\% \mathrm{~s}$ and p -character in hybrid orbitals (when only s and p-orbitals are involved in hybridisation) can be calculated by the following formula :
$\cos \theta=\frac{S}{S-1}=\frac{P-1}{P}$
Q. Two elements $X$ and $Y$ combined together to form a covalent compound. If $\%$ p-character is found to be $80 \%$ in a orbital then the hybridised state of central atom $X$ for the orbital is :

$$
\text { A. } s p^{2}
$$

B. $s p^{3}$
C. $s p^{4}$
D. $s p^{5}$

## Answer: C

## - Watch Video Solution

19. According to hybridisation theory, the $\% \mathrm{~s}$-character in $s p, s p^{2}$ and $s p^{3}$ hybrid orbitals is $50,33.3$ and 25 respectively, but this is not true for all the species. When $\theta$ is the bond angle between equivalent hybrid orbitals then $\% \mathrm{~s}$ and p -character in hybrid orbitals (when only s and p -orbitals are involved in hybridisation) can be calculated by the following formula :
$\cos \theta=\frac{S}{S-1}=\frac{P-1}{P}$
Q. Smallest $O \hat{S} O$ bond angle is found in :
A. $\mathrm{SO}_{2} \mathrm{~F}_{2}$
B. $\mathrm{SO}_{2} \mathrm{Cl}_{2}$
C. $\mathrm{SO}_{2}\left(\mathrm{CF}_{3}\right)_{2}$
D. $\mathrm{SO}_{2}\left(\mathrm{CH}_{3}\right)_{2}$

## Answer: D

## - Watch Video Solution

20. According to hybridisation theory, the \% s-character in $s p, s p^{2}$ and $s p^{3}$ hybrid orbitals is $50,33.3$ and 25 respectively, but this is not true for all the species. When $\theta$ is the bond angle between equivalent hybrid orbitals then $\% \mathrm{~s}$ and p -character in hybrid orbitals (when only s and p -orbitals are involved in hybridisation) can be calculated by the following formula : $\cos \theta=\frac{S}{S-1}=\frac{P-1}{P}$
Q. Correct order of $P-P$ bond length in the following compound is :
A. $P_{2} F_{4}<P_{2}\left(\mathrm{CH}_{3}\right)_{4}<\mathrm{P}_{2}\left(\mathrm{CF}_{3}\right)_{4}<\mathrm{P}_{2} \mathrm{H}_{4}$
B. $P_{2} F_{4}<P_{2}\left(\mathrm{CF}_{3}\right)_{4}<\mathrm{P}_{2}\left(\mathrm{CH}_{3}\right)_{4}<\mathrm{P}_{2} \mathrm{H}_{4}$
C. $P_{2} F_{4}<P_{2} \mathrm{H}_{4}<\mathrm{P}_{2}\left(\mathrm{CH}_{3}\right)_{4}<\mathrm{P}_{2}\left(\mathrm{CF}_{3}\right)_{4}$
D. $P_{2} F_{4}<P_{2}\left(C H_{3}\right)_{4}<P_{2} H_{4}<P_{2}\left(C F_{3}\right)_{4}$

## Answer: B

## - Watch Video Solution

21. The correct statement is :
A. in $\mathrm{CH}_{2} \mathrm{~F}_{2}$ the $\mathrm{F}-\mathrm{C}-\mathrm{F}$ bond angle is larger $109^{\circ} 28^{\prime}$
B. in $\mathrm{CH}_{2} \mathrm{~F}_{2}$ the $\mathrm{C}-\mathrm{F}$ bond has more than $25 \%$ s-character
C. in $\mathrm{CH}_{2} \mathrm{~F}_{2}$ the $\mathrm{H}-\mathrm{C}-\mathrm{H}$ bond angle is larger $109^{\circ} 28^{\prime}$
D. in $\mathrm{CH}_{2} \mathrm{~F}_{2}$ the $\mathrm{C}-\mathrm{H}$ bond has more than $25 \%$ s-character

## Answer: C,D

## - Watch Video Solution

22. $P C l_{5}$ is an example of a molecule having $s p^{3} d$-hybridisation. Three out of the orbitals in $s p_{x} p_{y}$-hybridisation while remaining two have $p_{x} d_{x^{2}}-$ hybridisation. If P -atom is attached to substitutuents differ in electronegativity, as in $P_{C l} F_{5-x}$, then it is has been experimently observed that the more electronegativity substituent occupies the axial position of t.b.p geometry.
Q. The incorrect statement regarding $\mathrm{PCl}_{2} \mathrm{~F}_{2}^{-}$molecule will be:
A. given compound is polar
B. both axial position occupied by F-atoms
C. both Cl atoms present in equatorial position
D. one Cl atom present at axial and other Cl atom is present at equatorial position of geometry

## Answer: D

## - Watch Video Solution

23. $P C l_{5}$ is an example of a molecule having $s p^{3} d$-hybridisation. Three out of the orbitals in $s p_{x} p_{y}$-hybridisation while remaining two have $p_{x} d_{x^{2}}$ hybridisation. If P -atom is attached to substitutuents differ in electronegativity, as in $P_{C l} F_{5-x}$, then it is has been experimently observed that the more electronegativity substituent occupies the axial position of t.b.p geometry.
Q. The highest $H-C-H$ bond angle present in :
A. $\mathrm{CH}_{2} \mathrm{~F}_{2}$
B. $\mathrm{CH}_{4}$
C. $\mathrm{CH}_{3} \mathrm{~F}$
D.

## Answer: A

## - Watch Video Solution

24. The first compound of the noble gasees was made in 1962. Barlett and Lohman had previously used the highly oxidizing compound platium hexaflouride to oxidize dioxygen.
$\mathrm{O}_{2}+P t F_{6} \rightarrow \mathrm{O}_{2}^{+}\left[\mathrm{PtF}_{6}\right]-$
The first ionization energy for $\mathrm{O}_{2} \rightarrow \mathrm{O}_{2}$ is $1165 \mathrm{~kJ} \cdot \mathrm{~mol}^{-1}$, which is almost as the value of $1170 \mathrm{~kJ} \cdot \mathrm{~mol}^{-1}$ for $\mathrm{Xe} \rightarrow \mathrm{Xe}^{+}$. It was predicated that xenon should react with $P t F_{6}$. Experimental showed that when deep of red $P t F_{6}$ vapour was mixed with an equal volume of $X e$ the gases combined immediately at room temperature to produce a solid.
$X e+P t F_{6} \rightarrow X e\left[P t F_{6}\right]$
Q. IUPAC name of first xenon-compounds synthesized by secientist Barlett is:
A. xenonhexaflouroplatinate(IV)
B. xenonhexaflouroplatinate(V)
C. hexafluoroplatinum(V) xenon
D. xenoniumhexafluoroplatinum(V)

## Answer: B

## - Watch Video Solution

25. The first compound of the noble gasees was made in 1962. Barlett and Lohman had previously used the highly oxidizing compound platium hexaflouride to oxidize dioxygen.

$$
O_{2}+P t F_{6} \rightarrow O_{2}^{+}\left[P t F_{6}\right]-
$$

The first ionization energy for $O_{2} \rightarrow O_{2}$ is $1165 \mathrm{~kJ} \cdot \mathrm{~mol}^{-1}$, which is almost as the value of $1170 \mathrm{~kJ} \cdot \mathrm{~mol}^{-1}$ for $\mathrm{Xe} \rightarrow X e^{+}$. It was predicated that xenon should react with $P t F_{6}$. Experimental showed that when deep of red $P t F_{6}$ vapour was mixed with an equal volume of Xe the gases combined immediately at room temperature to produce a solid.
$X e+P t F_{6} \rightarrow X e\left[P t F_{6}\right]$
Q. Noble gases are water insoluble, however decrease their insolubility in water decrease down the group due to increase in :
A. dipole-dipole attraction
B. dipole-induced dipoles
C. instantaneous dipole-induced dipole attraction
D. None of these

## Answer: B

## - Watch Video Solution

26. The first compound of the noble gasees was made in 1962. Barlett and Lohman had previously used the highly oxidizing compound platium hexaflouride to oxidize dioxygen.
$\mathrm{O}_{2}+\mathrm{PtF}_{6} \rightarrow \mathrm{O}_{2}^{+}\left[\mathrm{PtF}_{6}\right]^{-}$
The first ionization energy for $\mathrm{O}_{2} \rightarrow \mathrm{O}_{2}$ is $1165 \mathrm{~kJ} \cdot \mathrm{~mol}^{-1}$, which is almost
 should react with $P t F_{6}$. Experimental showed that when deep of red $P t F_{6}$ vapour was mixed with an equal volume of $X e$ the gases combined immediately at room temperature to produce a solid.
$X e+P t F_{6} \rightarrow X e\left[P t F_{6}\right]$
Q. Which of the following species is not having perfect octahedron
A. $X e F_{6}$
B. $S i F_{6}^{2-}$
C. $\mathrm{PCl}_{6}^{-}$
D. $\mathrm{XeO}_{6}^{4-}$

## Answer: A

## D Watch Video Solution

27. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of
antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy).
Q. The bond order of $N_{2}^{-}$is equal to that of
A. $O_{2}$
B. $\mathrm{O}_{2}^{2-}$
C. $\mathrm{O}_{2}^{+}$
D. None

## Answer: C

## - Watch Video Solution

28. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an
amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy).
Q. Which among the following pairs contains both paramagnetic species.
A. $\mathrm{O}_{2}^{2-}$ and $\mathrm{N}_{2}^{-}$
B. $O_{2}^{-}$and $N_{2}$
C. $\mathrm{O}_{2}$ and $\mathrm{N}_{2}$
D. $\mathrm{O}_{2}$ and $\mathrm{N}_{2}^{-}$

## Answer: D

## - Watch Video Solution

29. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding
molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy).
Q. Which of the following statement(s) is true:
A. Higher the bond order lesser the bond length.
B. Higher the bond order greater the bond length.
C. Higher the bond order lesser the bond energy.
D. Higher the bond order lesser the number of bonds

## Answer: A

## - Watch Video Solution

30. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and
antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy). Q. Which of the following pairs of molecule can exist?
A. $\mathrm{He}_{2}$ and $\mathrm{Be}_{2}$
B. $\mathrm{O}_{2}^{2-}$ and $\mathrm{Na}_{2}$
C. $\mathrm{O}_{2}^{2-}$ and $\mathrm{H}_{2}^{2-}$
D. $\mathrm{Be}_{2}$ and $\mathrm{Mg}_{2}$

## Answer: B

## - Watch Video Solution

31. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic
orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy). Q. How many nodal plane is present in $\sigma_{s}$ and $p$ bonding molecular orbital ?
A. zero
B. 1
C. 2
D. 3

## Answer: A

## Watch Video Solution

32. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals
overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy). Q. which of the following combination of orbitals is corrects?
A.

B. $\mapsto \odot \odot-\odot \odot$
c. $\leftrightarrow \infty-\infty-\infty \infty$
D. $8.8-8$.

## Answer: C

## - Watch Video Solution

33. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy). Q. Which of the following statements is not correct regarding bonding molecular orbitals?
A. Bonding molecular orbitals possess low energy than the atomic orbitals from which they are formed
B. Bonding molecular orbitals have low electron density the two nuclei
C. Electron in bonding molecular contributes to the attraction between atoms.
D. They are formed when the lobes of the combining atomic orbitals have the same sign.

## Answer: B

## - Watch Video Solution

34. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy). Q. If $x$-axis is the molecular axis, then $\pi$-moleulcar orbitals are formed by the overlap of:
A. $S+p_{x}$
B. $p_{x}+p_{y}$
C. $P_{z}+p_{z}$
D. $p_{x}+p_{x}$

## Answer: C

## - Watch Video Solution

35. Polar covalent molecules exhibit dipole moment. Dipole moment is equal to the product of charge separation, $q$ and the bond length $d$ for the bond. Unit of dipole moment is debye. One debye is equal to $10^{-18}$ esucm.

Dipole moments is a vector quantity. It has both magnitude and direction. Hence, dipole moment of a molecule depends upon the relative orientation of the bond dipoles, but not on the polarity of bonds alone. A symmetrical structure shows zero dipole moment. Thus, dipole moment helps to predict the geometry of a molecules. Dipole moment values can
be distinguish between cis- and trans- isomers, ortho, meta and pareforms of a substance, etc.
Q. Which is a polar molecule?
A. $\mathrm{XeF}_{4}$
B. $B F_{3}$
C. $I_{2} \mathrm{Cl}_{6}$
D. $\mathrm{PCl}_{2} \mathrm{~F}_{3}$

## Answer: D

## - Watch Video Solution

36. Polar covalent molecules exhibit dipole moment. Dipole moment is equal to the product of charge separation, $q$ and the bond length $d$ for the bond. Unit of dipole moment is debye. One debye is equal to $10^{-18}$ esu cm.

Dipole moments is a vector quantity. It has both magnitude and direction. Hence, dipole moment of a molecule depends upon the relative
orientation of the bond dipoles, but not on the polarity of bonds alone. A symmetrical structure shows zero dipole moment. Thus, dipole moment helps to predict the geometry of a molecules. Dipole moment values can be distinguish between cis- and trans- isomers, ortho, meta and pareforms of a substance, etc.
Q. A diatomic molecule has a dipole moment of 1.2D. If the bond length is $1.0 \times 10^{-8} \mathrm{~cm}$, what fraction of charge does exist each atom?
A. 0.1
B. 0.2
C. 0.25
D. 0.3

## Answer: C

## - Watch Video Solution

37. Polar covalent molecules exhibit dipole moment. Dipole moment is equal to the product of charge separation, $q$ and the bond length $d$ for
the bond. Unit of dipole moment is debye. One debye is equal to $10^{-18}$ esu cm.

Dipole moments is a vector quantity. It has both magnitude and direction. Hence, dipole moment of a molecule depends upon the relative orientation of the bond dipoles, but not on the polarity of bonds alone. A symmetrical structure shows zero dipole moment. Thus, dipole moment helps to predict the geometry of a molecules. Dipole moment values can be distinguish between cis- and trans- isomers, ortho, meta and pareforms of a substance, etc.
Q. Arrange the following compounds in increasing order of dipole moments, toluene (I), o-dichlorobenzene (II), m-dichlorobenzene (III) and p-dichlorobenzene (IV) :
A. $I V<I<I I<I I I$
B. $I<I V<I I<I I I$
C. $I V<I<I I I<I I$
D. $I V<I I<I<I I I$

## Answer: C

38. Polar covalent molecules exhibit dipole moment. Dipole moment is equal to the product of charge separation, $q$ and the bond length $d$ for the bond. Unit of dipole moment is debye. One debye is equal to $10^{-18}$ esu cm.

Dipole moments is a vector quantity. It has both magnitude and direction. Hence, dipole moment of a molecule depends upon the relative orientation of the bond dipoles, but not on the polarity of bonds alone. A symmetrical structure shows zero dipole moment. Thus, dipole moment helps to predict the geometry of a molecules. Dipole moment values can be distinguish between cis- and trans- isomers, ortho, meta and pareforms of a substance, etc.
Q. $\mu$ of the $A X_{4}$ type of molecule is zero. The geometry of it can be :
A. tetrahedral
B. square planar
C. A or B

## Answer: C

## - Watch Video Solution

39. Polar covalent molecules exhibit dipole moment. Dipole moment is equal to the product of charge separation, $q$ and the bond length $d$ for the bond. Unit of dipole moment is debye. One debye is equal to $10^{-18}$ esucm.

Dipole moments is a vector quantity. It has both magnitude and direction. Hence, dipole moment of a molecule depends upon the relative orientation of the bond dipoles, but not on the polarity of bonds alone. A symmetrical structure shows zero dipole moment. Thus, dipole moment helps to predict the geometry of a molecules. Dipole moment values can be distinguish between cis- and trans- isomers, ortho, meta and pareforms of a substance, etc.
Q. Which of the following statement is correct regarding $\mathrm{C}_{2} \mathrm{H}_{2} \mathrm{~F}_{2}$ molecule?
A. One isomer is polar, one is non-polar
B. Two isomers are polar, one is non-polar
C. Two isomers are planar, one is non-planar
D. Two isomers are only possible and planar

## Answer: B

## - Watch Video Solution

40. In general boiling point of covalent compounds is affect due to increasing molecular weight and hydrogen bonding. Thus it is obversed that the boiling point of octanol is greater that water while that of methanol is lesser than water. The other properties which are considerably affected due to hydrogen bond formation are acidic nature, melting point, anamalous behaviour of water below $4^{\circ} \mathrm{C}$., It is therefore concluded that hydrogen bonding palys a vutal role in explaning many observable facts.
Q. Which among the following has maximum boiling point?
A. $\mathrm{CH}_{2}-\mathrm{CH}_{2}-\left(\mathrm{CH}_{2}\right)_{2}-\mathrm{CH}_{2} \mathrm{OH}$
B. $\mathrm{CH}_{3}-\mathrm{CH}_{2}-\mathrm{CH}_{2}-\mathrm{CH} \mid \mathrm{OH}-\mathrm{CH}_{3}$
C. $\mathrm{CH}_{3}-\mathrm{CH}_{2}-\mathrm{CH} \mid \mathrm{OH}-\mathrm{CH}_{2}-\mathrm{CH}_{3}$
D. $\underset{\substack{\mathrm{CH}_{3} \\ \mathrm{CH} \\ \hline \\ \mathrm{Cl} \\ \mathrm{OH} \\-\mathrm{CH}_{2}-\mathrm{CH}_{3}}}{\text { D }}$

## Answer: A

## - Watch Video Solution

41. In general boiling point of covalent compounds is affect due to increasing molecular weight and hydrogen bonding. Thus it is obversed that the boiling point of octanol is greater that water while that of methanol is lesser than water. The other properties which are considerably affected due to hydrogen bond formation are acidic nature, melting point, anamalous behaviour of water below $4^{\circ} \mathrm{C}$., It is therefore concluded that hydrogen bonding palys a vutal role in explaning many observable facts.
Q. Which of the following statements is true?
A. The lattice structure of ice involves true covalent bond
B. The lattice structure of ice is the result of dipole-dipole interaction
C. The lattice structure of ice is the result of intra and inter-molecular hydrogen bond formation
D. The lattice structure of ice is only due to inter-molecular hydrogen bonding

## Answer: D

## - Watch Video Solution

42. In general boiling point of covalent compounds is affect due to increasing molecular weight and hydrogen bonding. Thus it is obversed that the boiling point of octanol is greater that water while that of methanol is lesser than water. The other properties which are considerably affected due to hydrogen bond formation are acidic nature, melting point, anamalous behaviour of water below $4{ }^{\circ} \mathrm{C}$., It is therefore concluded that hydrogen bonding palys a vutal role in explaning many
observable facts.
Q. $K_{a_{2}}$ of maleic acid is lesser than $K_{a_{2}}$ of fumaric acid due to:
A. Intramolecular hydrogen bonding in the formed after one proton removal in fumaric acid
B. Intermolecular hydrogen bonding in the ion formed after one proton removal in maleic acid
C. Intramolecular hydrogen bonding in the ion formed after one proton removal in maleic acid
D. Intermolecular hydrogen bonding in the ion formed after one proton removal in fumaric acid

## Answer: C

## - Watch Video Solution

43. The molecule in which an atom is associated with more than 8 electrons is known as hypervalent molecule and less than 8 electrons is
known as hypovalent molecule. All hypervalent molecules must have $p \pi-d \pi$ bonding but the molecules having back bonding back boding need not to have always $p \pi-d \pi$ bondin.
Q.Which of the molecule is not hypovalent but complete its octet:
A. $\mathrm{AlI}_{3}$
B. $\mathrm{AlCl}_{3}$
C. $\mathrm{AlBr}_{3}$
D. $\mathrm{AlF}_{3}$

## Answer: D

## - Watch Video Solution

44. The molecule in which an atom is associated with more than 8 electrons is known as hypervalent molecule and less than 8 electrons is known as hypovalent molecule. All hypervalent molecules must have $p \pi-d \pi$ bonding but the molecules having back bonding back boding
need not to have always $p \pi-d \pi$ bondin.
Q. Which of the following is having complete octet:
A. $\mathrm{BeCl}_{2}$ (dimer)
B. $\mathrm{BeH}_{2}$ (dimer)
C. $\mathrm{BeH}_{2}$ (s)
D. $\mathrm{BeCl}_{2}$ (s)

## Answer: D

## - Watch Video Solution

45. The molecule in which an atom is associated with more than 8 electrons is known as hypervalent molecule and less than 8 electrons is known as hypovalent molecule. All hypervalent molecules must have $p \pi-d \pi$ bonding but the molecules having back bonding back boding need not to have always $p \pi-d \pi$ bondin.
Q.Which of the following molecule is not having $p \pi-d \pi$ bonding:
A. $\mathrm{SO}_{2}$
B. $P_{4} O_{10}$
C. $P F_{3}$
D. $B_{3} N_{3} H_{6}$

## Answer: D

## - Watch Video Solution

46. Colour of compounds occurs due to phenomenon of polarisation, charge transfer, d-d transition and H.O.M.O.L.U.M.O transition. Most of the transition metal transition metal complex compound are coloured either due to d-d electrons transition or charge transfer and ionic compounds are coloured due to polarisation of anion. Q . Which of the following is correct about $\operatorname{KFE}$ II $\left[\operatorname{FeII}\left(\mathrm{CN}_{6}\right)\right]$ and $\operatorname{KFE}^{I I I}\left[\operatorname{FeIII}\left(\mathrm{CN}_{6}\right)\right]$ complex compounds?
A. Both are blue coloured compounds because colour arises due to dd electrons transition in Fe cation present outside the complex ion.
B. Both are blue coloured compounds because colour arises due to transfer of electron between $F e^{I I}$ and $F E^{I I I}$ cation
C. Both are blue coloured compounds because in complexes $\mathrm{Fe}^{I I}$ cation shows same d-d transition bond
D. Complex (I) has blue colour becouse (II) has brown colour

## Answer: B

## D View Text Solution

47. Colour of compounds occurs due to phenomenon of polarisation, charge transfer, d-d transition and H.O.M.O.L.U.M.O transition. Most of the transition metal transition metal complex compound are coloured either due to d-d electrons transition or charge transfer and ionic compounds
are coloured due to polarisation of anion. Q. If $\mathrm{MCl}_{4}$ salt is white, then comment on colour of its iodine salt.
A. Coloured
B. White
C. May be or coloured
D. Black

## Answer: C

## - View Text Solution

48. Colour of compounds occurs due to phenomenon of polarisation, charge transfer, d-d transition and H.O.M.O.L.U.M.O transition. Most of the transition metal transition metal complex compound are coloured either due to d -d electrons transition or charge transfer and ionic compounds are coloured due to polarisation of anion. Q. Choose incorrect statement.
A. Halogens are coloured due to HOMO-LUMO transition
B. During charge transfer, oxidation state of atoms changes
C. Higher the polarisation, more is colour intensity
D. Comple compound having no unpaired electron can not undergo d-
d transition and therefore it is colourless

## Answer: D

## D View Text Solution

49. Hydrogen bond is the given to the relatively weak secondry interaction between a hydrogen atom bound to an electronegative atom and another atom which is also generally electronegative and which has one or more lone pairs and can thus acts as a base. We can give the follwoing generalized representation of hydrogen bond.
$\delta-\quad \delta+$ $X-H \ldots Y$

Bond dissociation energy of H-bond ranges from 8 and $42 \mathrm{~kJ} / \mathrm{ol}$, and the most commonly encountred hydrogen bonds are
$O-H \ldots O, N-H \ldots O$ and $F-H . . E$.
Q. Among molecules of HCl , which of the following forces are present.
A. Interaction between two HCl molecules is found to be greater than $8 \mathrm{~kJ} / \mathrm{mol}$
B. Weak dipole-dipole interaction
C. Weak ion-dipole interactions
D. All of above

## Answer: B

## - View Text Solution

50. Hydrogen bond is the given to the relatively weak secondry interaction between a hydrogen atom bound to an electronegative atom and another atom which is also generally electronegative and which has one or more lone pairs and can thus acts as a base. We can give the follwoing generalized representation of hydrogen bond.
$\delta-\quad \delta+$
X - H ...Y

Bond dissociation energy of H -bond ranges from 8 and $42 \mathrm{~kJ} / \mathrm{ol}$, and the most commonly encountred hydrogen bonds are $O-H \ldots O, N-H . . . O$ and $F-H . . E$.
Q.Which of the following interaction has energy between $8-42 \mathrm{~kJ} / \mathrm{mol}$ ?
A. $\mathrm{Na}^{+}: \mathrm{CCl}_{4}$
B. $\mathrm{CHCl}_{3}: \mathrm{Br}^{-}$
C. $\mathrm{C}_{6} \mathrm{H}_{6}: \mathrm{CCl}_{4}$
D. $\mathrm{H}_{2} \mathrm{O}: \mathrm{HCN}$

## Answer: D

## - View Text Solution

51. The intermolecular forces of attraction (i.e., H-bonding and van der waal's forces) exist among polar and non-polar species which effect melting point, boiling point, solubility and viscosity of covalent

## compounds :

Q. Melting and boling points of halogen increase down the group due to
A. Increase in London dispersion forces
B. Increase in extent of polarity
C. Increase in Molecular mass
D. Both (a) and (b)

## Answer: D

## - View Text Solution

52. The intermolecular forces of attraction (i.e., H-bonding and van der waal's forces) exist among polar and non-polar species which effect melting point, boiling point, solubility and viscosity of covalent compounds :
Q.The type of molecular force of attraction present in the following

A. Intermolecular H -bonding
B. Intramolecular H-bonding
C. van der waal's force
D. All of these

Answer: D
53. The intermolecular forces of attraction (i.e., H -bonding and van der waal's forces) exist among polar and non-polar species which effect melting point, boiling point, solubility and viscosity of covalent compounds :
Q. Select the incorrect order of boiling point between the following compounds:
A. $\mathrm{N}_{2} \mathrm{H}<\mathrm{CH}_{3} \mathrm{~N}_{3}$
B. $\mathrm{Me}_{2} \mathrm{SO}_{4}<\mathrm{H}_{2} \mathrm{SO}_{4}$
C. $\mathrm{Me}_{3} \mathrm{BO}_{3}<\mathrm{B}(\mathrm{OH})_{3}$
D. $B F_{3}<B I_{2}$

## Answer: A

## - View Text Solution

54. There are five species P, Q, R, S and T. Spectroscopical analysis shows that $P, Q$ and $R$ are homonuclear diatomic species and have their bond
order 2.4, 1.5 and 2.5 respectively and rest two species S and T are heteronuclear diatomic species and have bond order 3 and 2 respectively. All homonuclear diatomic species are paramagnetic and all heteronuclear species are diamagnetic in nature. P, R, S and T are monocovalent positive ion and $Q$ is monovalent negative ion:
Q. According to given information the incorrect match is :
A. $P=N_{2}^{+}$
B. $R=O_{2}^{+}$
C. $\mathrm{S}-\mathrm{CO}^{+}$
D. $T=C N^{+}$

## Answer: C

## - View Text Solution

55. There are five species $\mathrm{P}, \mathrm{Q}, \mathrm{R}, \mathrm{S}$ and T . Spectroscopical analysis shows that $P, Q$ and $R$ are homonuclear diatomic species and have their bond order 2.4, 1.5 and 2.5 respectively and rest two species $S$ and $T$ are
heteronuclear diatomic species and have bond order 3 and 2 respectively. All homonuclear diatomic species are paramagnetic and all heteronuclear species are diamagnetic in nature. P, R, S and T are monocovalent positive ion and $Q$ is monovalent negative ion:
Q. The correct statement is :
A. If $P$ is having 13 electrons then removal of one electron retains its magnetic behaviour
B. If $Q$ is having 17 electrons then addition of one electron retains its magnetic behaviour
C. If $R$ is having 15 electrons then addition of one electron retains its magnetic behaviour
D. If T is having 12 electrons then addition of one electron retains its magnetic behaviour

## Answer: C

## - View Text Solution

56. There are five species P, Q, R, S and T. Spectroscopical analysis shows that $P, Q$ and $R$ are homonuclear diatomic species and have their bond order 2.4, 1.5 and 2.5 respectively and rest two species $S$ and $T$ are heteronuclear diatomic species and have bond order 3 and 2 respectively. All homonuclear diatomic species are paramagnetic and all heteronuclear species are diamagnetic in nature. P, R, S and T are monocovalent positive ion and $Q$ is monovalent negative ion:
Q. The incorrect statements is :
A. If $R$ has 15 electrons then bond order of $R$ is greater than its parent molecule
B. If $Q$ has 17 electrons then bond order of $Q$ is less than its parent molecule
C. If $P$ has 17 electrons then bond order of $P$ is greater than its parent molecule
D. On addition of two electrons in P (having 13 electrons) the bond

## Answer: C

## D View Text Solution

57. 

| Compound, $M X_{n}$ type $(n=2$ <br> or 3 or 4) | Value of $\cos \theta(\theta=$ bond angle between <br> equivalent hybrid orbitals $)$ |
| :---: | :---: |
| $P$ | -0.241 |
| $Q$ | -0.292 |
| $R$ | -0.5 |
| $S$ | -0.325 |
| $T$ | -0.469 |

In all expected compounds each central atom only uses its $s$ and $p$ orbitals in hybridization. The relationship between bond angle ' $\theta$ ' and decimal fraction of $s$ and $p$ character present in the equivalent orbitals is given by :
$\cos \theta=\frac{S}{S-1}=\frac{P-1}{P}, \mathrm{~S}=$ decimal fraction of s -character in the equivalent hybrid orbital and $\mathrm{P}=$ decimal fraction of p -character in the equivalent hybrid orbital.

Q. The correct order of \% p-character in bond pairs of central atoms in the following compounds is:
A. $P>T>S>Q>R$
B. $S>R>T>P>Q$
C. $P>Q>S>R>T$
D. $P>Q>S>T>R$

## Answer: D

## - View Text Solution

58. 

| Compound, $M X_{n}$ type $(n=2$ <br> or 3 or 4) | Value of $\cos \theta(\theta=$ bond angle between <br> equivalent hybrid orbitals $)$ |
| :---: | :---: |
| $P$ | -0.241 |
| $Q$ | -0.292 |
| $R$ | -0.5 |
| $S$ | -0.325 |
| $T$ | -0.469 |

In all expected compounds each central atom only uses its $s$ and $p$ orbitals in hybridization. The relationship between bond angle ' $\theta$ ' and decimal fraction of $s$ and $p$ character present in the equivalent orbitals is given by :
$\cos \theta=\frac{S}{S-1}=\frac{P-1}{P}, \mathrm{~S}=$ decimal fraction of s -character in the equivalent hybrid orbital and $\mathrm{P}=$ decimal fraction of p -character in the equivalent hybrid orbital.

Q. If the value n is 2 for compound $T$, then number of lone pair present at central atom of compound $T$ will be :
A. 0
B. 1
C. 2
D. 3

## Answer: B

## - View Text Solution

59. 

| Compound, $M X_{n}$ type $(n=2$ <br> or 3 or 4) | Value of $\cos \theta(\theta=$ bond angle between <br> equivalent hybrid orbitals $)$ |
| :---: | :---: |
| $P$ | -0.241 |
| $Q$ | -0.292 |
| $R$ | -0.5 |
| $S$ | -0.325 |
| $T$ | -0.469 |

In all expected compounds each central atom only uses its $s$ and $p$ orbitals in hybridization. The relationship between bond angle ' $\theta$ ' and
decimal fraction of $s$ and $p$ character present in the equivalent orbitals is given by :
$\cos \theta=\frac{S}{S-1}=\frac{P-1}{P}, \mathrm{~S}=$ decimal fraction of s -character in the equivalent hybrid orbital and $\mathrm{P}=$ decimal fraction of p -character in the equivalent hybrid orbital.

Q.The incorrect statement is :
A. The ratio in \% p-character to \% s-character is less than four, for the bond pair of central atom of compound S
B. Central atom uses three hybrid orbitals to form compounds $R$
C. Central atom uses four hybrid orbitals to form compounds S
D. There are three compounds present between point $C$ to $E$, according to $\% \mathrm{~s}$-character in bond pair of central atom.

## Answer: D

## - View Text Solution

60. The comcept of redistribution of energy in different orbitals of an atom associated with different energies to give new orbitals of equal (or somethimes it may be non-equal) energy oriented in space in definite directions is called hybridization and formed new orbitals are called hybrid orbitals. The bonds formed by such orbitals are called hybrid bonds. The process of mixing of orbitals itself requires some energy. Thus, some additional energy, is needed for the hybridisation (mixing) of atomic orbitals.
Q. Select from each set the molecule or ion having the smallest bond angle :
(i) $\mathrm{H}_{2} \mathrm{Se}, \mathrm{H}_{2} \mathrm{Te}$ and $\mathrm{PH}_{3}$
(ii) $\mathrm{NO}_{2}^{-}$and $\mathrm{NH}_{2}^{-}$
(iii) $P O F_{3}$ and $P O C l_{3}(X-P-X$ angle $)$
(iv) $\mathrm{OSF}_{2} \mathrm{Cl}_{2}$ and $\mathrm{SF}_{2}\left(\mathrm{CH}_{3}\right)_{2}$ ( $\mathrm{F}-\mathrm{S}-\mathrm{F}$ angle)
A. $\mathrm{H}_{2} \mathrm{Se}, \mathrm{NH}_{2}^{-} \mathrm{POF}_{3}$ and $\mathrm{OSF}_{2} \mathrm{Cl}_{2}$
B. $\mathrm{H}_{2} \mathrm{Te}, \mathrm{NO}_{2}^{-}, \mathrm{POF}_{3}$ and $\mathrm{SF}_{2}\left(\mathrm{CH}_{3}\right)_{2}$
C. $\mathrm{PH}_{3}, \mathrm{NH}_{2}^{-}, \mathrm{POCl}_{3}$ and $\mathrm{SF}_{2}\left(\mathrm{CH}_{3}\right)_{2}$
D. $\mathrm{H}_{2} \mathrm{Te}, \mathrm{NH}_{2}^{-}, \mathrm{POF}_{3}$ and $\mathrm{SF}_{2}\left(\mathrm{CH}_{3}\right)_{2}$

## Answer: D

## - View Text Solution

61. The comcept of redistribution of energy in different orbitals of an atom associated with different energies to give new orbitals of equal (or somethimes it may be non-equal) energy oriented in space in definite directions is called hybridization and formed new orbitals are called hybrid orbitals. The bonds formed by such orbitals are called hybrid bonds. The process of mixing of orbitals itself requires some energy. Thus, some additional energy, is needed for the hybridisation (mixing) of
atomic orbitals.
Q. Which of the following statement is correct?
A. In $B r F_{3}$, maximum three halogen atoms can lie in same plane
B. In $\mathrm{CH}_{2} \mathrm{SF}_{2}\left(\mathrm{CH}_{3}\right)_{2}$ molecule all hydrogen atoms which bonded to $s-s p^{2}$ overlapping, lie in equitorial plane
C. $\operatorname{In} \mathrm{OSCl}_{4}, \mathrm{Cl}-\mathrm{S}-\mathrm{Cl}$ equitorial bond angle is greater than $120^{\circ}$
D. Molecules $\mathrm{IOF}_{5}$ and $\mathrm{XeO}_{2} \mathrm{~F}_{4}$ have similar shape but have different number of lone pairs in whole molecule

## Answer: B

## - Watch Video Solution

62. The comcept of redistribution of energy in different orbitals of an atom associated with different energies to give new orbitals of equal (or somethimes it may be non-equal) energy oriented in space in definite directions is called hybridization and formed new orbitals are called
hybrid orbitals. The bonds formed by such orbitals are called hybrid bonds. The process of mixing of orbitals itself requires some energy. Thus, some additional energy, is needed for the hybridisation (mixing) of atomic orbitals.
Q. In neutral moleule $\mathrm{XeO}_{n_{1}} F_{n_{2}}$, central atom has no lone pair and ratio of $n_{2}$ $\overline{n_{1}}$ is two, then which of the following orbitals does not participate in bonding ( $n_{1}$ and $n_{2}$ are natural numbers):
A. $d_{x^{2}}$
B. $p_{x}$
C. $d_{x^{2}-y^{2}}$
D. None of these

## Answer: D

## - Watch Video Solution

63. Drago suggested an emprical rule which is compatible with the energetics of hybridization. It will occupy a stereochemically inactive sorbital, and the bonding will be through p-orbitals and bond angles will be nearly $90^{\circ}$ if the electronegativity of the surrounding atoms is $\leq 2.5$.
Q. In which of the following molecule central atom has higher \% scharacter in its bond pair:
A. $\mathrm{AsH}_{3}$
B. $\mathrm{GeH}_{3}$
C. $P_{4}$
D. $\mathrm{H}_{2} \mathrm{Se}$

## Answer: B

## - View Text Solution

64. Drago suggested an emprical rule which is compatible with the energetics of hybridization. It will occupy a stereochemically inactive s-
orbital, and the bonding will be through p-orbitals and bond angles will be nearly $90^{\circ}$ if the electronegativity of the surrounding atoms is $\leq 2.5$.
Q. Correct order of bond angle is :
A. $\mathrm{PH}_{4}^{+}>\mathrm{OF}_{2}>\mathrm{SF}_{2}>\mathrm{SbH}_{3}>\mathrm{H}_{2} \mathrm{Te}$
B. $\mathrm{OF}_{2}>\mathrm{SF}_{2}>\mathrm{PH}_{4}^{+}>\mathrm{SbH}_{3}>\mathrm{H}_{2} \mathrm{Te}$
C. $\mathrm{PH}_{4}^{+}>\mathrm{SF}_{2}>\mathrm{OF}_{2}>\mathrm{SbH}_{3}>\mathrm{H}_{2} \mathrm{Te}$
D. $\mathrm{SF}_{2}>\mathrm{OF}_{2}>\mathrm{PH}_{4}^{+}>\mathrm{SbH}_{3}>\mathrm{H}_{2} \mathrm{Te}$

## Answer: A

## - View Text Solution

65. According to hybridisation theory, the \% s-character in $s p, s p^{2}$ and $s p^{3}$ hybrid orbitals is $50,33.3$ and 25 respectively, but this is not true for all the species. When $\theta$ is the bond angle between equivalent hybrid orbitals then $\% \mathrm{~s}$ and p -character in hybrid orbitals (when only s and p -orbitals are involved in hybridisation) can be calculated by the following formula :
$\cos \theta=\frac{S}{S-1}=\frac{P-1}{P}$
Q. Two elements X and Y combined together to form a covalent compound. If \% p-character is found to be $80 \%$ in a orbital then the hybridised state of central atom X for the orbital is :
A. $s p^{2}$
B. $s p^{3}$
C. $s p^{4}$
D. $s p^{5}$

## Answer: C

## - Watch Video Solution

66. According to hybridisation theory, the \% s-character in $s p, s p^{2}$ and $s p^{3}$ hybrid orbitals is $50,33.3$ and 25 respectively, but this is not true for all the species. When $\theta$ is the bond angle between equivalent hybrid orbitals then $\% \mathrm{~s}$ and p -character in hybrid orbitals (when only s and p -orbitals are involved in hybridisation) can be calculated by the following formula :
$\cos \theta=\frac{S}{S-1}=\frac{P-1}{P}$
Q. Smallest $O \hat{S} O$ bond angle is found in :
A. $\mathrm{SO}_{2} \mathrm{~F}_{2}$
B. $\mathrm{SO}_{2} \mathrm{Cl}_{2}$
C. $\mathrm{SO}_{2}\left(\mathrm{CF}_{3}\right)_{2}$
D. $\mathrm{SO}_{2}\left(\mathrm{CH}_{3}\right)_{2}$

## Answer: D

## - Watch Video Solution

67. According to hybridisation theory, the \% s-character in $s p, s p^{2}$ and $s p^{3}$ hybrid orbitals is $50,33.3$ and 25 respectively, but this is not true for all the species. When $\theta$ is the bond angle between equivalent hybrid orbitals then $\% \mathrm{~s}$ and p -character in hybrid orbitals (when only s and p -orbitals are involved in hybridisation) can be calculated by the following formula :
$\cos \theta=\frac{S}{S-1}=\frac{P-1}{P}$
Q. Correct order of $P-P$ bond length in the following compound is :
A. $P_{2} F_{4}<P_{2}\left(\mathrm{CH}_{3}\right)_{4}<P_{2}\left(\mathrm{CF}_{3}\right)_{4}<P_{2} \mathrm{H}_{4}$
B. $P_{2} F_{4}<P_{2}\left(C F_{3}\right)_{4}<P_{2}\left(C H_{3}\right)_{4}<P_{2} H_{4}$
C. $P_{2} F_{4}<P_{2} H_{4}<P_{2}\left(C H_{3}\right)_{4}<P_{2}\left(C F_{3}\right)_{4}$
D. $P_{2} F_{4}<P_{2}\left(C H_{3}\right)_{4}<P_{2} H_{4}<P_{2}\left(C F_{3}\right)_{4}$

## Answer: B

## - Watch Video Solution

68. $P C l_{5}$ is an example of a molecule having $s p^{3} d$-hybridisation. Three out of the orbitals in $s p_{x} p_{y}$-hybridisation while remaining two have $p_{x} d_{x^{2}}$ hybridisation. If P -atom is attached to substitutuents differ in electronegativity, as in $P C l_{x} F_{5-x}$, then it is has been experimently observed that the more electronegativity substituent occupies the axial position of t.b.p geometry.
Q.The correct statement is :
A. in $\mathrm{CH}_{2} \mathrm{~F}_{2}$ the $\mathrm{F}-\mathrm{C}-\mathrm{F}$ bond angle is larger $109^{\circ} 28^{\prime}$
B. in $\mathrm{CH}_{2} \mathrm{~F}_{2}$ the C-F bond has more than $25 \%$ c-character
C. in $\mathrm{CH}_{2} \mathrm{~F}_{2}$ the $\mathrm{H}-\mathrm{C}-\mathrm{H}$ bond angle is larger $109^{\circ} 28^{\prime}$
D. in $\mathrm{CH}_{2} \mathrm{~F}_{2}$ the $\mathrm{C}-\mathrm{H}$ ' bond has more than $25 \% \mathrm{c}$-character

## Answer: C

## - View Text Solution

69. $P C l_{5}$ is an example of a molecule having $s p^{3} d$-hybridisation. Three out of the orbitals in $s p_{x} p_{y}$-hybridisation while remaining two have $p_{x} d_{x^{2}}-$ hybridisation. If P -atom is attached to substitutuents differ in electronegativity, as in $P C_{x} F_{5-x}$, then it is has been experimently observed that the more electronegativity substituent occupies the axial position of t.b.p geometry.
Q. The incorrect statement regarding $\mathrm{PCl}_{2} \mathrm{~F}_{2}$ molecule will be:
A. given compound is polar
B. both axial position occupied by F-atoms
C. both Cl atoms present in equatorial position
D. one Cl atom present at axial and other Cl atom is present at equatorial position of geometry

## Answer: D

## - View Text Solution

70. $P C l_{5}$ is an example of a molecule having $s p^{3} d$-hybridisation. Three out of the orbitals in $s p_{x} p_{y}$-hybridisation while remaining two have $p_{x} d_{x^{2}}$ hybridisation. If P -atom is attached to substitutuents differ in electronegativity, as in $\mathrm{PCl}_{x} F_{5-x}$, then it is has been experimently observed that the more electronegativity substituent occupies the axial position of t.b.p geometry.
Q. The highest $H-C-H$ bond angle present in :
A. $\mathrm{CH}_{2} \mathrm{~F}_{2}$
B. $\mathrm{CH}_{4}$
C. $\mathrm{CH}_{3} \mathrm{~F}$
D.

## Answer: A

## - Watch Video Solution

71. The first compound of the noble gasees was made in 1962. Barlett and Lohman had previously used the highly oxidizing compound platium hexaflouride to oxidize dioxygen.
$\mathrm{O}_{2}+\mathrm{PtF}_{6} \rightarrow \mathrm{O}_{2}^{+}\left[\mathrm{PtF}_{6}\right]-$
The first ionization energy for $\mathrm{O}_{2} \rightarrow \mathrm{O}_{2}$ is $1165 \mathrm{~kJ} \cdot \mathrm{~mol}^{-1}$, which is almost
 should react with $P t F_{6}$. Experimental showed that when deep of red $P t F_{6}$ vapour was mixed with an equal volume of $X e$ the gases combined immediately at room temperature to produce a solid.
$X e+P t F_{6} \rightarrow X e\left[P t F_{6}\right]$
Q. IUPAC name of first xenon-compounds synthesized by secientist Barlett is:
A. xenonhexaflouroplatinate(IV)
B. xenonhexaflouroplatinate( V )
C. hexafluoroplatinum $(\mathrm{V})$ xenon
D. xenoniumhexafluoroplatinum(V)

## Answer: B

## - Watch Video Solution

72. The first compound of the noble gases was made in 1962. Barlett and Lohman had previously used the highly oxidizing compound platium hexaflouride to oxidize dioxygen.
$\mathrm{O}_{2}+P t F_{6} \rightarrow \mathrm{O}_{2}^{+}\left[\mathrm{PtF}_{6}\right]-$
The first ionization energy for $\mathrm{O}_{2} \rightarrow \mathrm{O}_{2}$ is $1165 \mathrm{~kJ} \cdot \mathrm{~mol}^{-1}$, which is almost as the value of $1170 \mathrm{~kJ} \cdot \mathrm{~mol}^{-1}$ for $\mathrm{Xe} \rightarrow X e^{+}$. It was predicated that xenon should react with $P t F_{6}$. Experimental showed that when deep of red $P t F_{6}$ vapour was mixed with an equal volume of Xe the gases combined immediately at room temperature to produce a solid.
$X e+P t F_{6} \rightarrow X e\left[P t F_{6}\right]$
Q. Noble gases are water insoluble, however their insolubility in water decreases down the group due to increase in :
A. dipole-dipole attraction
B. dipole-induced dipoles
C. instantaneous dipole-induced dipole attraction
D. None of these

## Answer: B

## - Watch Video Solution

73. The first compound of the noble gasees was made in 1962. Barlett and

Lohman had previously used the highly oxidizing compound platium hexaflouride to oxidize dioxygen.
$O_{2}+P t F_{6} \rightarrow O_{2}^{+}\left[P t F_{6}\right]-$
The first ionization energy for $\mathrm{O}_{2} \rightarrow \mathrm{O}_{2}$ is $1165 \mathrm{~kJ} \cdot \mathrm{~mol}^{-1}$, which is almost as the value of $1170 \mathrm{~kJ} \cdot \mathrm{~mol}^{-1}$ for $\mathrm{Xe} \rightarrow X e^{+}$. It was predicated that xenon
should react with $P t F_{6}$. Experimental showed that when deep of red $P t F_{6}$ vapour was mixed with an equal volume of Xe the gases combined immediately at room temperature to produce a solid.
$X e+P t F_{6} \rightarrow X e\left[P t F_{6}\right]$
Q. Which of the following species is not having perfect octahedron structure?
A. $\mathrm{XeF}_{6}$
B. $S i F_{6}^{2-}$
C. $\mathrm{PCl}_{6}^{-}$
D. $\mathrm{XeO}_{6}^{4-}$

## Answer: A

## - Watch Video Solution

74. According to MOT, two atomic orbitals overlap relsulting in the formation of molecular orbital. Number of atomic orbitals overlapping together is equal to the molecular orbital formed. The two atomic orbital
formed by LCAO (linear combination of atomic orbital) in the same phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. theenergy of bonding molecular orbital is less than that of the pure atomic orbital by an amount $\Delta$. this is known as the stabilization energy. the energy of antibonding molecular orbital is increased by ' $\Delta$ ' (destabilisation energy)

The bond order of $N_{2}^{-}$is equal to that of
A. $O_{2}$
B. $\mathrm{O}_{2}^{2-}$
C. $\mathrm{O}_{2}^{+}$
D. None

## Answer: C

## - Watch Video Solution

75. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals
overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy).
Q. Which among the following pairs contains both paramagnetic species.
A. $\mathrm{O}_{2}^{2-}$ and $\mathrm{N}_{2}^{-}$
B. $O_{2}^{-}$and $N_{2}$
C. $\mathrm{O}_{2}$ and $\mathrm{N}_{2}$
D. $\mathrm{O}_{2}$ and $\mathrm{N}_{2}^{-}$

## Answer: D

## - Watch Video Solution

76. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy). Q. Which of the following statement(s) is true:
A. Higher the bond order lesser the bond length.
B. Higher the bond order greater the bond length.
C. Higher the bond order lesser the bond energy.
D. Higher the bond order lesser the number of bonds

## Answer: A

77. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy). Q. Which of the following pairs of molecule can exist?
A. $\mathrm{He}_{2}$ and $\mathrm{Be}_{2}$
B. $\mathrm{O}_{2}^{2-}$ and $\mathrm{Na}{ }_{2}$
C. $\mathrm{O}_{2}^{2-}$ and $\mathrm{H}_{2}^{2-}$
D. $B e_{2}$ and $\mathrm{Mg}_{2}$

## Answer: B

78. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy). Q. How many nodal plane is present in $\sigma_{s}$ and $p$ bonding molecular orbital ?
A. zero
B. 1
C. 2
D. 3

## Answer: A

## - Watch Video Solution

79. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy).
Q. which of the following combination of orbitals is corrects?
A. ${ }^{(2)} \oplus \odot+\odot \odot \rightarrow \oplus(\oplus$
B.
 $\rightarrow \odot \odot$
C. $\left.{ }^{( }\right) \odot+\odot-\odot-\infty$

## Answer: C

## - Watch Video Solution

80. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy). Q. Which of the following statements is not correct regarding bonding molecular orbitals?
A. Bonding molecular orbitals possess energy than the atomic orbitals from which they are formed
B. Bonding molecular orbitals have low electron density the two nuclei
C. Electron in bonding molecular contributes to the attraction between atoms.
D. They are formed when the lobes of the conbining atomic orbitals have the same sign.

## Answer: B

## - Watch Video Solution

81. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and
antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount $\Delta$. This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by $\Delta^{\prime}$ (destabilisation energy). Q. If $x$-axis is the molecular axis, then $\pi$-moleulcar orbitals are formed by the overlap of:
A. $S+p_{x}$
B. $p_{x}+p_{y}$
C. $P_{z}+p_{x}$
D. $p_{X}+p_{x}$

## Answer: C

## - View Text Solution

82. Polar covalent molecules exhibit dipole moment. Dipole moment is equal to the product of charge separation, $q$ and the bond length $d$ for the bond. Unit of dipole moment is debye. One debye is equal to $10^{-18}$

## esu cm.

Dipole moments is a vector quantity. It has both magnitude and direction. Hence, dipole moment of a molecule depends upon the relative orientation of the bond dipoles, but not on the polarity of bonds alone. A symmetrical structure shows zero dipole moment. Thus, dipole moment helps to predict the geometry of a molecules. Dipole moment values can be distinguish between cis- and trans- isomers, ortho, meta and pareforms of a substance, etc.
Q. Which is a polar molecule?
A. $\mathrm{XeF}_{4}$
B. $B F_{3}$
C. $\mathrm{I}_{2} \mathrm{Cl}_{6}$
D. $\mathrm{PCl}_{2} \mathrm{~F}_{3}$

## Answer: D

## - Watch Video Solution

83. Polar covalent molecules exhibit dipole moment. Dipole moment is equal to the product of charge separation , $q$ and the bond length $d$ for the bond. Unit of dipole moment is debye. One debye is equal to $10^{-18}$ esucm.

Dipole moments is a vector quantity. It has both magnitude and direction. Hence, dipole moment of a molecule depends upon the relative orientation of the bond dipoles, but not on the polarity of bonds alone. A symmetrical structure shows zero dipole moment. Thus, dipole moment helps to predict the geometry of a molecules. Dipole moment values can be distinguish between cis- and trans- isomers, ortho, meta and pareforms of a substance, etc.
Q. A diatomic molecule has a dipole moment of 1.2D. If the bond length is
$1.0 \times 10^{-8} \mathrm{~cm}$, what fraction of charge does exist each atom?
A. 0.1
B. 0.2
C. 0.25
D. 0.3

## Answer: C

## - Watch Video Solution

84. Polar covalent molecules exhibit dipole moment. Dipole moment is equal to the product of charge separation, $q$ and the bond length $d$ for the bond. Unit of dipole moment is debye. One debye is equal to $10^{-18}$ esucm.

Dipole moments is a vector quantity. It has both magnitude and direction. Hence, dipole moment of a molecule depends upon the relative orientation of the bond dipoles, but not on the polarity of bonds alone. A symmetrical structure shows zero dipole moment. Thus, dipole moment helps to predict the geometry of a molecules. Dipole moment values can be distinguish between cis- and trans- isomers, ortho, meta and pareforms of a substance, etc.
Q. Arrange the following compounds in increasing order of dipole moments, toluene (I), o-dichlorobenzene (II), m-dichlorobenzene (III) and p-dichlorobenzene (IV) :
A. $I V<I<I I<$ III
B. I $<$ IV $<$ II $<$ III
C. IV $<$ I $<$ III $<$ II
D. IV $<$ II $<$ I $<$ III

## Answer: C

## - View Text Solution

85. Polar covalent molecules exhibit dipole moment. Dipole moment is equal to the product of charge separation, $q$ and the bond length $d$ for the bond. Unit of dipole moment is debye. One debye is equal to $10^{-18}$ esu cm.

Dipole moments is a vector quantity. It has both magnitude and direction. Hence, dipole moment of a molecule depends upon the relative orientation of the bond dipoles, but not on the polarity of bonds alone. A symmetrical structure shows zero dipole moment. Thus, dipole moment helps to predict the geometry of a molecules. Dipole moment values can
be distinguish between cis- and trans- isomers, ortho, meta and pareforms of a substance, etc.
Q. $\mu$ of the $A X_{4}$ type of molecule is zero. The geometry of it can be :
A. tetrahedral
B. square planar
C. A or B
D. None of these

## Answer: C

## - View Text Solution

86. Polar covalent molecules exhibit dipole moment. Dipole moment is equal to the product of charge separation, $q$ and the bond length $d$ for the bond. Unit of dipole moment is debye. One debye is equal to $10^{-18}$ esu cm.

Dipole moments is a vector quantity. It has both magnitude and direction. Hence, dipole moment of a molecule depends upon the relative
orientation of the bond dipoles, but not on the polarity of bonds alone. A symmetrical structure shows zero dipole moment. Thus, dipole moment helps to predict the geometry of a molecules. Dipole moment values can be distinguish between cis- and trans- isomers, ortho, meta and pareforms of a substance, etc.
Q. Which of the following statement is correct regarding $\mathrm{C}_{2} \mathrm{H}_{2} \mathrm{~F}_{2}$ molecule?
A. One isomer is polar, one is non-polar
B. Two isomers are polar, one is non-polar
C. Two isomers are planar, one is non-planar
D. Two isomers are only possible and planar

## Answer: B

## - Watch Video Solution

87. In general boiling point of covalent compounds is affect due to increasing molecular weight and hydrogen bonding. Thus it is obversed
that the boiling point of octanol is greater that water while that of methanol is lesser than water. The other properties which are considerably affected due to hydrogen bond formation are acidic nature, melting point, anamalous behaviour of water below $4^{\circ} \mathrm{C}$., It is therefore concluded that hydrogen bonding palys a vutal role in explaning many observable facts.
Q. Which among the following has maximum boiling point?
A. $\mathrm{CH}_{2}-\mathrm{CH}_{2}-\left(\mathrm{CH}_{2}\right)_{2}-\mathrm{CH}_{2} \mathrm{OH}$
B. $\mathrm{CH}_{3}-\mathrm{CH}_{2}-\mathrm{CH}_{2}-\mathrm{CH}$ OH $-\mathrm{CH}_{2}-\mathrm{CH}_{3}$
C. $\mathrm{CH}_{3}-\mathrm{CH}_{2}-\mathrm{CH} \mid \mathrm{OH}-\mathrm{CH}_{2}-\mathrm{CH}_{3}$
D. $\underset{\substack{\mathrm{CH}_{3} \\ \mathrm{CH} \\ \hline \\ \mathrm{Cl} \\ \mathrm{OH} \\-\mathrm{CH}_{2}-\mathrm{CH}_{3}}}{\text { d }}$

## Answer: A

## - Watch Video Solution

88. In general boiling point of covalent compounds is affect due to increasing molecular weight and hydrogen bonding. Thus it is obversed that the boiling point of octanol is greater that water while that of methanol is lesser than water. The other properties which are considerably affected due to hydrogen bond formation are acidic nature, melting point, anamalous behaviour of water below $4^{\circ} \mathrm{C}$., It is therefore concluded that hydrogen bonding palys a vutal role in explaning many observable facts.
Q. Which of the following statements is true?
A. The lattice structure of ice involves true covalent bond
B. The lattice structure of ice is the result of dipole-dipole interaction
C. The lattice structure of ice is the result of intra and inter-molecular
hydrogen bond formation
D. The lattice structure of ice is only due to inter-molecular hydrogen bonding

## (D) Watch Video Solution

89. In general boiling point of covalent compounds is affect due to increasing molecular weight and hydrogen bonding. Thus it is obversed that the boiling point of octanol is greater that water while that of methanol is lesser than water. The other properties which are considerably affected due to hydrogen bond formation are acidic nature, melting point, anamalous behaviour of water below $4^{\circ} \mathrm{C}$., It is therefore concluded that hydrogen bonding palys a vutal role in explaning many observable facts.
Q. $K_{a_{2}}$ of maleic acid is lesser than $K_{a_{2}}$ of fumaric acid due to:
A. Intramolecular hydrogen bonding in the formed after one proton
removal in fumaric acid
B. Intermolecular hydrogen bonding in the ion formed after one proton removal in maleic acid
C. Intramolecular hydrogen bonding in the ion formed after one proton removal in maleic acid
D. Intermolecular hydrogen bonding in the ion formed after one proton removal in fumaric acid

## Answer: C

## - Watch Video Solution

90. The molecule in which an atom is associated with more than 8 electrons is known as hypervalent molecule and less than 8 electrons is known as hypovalent molecule. All hypervalent molecules must have $p \pi-d \pi$ bonding but the molecules having back bonding back boding need not to have always $p \pi-d \pi$ bondin.
Q.Which of the molecule is not hypovalent but complete its octet:
A. $\mathrm{AlI}_{3}$
B. $\mathrm{AlCl}_{3}$
C. $\mathrm{AlBr}_{3}$
D. $\mathrm{AlF}_{3}$

## Answer: C

## - Watch Video Solution

91. The molecule in which an atom is associated with more than 8 electrons is known as hypervalent molecule and less than 8 electrons is known as hypovalent molecule. All hypervalent molecules must have $p \pi-d \pi$ bonding but the molecules having back bonding back boding need not to have always $p \pi-d \pi$ bondin.
Q. Which of the following is having complete octet:
A. $\mathrm{BeCl}_{2}$ (dimer)
B. $\mathrm{BeH}_{2}$ (dimer)
C. $\mathrm{BeH}_{2}$ (s)
D. $\mathrm{BeCl}_{2}$ (s)

## Answer: D

## - Watch Video Solution

92. The molecule in which an atom is associated with more than 8 electrons is known as hypervalent molecule and less than 8 electrons is known as hypovalent molecule. All hypervalent molecules must have $p \pi-d \pi$ bonding but the molecules having back bonding back boding need not to have always $p \pi-d \pi$ bondin.
Q.Which of the following molecule is not having $p \pi-d \pi$ bonding:
A. $\mathrm{SO}_{2}$
B. $P_{4} O_{10}$
C. $P F_{3}$
D. $B_{3} N_{3} H_{6}$

## Answer: D

## ONE OR MORE ANSWER IS/ARE CORRECT

1. Which is correct statement ?
A. LiCl is more soluble in polar solvent (water) than NaCl
B. $K_{a_{2}}$ of fumaric acid is more than $K_{a_{2}}$ of maleic acid
C. The $\mathrm{O}-\mathrm{O}$ bond length in $\mathrm{O}_{2}\left[A s F_{4}\right]$ is shorter than $\mathrm{KO}_{2}$
D. In $C F_{2}=C=C F_{2}$ molecule all the four flourine atoms are in the same plane

## Answer: A::B::C

## - Watch Video Solution

2. Select correct statement (s) :
A. Thermodynamic stability of graphite gt diamond, but reverse order is true for their kinetic stability.
B. Melting point of $\mathrm{NaCl}>\mathrm{LiCl}$, but reverse order for their thermal stability
C. Ionisation energy of $N_{2}>O_{2}$, but reverse order of ionisation energy is true for their corresponding atoms
D.

## Answer: A::B::D

## - View Text Solution

3. Select correct statement(s) regarding $\sigma$ and $\pi$ bonds :
A. $\sigma$-bond lies on the line joining the nuclei of bonded atoms
B. $\pi$ - electron cloud lies on either side to the line joining the nuclei of
C. $(2 p \pi-3 d \pi) \pi$-bond is stronger than $(2 p \pi-2 \pi) \pi$-bond
D. $\sigma$-bond has primary effect to decide direction of covalent bond, which $\pi$ - bond has no primery effect in direction of bond.

## Answer: A::B::C::D

## D Watch Video Solution

4. Which of the following molecule species is/are having $\pi_{2 p}$ as H.O.M.O (highest occupied molecular orbital) :
A. $N_{2}^{-}$
B. $\mathrm{O}_{2}^{2+}$
C. $\mathrm{NO}^{+}$
D. $B_{2}^{+}$

## Answer: B::C::D

5. Select correct order between given compounds .
A. $\mathrm{COCl}_{2}>\mathrm{COF}_{2}: X C X$ bond angle
B. $\mathrm{NO}_{2} \mathrm{~F}>\mathrm{NO}_{2} \mathrm{Cl}: \mathrm{ONO}$ bond angle
C. $\mathrm{SO}_{2} \mathrm{~F}_{2}<\mathrm{SOF}_{2}: F S F$ bond angle
D. $N_{2} F_{2}<N_{2}\left(\mathrm{CH}_{3}\right)_{2}: N-N$ bond length

## Answer: A::B::D

## - View Text Solution

6. Select the correct statement(s) regarding $\mathrm{BF}_{2} \mathrm{NH}_{2}$ molecule:
A. FBF bond angle $<120^{\circ}$
B. HNH bond angle $>109^{\circ} 28^{\prime}$
C. HNH bond angle $<109^{\circ} 28^{\prime}$
D. FBF bond angle $>120^{\circ}$

## D Watch Video Solution

7. Correct statement (s) about dipole moment of $R_{3} \mathrm{NO}$ and $\mathrm{R}_{3} \mathrm{PO}$ is/are:
A. dipole moment of $R_{3} \mathrm{NO}>$ dipole moment of $R_{3} P O$
B. dipole moment of $R_{3} \mathrm{NO}<$ dipole moment of $R_{3} P O$
C. Experimental dipole moment of $R_{3} N O>$ Experimantal dipole moment of $R_{3} P O$
D. Experimental dipole moment of $R_{3} N O<$ Experimantal dipole moment of $R_{3} P O$

## Answer: A::D

## - View Text Solution

8. In which of the following compounds observed bond angle is found to be greater than expected, but not due to back bonding.
A. $N\left(\mathrm{SiH}_{3}\right)_{3}$
B. $\mathrm{N}\left(\mathrm{CH}_{3}\right)_{3}$
C. $\mathrm{O}\left(\mathrm{CH}_{3}\right)_{2}$
D. $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$

## Answer: B::C

## - Watch Video Solution

9. Two compounds $\mathrm{PX}_{2} Y_{3}$ and $P X_{3} Y_{2}$ (Where $\mathrm{P}=$ phosphorous atom and X , $Y=$ monovalent atoms). If all ' X ' atoms are replaced by ' $Z$ ' atoms and electronegativity order is $X>Y>Z$. Then incorrect statement (s) is/are:
A. The dipole moment of product obtained from $\mathrm{PX}_{2} Y_{3}$ is non-zero
B. The dipole moment of product obtained from $\mathrm{PX}_{2} Y_{3}$ is zero
C. The dipole moment of product obtained from $P X_{3} Y_{2}$ is zero
D. The dipole moment of product obtained from $\mathrm{PX}_{3} Y_{2}$ is non-zero

## Answer: A:C

## - Watch Video Solution

10. Corrrect order of bond angle in the given compounds is/are:


A. $\gamma<\gamma^{\prime}$
B. $\gamma<\beta=\alpha$
C. $\alpha>\alpha^{\prime}$
D. $\beta>\beta^{\prime}$
11. The correct statement(s) is /are :
A. Boiling point of m-hydroxybenzaldehyde is greater than ohydroxybenzaldehyde
B. Boiling point of $\mathrm{CHCl}_{3}$ is higher than $\mathrm{CCl}_{4}$
C. Melting point of $\mathrm{BeCl}_{2}$ is higher than $\mathrm{BeF}_{2}$
D. Boiling point of HF is greater than $\mathrm{CH}_{3} \mathrm{~F}$

## Answer: A::B::D

## - Watch Video Solution

12. Consider of following reactions

$$
K_{a}
$$

$$
\mathrm{CHF}_{3} \rightarrow \mathrm{CF}_{3}^{-}+\mathrm{H}^{+}
$$

$$
K_{a}^{+}
$$

$\mathrm{CHCl}_{3}^{-} \rightarrow \mathrm{CCl}_{3}^{-}+\mathrm{H}^{+}$

Then regarding given reactions which of the following statement(s) is /are correct:
A. $K_{a}>K_{a}$
B. $\mathrm{CHF}_{3}$ act as a stronger bronsted acid than $\mathrm{CHCl}_{3}$
C. $\mathrm{CCl}_{3}^{-}$is more stable than $\mathrm{CF}_{3}^{-}$
D. $\mathrm{CCl}_{3}^{-}$is weaker lewis base than $\mathrm{CF}_{3}^{-}$

## Answer: C::D

## - Watch Video Solution

13. In which of the following molecules $\mu_{\text {exp }}$ (observed dipole moment) is found to be greater than $\mu_{\mu}$ (expected dipole moment)?
A. $\mathrm{POCl}_{3}$
B. "\#\#BL_VKJ_ORG_CHE_CO3_EO4_013_001.png" width="30\%">
C. $H N C$
D. \#\#BLI_VKJ_ORG_CHE_CO3_EO4_013_002.png" width="30\%">

## Answer: A::B::C::D

## - View Text Solution

14. Correct statement (s) regarding $\mathrm{As}\left(\mathrm{CH}_{3}\right) \mathrm{F}_{2} \mathrm{Cl}_{2}$ molecule is/are:
A. Maximum three halogen atoms can lie in same plane
B. Both axial and equatorial plane may have equal number of atoms
C. As - Cl bond length is longer than $A s-F$ bond length .
D. Maximum five atoms can lie in equatorial plane.

## Answer: A::B::C::D

## - Watch Video Solution

15. Which of the following species is/are having ' $N-N$ ' bond order $=2$ ?
A. $N_{3}^{-}$
B. $N_{2} F_{2}$
C. $\mathrm{N}_{2} \mathrm{O}_{4}$
D. $\mathrm{N}_{2} \mathrm{O}$

## Answer: A::B

## - Watch Video Solution

16. Which of the following statements is correct?
A. $\mathrm{ClF}_{3}$ molecule is bent $T$ shape
B. In $S F_{4}$ molecule, $F-S-F$ equatorial bond angle is $103^{\circ}$ due to $\mathrm{lp}-\mathrm{lp}$ repulsion
C. In $\left[\mathrm{Cl}_{4}\right]^{-}$molecular ion, $\mathrm{Cl}-\mathrm{I}-\mathrm{Cl}$ bond angle is $90^{\circ}$
D. In $\mathrm{OBr}_{2}$, the bond angle is less than $\mathrm{OCl}_{2}$

## Answer: A::C

17. Which of the following species is/are not know?
A. $\mathrm{FeI}_{3}$
B. $\mathrm{SH}_{6}$
C. $\mathrm{PbI}_{4}$
D. $P I_{5}$

## Answer: A::B::C

## - Watch Video Solution

18. Select correct order between following compounds:
A. $\mathrm{NH}_{3}>\mathrm{NF}_{3}$ : bond angle
B. $\mathrm{NH}_{3}>\mathrm{NF}_{3}$ : dipole moment
C. $\mathrm{NH}_{3}>\mathrm{NF}_{3} \%$ s-character of lone pair
D. $\mathrm{NH}_{3}>N F_{3}$ : reactivity towards lewis acid

## Answer: A::B::D

## - Watch Video Solution

19. Which of the following is (are) V-shaped?
A. $S_{3}^{2-}$
B. $I_{3}^{-}$
C. $N_{3}^{-}$
D. $I_{3}^{+}$

## Answer: A::D

## - Watch Video Solution

20. Select correct order between given compounds .
A. $\mathrm{COCl}_{2}>\mathrm{COF}_{2}: X \hat{C} X$ bond angle
B. $\mathrm{NO}_{2} \mathrm{~F}>\mathrm{NO}_{2} \mathrm{Cl}: \mathrm{ON} \mathrm{O}$ bond angle
C. $\mathrm{SO}_{2} \mathrm{~F}_{2}<\mathrm{SOF}_{2}$ : $\mathrm{FS} F$ bond angle
D. $\mathrm{N}_{2} \mathrm{~F}_{2}<\mathrm{N}_{2}\left(\mathrm{CH}_{3}\right)_{2}: \mathrm{N}-\mathrm{N}$ bond length

## Answer: A::B::D

## - View Text Solution

21. Which of the following equlibria would have highest and lowest value of $K_{p}$ at a commone temperature?
A. $\mathrm{BeCO}_{3} \rightarrow \mathrm{BeO}+\mathrm{CO}_{2}$
B. $\mathrm{CaCO}_{3} \rightarrow \mathrm{CaO}+\mathrm{CO}_{2}$
C. $\mathrm{SrCO}_{3} \rightarrow \mathrm{SrO}+\mathrm{CO}_{2}$
D. $\mathrm{BaCO}_{3} \rightarrow \mathrm{BaO}+\mathrm{CO}_{2}$
22. Which of the following process is/are assciated with change of hybridisation of the underlined compounds?
A. $\mathrm{Al}(\mathrm{OH})_{3} \mathrm{pp}$. dissolved in NaOH
B. $\mathrm{B}_{2} \mathrm{H}_{6}$ is dissolved in THF
C. $\mathrm{SiF}_{4}$ vapour is passed through liq. HF
D. solidifaction $\mathrm{PCl}_{5}$ vapour

## Answer: A::C::D

## - Watch Video Solution

23. Which of the following are true?
A. van der waals forces are reponsible for the formation of molecular
B. Branching lower the boiling points of isomeric organic due to decrease in van der waals forces
C. In graphite, van der waal forces act between the carbon layers
D. In diamond, van der waal forces act between the carbon layers

## Answer: A::B::C

## - Watch Video Solution

24. Which of the following statement is incorrect?
A. $O_{2}$ is paramagnetic, $O_{3}$ is also paramagnetic
B. $O_{2}$ is paramagnetic, $O_{2}^{2-}$ is diamagnetic
C. $B_{2}$ is paramagnetic, $C_{2}$ is also paramagnetic
D. Different obervation is found in their bond length when

$$
\mathrm{NO} \rightarrow \mathrm{NO}^{+} \text {and } \mathrm{CO} \rightarrow \mathrm{CO}^{+}
$$

## Answer: C

## Watch Video Solution

25. Which of the following statements are not correct?
A. All $\mathrm{C}-\mathrm{O}$ bonds in $\mathrm{CO}_{3}^{2-}$ are equal but not in $\mathrm{H}_{2} \mathrm{CO}_{3}$
B. All $\mathrm{C}-\mathrm{O}$ bonds in $\mathrm{HCO}_{2}^{-}$are equal but not in $\mathrm{HCO}_{2} \mathrm{H}$
C. $\mathrm{C}-\mathrm{O}$ bond length in $\mathrm{HCO}_{2}^{-}$is longer than $\mathrm{C}-\mathrm{O}$ bond length in $\mathrm{CO}_{3}^{2-}$
D. $\mathrm{C}-\mathrm{O}$ bond length in $\mathrm{HCO}_{2}^{-}$and $\mathrm{C}-\mathrm{O}$ bond length in $\mathrm{CO}_{3}^{2-}$ are equal

## Answer: C::D

## - Watch Video Solution

26. In the structure of $\mathrm{H}_{2} \mathrm{CSF}_{4}$, which of the following statement is/are
A. Two $C$ - $H$ bonds are in the same plane of axial $S$ - $F$ bonds
B. Two $C-H$ bonds are in the same plane of equitorial $S-F$ bonds
C. Total six atoms are in the plane
D. Equitorial $S$ - $F$ plane is perpendicular to the nodal plane of $\pi-$ bonds

## Answer: A::C::D

## - Watch Video Solution

27. In which compound compounds vacant hybride orbitals take part in bonding:
A. $B_{2} H_{6}$
B. $\mathrm{Al}_{2} \mathrm{Cl}_{6}$
C. $\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{Cl}$
D. $\mathrm{H}_{3} \mathrm{BO}_{3}$

## D Watch Video Solution

28. Which of the following is true for $\mathrm{N}_{2} \mathrm{O}$ ?
A. Its molecule is linear
B. Symmetric $N-O-N$ is a favoured structure as compared to
$N-N-O$ skeleton
C. Bond orders are fractional for $N-N$ and $N-O$ bonds
D. It is a neutral oxide

## Answer: A::C::D

## - Watch Video Solution

29. Silane is more reactive than $\mathrm{CH}_{4}$ towards $\mathrm{Nu}^{-}$substitution due to :
A. larger size of Si compared to C which facilitating the attack by nucleophile
B. Polarity of $\mathrm{Si}-\mathrm{H}$ bonds is opposite to that of $C-H$ bond
C. Availability of vacant 3d orbitals in case to form the reaction intermediate easily for nucleophilic attack
D. $\mathrm{Si}-\mathrm{H}$ bond energy is lower than that of $C-H$ bonds

## Answer: A::B::C::D

## - Watch Video Solution

30. Which of the following statement(s) is/are not correct for following compounds?
(I)SCl $2\left(\mathrm{OCH}_{3}\right)_{2}$ and (II)SF $\left.\mathrm{SOCH}_{3}\right)_{2}$
A. $-\mathrm{OCH}_{3}$ groups in both cases occupy the same position
B. Cl-atoms occupy equitorial position incase of (I) and F-atoms occupy equitorial position in case of (II)
C. Cl-atoms occupy axial position in case of (II) \& F-atoms occupy equitorial position in case of (II)
D. Cl and F - atoms occupy either axial or equitorial position in case of
(I) and (II) respectively

## Answer: A::B::C::D

## - Watch Video Solution

31. If $N_{B}$ is the number of bonding electron and $N_{A}$ is the number of antibonding electrons of a molecules. Then choose the incorrect statement(s) for the relationship , $N_{B}>N_{A} "$
A. Molecule may be stable or unstable
B. Molecule may have any integral, frational or zero value of bond
C. Molecule is only paramagnetic species
D. Molecule does not exist

## Answer: B::C::D

## - Watch Video Solution

32. Stepwise hydrolysis of $P_{4} O_{10}$ takes place via formation of:
A. tetrametaphosphoric acid
B. tetrapolyphosphoric acid
C. pyrophosphoric acid
D. Orthophosphoric acid

## Answer: A::B::C::D

## - Watch Video Solution

33. Select the correct statement(s) about the compound $N O\left[B F_{4}\right]$ :
A. It has $5 \sigma$ and $2 \pi$ bond
B. Nitrogen-oxygen bond length is higher than nitric oxide (NO)
C. It is a diamagnetic species
D. $B-F$ bond length in this compound is lower than in $B F_{3}$

## Answer: A::C

## - Watch Video Solution

34. Which of the following molecule has as $O_{O}$ bonds?
A. $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{8}$
B. $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{7}$
C. $\mathrm{H}_{2} \mathrm{SO}_{5}$
D. $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{6}$

## D Watch Video Solution

35. Which of the following species in paramagnetic:
A. $C N^{-}$
B. $\mathrm{SnCl}_{2}$
C. $\mathrm{C}_{2} \mathrm{H}_{2}$
D. $\mathrm{NO}_{2}$

## Answer: B::D

## - View Text Solution

36. $\mathrm{CO}_{2}$ is not isostructural with
A. $\mathrm{HgCl}_{2}$
B. $\mathrm{SnCl}_{2}$
C. $\mathrm{C}_{2} \mathrm{H}_{2}$
D. $\mathrm{NO}_{2}$

## Answer: B::D

## - Watch Video Solution

37. Which of the following have a linear structure?
A. $\mathrm{HgCl}_{2}$
B. $\mathrm{SnCl}_{2}$
C. $\mathrm{ICl}_{2}^{-}$
D. $C S_{2}$

## Answer: A::C::D

38. Which of the following compound (s) is/are non-polar?
A. $\mathrm{NO}_{2}$
B. $B_{2} H_{6}$
C. $\mathrm{PF}_{3} \mathrm{Cl}_{2}$
D. $B_{3} N_{3} H_{6}$

## Answer: B::D

## - Watch Video Solution

39. Non-polar molecule are:
A. $\mathrm{CH}_{4}$
B. $C_{2} F_{2}$
C. $C_{2} F_{4}$
D. $\mathrm{OF}_{2}$

## - Watch Video Solution

40. Which of the following molecule species is/are having $\pi_{2 p}$ as H.O.M.O
(highest occupied molecular orbital) :
A. $N_{2}^{-}$
B. $O_{2}^{2+}$
C. $\mathrm{NO}^{+}$
D. $B_{2}^{+}$

## Answer: B::C::D

## - Watch Video Solution

41. Correct order of b.p.t is/are:
A. $\mathrm{H}_{2}<\mathrm{He}$
B. $H_{2}<D_{2}$
C. $\mathrm{H}_{2} \mathrm{O}<\mathrm{D}_{2} \mathrm{O}$
D. $\mathrm{NH}_{3}<\mathrm{SbH}_{3}$

## Answer: B::C::D

## - View Text Solution

42. Incorrect order between following compounds is/are:
A. $\mathrm{O}\left(\mathrm{CH}_{3}\right)_{2}<\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ : number of $s p^{3}$-hybride atoms
B. $\mathrm{O}\left(\mathrm{CH}_{3}\right)_{2}<\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ : Bond angle w.r.t common atom
C. $\mathrm{O}\left(\mathrm{CH}_{3}\right)_{2}<\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}: \%$ s-character of hybrid orbital on central atom
D. $\mathrm{O}\left(\mathrm{CH}_{3}\right)_{2}<\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ : reactivity towards lewis acid

## Watch Video Solution

43. Which is correct statement ?
A. LiCl is more soluble in polar solvent (water) than NaCl
B. $K_{a_{2}}$ fumaric acid is more than $K_{a_{2}}$ of maleic acid
C. The $\mathrm{O}-\mathrm{O}$ bond length in $\mathrm{O}_{2}\left[A s F_{4}\right]$ is shorter than $\mathrm{KO}_{2}$
D. In $C F_{2}=C=C F_{2}$ molecule all the four flourine atoms are in the same plane

## Answer: A::B::C

## D View Text Solution

44. Select correct statement (s) :
A. Thermodynamic stability of graphite gt diamond, but reverse order is true for their kinetic stability.
B. Melting point of $\mathrm{NaCl}>\mathrm{LiCl}$, but reverse order for their thermal stability
C. lonisation energy of $\mathrm{N}_{2}>\mathrm{O}_{2}$, but reverse order of ionisation energy is true for their corresponding atoms
D.

## Answer: A::B::D

## - View Text Solution

45. Select correct statement(s) regarding $\sigma$ and $\pi$ bonds :
A. $\sigma$-bond lies on the line joining the nuclei of bonded atoms
B. $\pi$ - electron cloud lies on either side to the line joining the nuclei of
bonded atoms
C. $(2 p \pi-3 d \pi) \pi$-bond is stronger than $(2 p \pi-2 \pi) \pi$-bond
D. $\sigma$-bond has primary effect to decide direction of covalent bond, which $\pi$ - bond has no primery effect in direction of bond.

## Answer: A::B::C::D

## - Watch Video Solution

46. Which of the following molecule species is/are having $\pi_{2 p}$ as H.O.M.O (highest occupied molecular orbital) :
A. $N_{2}^{-}$
B. $O_{2}^{2+}$
C. $\mathrm{NO}^{+}$
D. $B_{2}^{+}$

## Answer: B::C::D

47. Select correct order between given compounds .
A. $\mathrm{COCl}_{2}>\mathrm{COF}_{2}: X C X$ bond angle
B. $\mathrm{NO}_{2} \mathrm{~F}>\mathrm{NO}_{2} \mathrm{Cl}$ : ONO bond angle
C. $\mathrm{SO}_{2} \mathrm{~F}_{2}<\mathrm{SOF}_{2}$ : FSF bond angle
D. $\mathrm{N}_{2} \mathrm{~F}_{2}<\mathrm{N}_{2}\left(\mathrm{CH}_{3}\right)_{2}: \mathrm{N}-\mathrm{N}$ bond length

## Answer: A::B::D

## - View Text Solution

48. Select the correct statement(s) regarding $\mathrm{BF}_{2} \mathrm{NH}_{2}$ molecule:
A. FBF bond angle $<120^{\circ}$
B. HNH bond angle > $109^{\circ} 28^{\prime}$
C. HNH bond angle < $109^{\circ} 28^{\prime}$
D. FBF bond angle > $120^{\circ}$

## D View Text Solution

49. Correct statement (s) about dipole moment of $R_{3} N O$ and $R_{3} P O$ is /are:
A. dipole moment of $R_{3} N O>$ dipole moment of $R_{3} P O$
B. dipole moment of $R_{3} N O<$ dipole moment of $R_{3} P O$
C. Experimental dipole moment of $R_{3} N O>$ Experimantal dipole moment of $R_{3} P O$
D. Experimental dipole moment of $R_{3} N O<$ Experimantal dipole moment of $R_{3} P O$

## Answer: A::D

## - View Text Solution

50. In which of the following compounds observed bond angle is found to be greater than expected, but not due to back bonding.
A. $N\left(\mathrm{SiH}_{3}\right)_{3}$
B. $\mathrm{N}\left(\mathrm{CH}_{3}\right)_{3}$
C. $\mathrm{O}\left(\mathrm{CH}_{3}\right)_{2}$
D. $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$

## Answer: B::C

## - Watch Video Solution

51. Two compounds $\mathrm{PX}_{2} Y_{3}$ and $P X_{3} Y_{2}$ (Where $\mathrm{P}=$ phosphorous atom and $X, Y=$ monovalent atoms). If all ' $X$ ' atoms are replaced by ' $Z$ ' atoms and electronegativity order is $X>Y>Z$. Then incorrect statement (s) is/are:
A. The dipole moment of product obtained from $\mathrm{PX}_{2} Y_{3}$ is non-zero
B. The dipole moment of product obtained from $P X_{2} Y_{3}$ is zero
C. The dipole moment of product obtained from $P X_{3} Y_{2}$ is zero
D. The dipole moment of product obtained from $\mathrm{PX}_{3} Y_{2}$ is non-zero

Answer: B::D

## - Watch Video Solution

52. Corrrect order of bond angle in the given compounds is/are:


A. $\gamma<\gamma^{\prime}$
B. $\gamma<\beta=\alpha$
C. $\alpha>\alpha^{\prime}$
D. $\beta>\beta^{\prime}$

## Answer: A::B::C::D

53. The correct statement(s) is /are :
A. Boiling point of m-hydroxybenzaldehyde is greater than ohydroxybenzaldehyde
B. Boiling point of $\mathrm{CHCl}_{3}$ is higher than $\mathbb{C l}_{4}$
C. Melting point $\mathrm{BeCl}_{2}$ is higher than $\mathrm{BeF}_{2}$
D. Boiling point HF is greater than $\mathrm{CH}_{3} \mathrm{~F}$

## Answer: A::B::D

## D View Text Solution

54. Consider of following reactions
$\mathrm{CHF}_{3} \xrightarrow{\mathrm{~K}_{a}} \mathrm{CF}_{3}^{-}+\mathrm{H}^{+}$

$$
K_{a}^{+}
$$

$\mathrm{CHCl}_{3}^{-} \rightarrow \mathrm{CCl}_{3}^{-}+\mathrm{H}^{+}$
Then regarding given reactions which of the following statement(s) is
/are correct:
A. $K_{a}>K_{a}^{\prime}$
B. $\mathrm{CHF}_{3}$ act as a stronger bronsted acid than $\mathrm{CHCl}_{3}$
C. $\mathrm{CCl}_{3}^{-}$is more stable than $\mathrm{CF}_{3}^{-}$
D. $\mathrm{CCl}_{3}^{-}$is weaker lewis base than $\mathrm{CF}_{3}^{-}$

## Answer: C::D

## - Watch Video Solution

55. In which of the following molecules $\mu_{\exp }$ (observed dipole moment) is found to be greater than $\mu_{\mu}$ (expected dipole moment)?
A. $\mathrm{POCl}_{3}$
B.
(b)

C. $H N C$
(d)

D.

## Answer: A::B::C::D

## - View Text Solution

56. Correct statement (s) regarding $\mathrm{As}\left(\mathrm{CH}_{3}\right) \mathrm{F}_{2} \mathrm{Cl}_{2}$ molecule is/are:
A. Maximum there halogen atoms can lie in same plane
B. Both axial and equatorial plane may have equal number of atoms
C. As - Cl bond length is longer than $A s-F$ bond length .
D. Maximum five atoms can lie in equatorial plane.

## Answer: A::B::C::D

## - Watch Video Solution

57. Which of the following species is/are having ' $N-N$ ' bond order $=2$ ?
A. $N_{3}^{-}$
B. $N_{2} F_{2}$
C. $\mathrm{N}_{2} \mathrm{O}_{4}$
D. $\mathrm{N}_{2} \mathrm{O}$

## Answer: A: B

## - Watch Video Solution

58. Which of the following statements is correct?
A. $\mathrm{ClF}_{3}$ molecule is bent ' T ' shape
B. In $S F_{4}$ molecule, $F-S-F$ equatorial bond angle is $103^{\circ}$ due to $\mathrm{lp}-\mathrm{lp}$ repulsion
C. In $\left[\mathrm{Cl}_{4}\right]^{-}$molecular ion, $\mathrm{Cl}-\mathrm{I}-\mathrm{Cl}$ bond angle is $90^{\circ}$
D. In $\mathrm{OBr}_{2}$, the bond angle is less than $\mathrm{OCl}_{2}$

## Answer: A:C

## - View Text Solution

59. Which of the following species is/are not know?
A. $\mathrm{FeI}_{3}$
B. $\mathrm{SH}_{6}$
C. $\mathrm{PbI}_{4}$
D. $\mathrm{PI}_{5}$

## Answer: A::B::C

## - Watch Video Solution

60. Select correct order between following compounds:
A. $\mathrm{NH}_{3}>\mathrm{NF}_{3}$ : bond angle
B. $\mathrm{NH}_{3}>\mathrm{NF}_{3}$ : dipole moment
C. $\mathrm{NH}_{3}>\mathrm{NF}_{3} \%$ s-character of lone pair
D. $\mathrm{NH}_{3}>\mathrm{NF}_{3}$ : reactivity towards lewis acid

## Answer: A::B::D

## - Watch Video Solution

61. Which of the following is (are) V-shaped?
A. $S_{3}^{2-}$
B. $I_{3}^{-}$
C. $N_{3}^{-}$
D. $I_{3}^{+}$

## Answer: A::D

62. Select correct order between given compounds .
A. $\mathrm{COCl}_{2}>\mathrm{COF}_{2}: X \hat{C} X$ bond angle
B. $\mathrm{NO}_{2} \mathrm{~F}>\mathrm{NO}_{2} \mathrm{Cl}: \mathrm{ON} O$ bond angle
C. $\mathrm{SO}_{2} \mathrm{~F}_{2}<\mathrm{SOF}_{2}: \hat{\mathrm{S}} \mathrm{F}$ bond angle
D. $N_{2} \mathrm{~F}_{2}<\mathrm{N}_{2}\left(\mathrm{CH}_{3}\right)_{2}: N-N$ bond length

## Answer: A::B::D

## - View Text Solution

63. Which of the following equlibria would have highest and lowest value of $K_{p}$ at a commone temperature?
A. $\mathrm{BeCO}_{3} \rightarrow \mathrm{BeO}+\mathrm{CO}_{2}$
B. $\mathrm{CaCO}_{3} \rightarrow \mathrm{CaO}+\mathrm{CO}_{2}$
C. $\mathrm{SrCO}_{3} \rightarrow \mathrm{SrO}+\mathrm{CO}_{2}$
D. $\mathrm{BaCO}_{3} \rightarrow \mathrm{BaO}+\mathrm{CO}_{2}$

## Answer: A::D

## - Watch Video Solution

64. Which of the following process is/are assciated with change of hybridisation of the underlined compounds?
A. $\mathrm{Al}(\mathrm{OH})_{3}$ pp. dissolved in NaOH
B. $B_{2} H_{5}$ is dissolved in THF
C. $\mathrm{SiF}_{4}$ vapour is passed through liq. HF
D. solidifaction $\mathrm{PCl}_{5}$ vapour

## Answer: A::C::D

## - View Text Solution

65. Which of the following are true?
A. van der waals forces are reponsible for the formation of molecular crytals
B. Branching lower the boiling points of isomeric organic due to decrease in van der waals forces
C. In graphite, van der waal forces act between the carbon layers
D. In diamond, van der waal forces act between the carbon layers

## Answer: A::B::C

## - View Text Solution

66. Which of the following statement is incorrect?
A. $\mathrm{O}_{2}$ is paramagnetic, $\mathrm{O}_{3}$ is also paramagnetic
B. $\mathrm{O}_{2}$ is paramagnetic, $\mathrm{O}_{2}$ is diamagnetic
C. $B_{2}$ is paramagnetic, $C_{2}$ is also paramagnetic
D. Different obervation is found in their bond length when

$$
\mathrm{NO} \rightarrow \mathrm{NO}^{+} \text {and } \mathrm{CO} \rightarrow \mathrm{CO}^{+}
$$

## Answer: A::B::D

## - View Text Solution

67. Which of the following statements are not correct?
A. All $\mathrm{C}-\mathrm{O}$ bonds in $\mathrm{CO}_{3}^{2-}$ are equal but not in $\mathrm{H}_{2} \mathrm{CO}_{3}$
B. All $\mathrm{C}-\mathrm{O}$ bonds in $\mathrm{HCO}_{2}^{-}$are equal but not in $\mathrm{HCO}_{2} \mathrm{H}$
C. $\mathrm{C}-\mathrm{O}$ bond length in $\mathrm{HCO}_{2}^{-}$is longer than $\mathrm{C}-\mathrm{O}$ bond length in $\mathrm{CO}_{3}^{2-}$
D. $\mathrm{C}-\mathrm{O}$ bond length in $\mathrm{HCO}_{2}^{-}$and $\mathrm{C}-\mathrm{O}$ bond length in $\mathrm{CO}_{3}^{2-}$ are equal

## Answer: C::D

68. In the structure of $\mathrm{H}_{2} \mathrm{CSF}_{4}$, which of the following statement is/are correct?
A. Two $C-H$ bonds are in the same plane of axial $S$ - $F$ bonds
B. Two $C-H$ bonds are in the same plane of equitorial $S-F$ bonds
C. Total six atoms are in the plane
D. Equitorial $S-F$ plane is perpendicular to the nodal plane of $\pi-$ bonds

## Answer: A::C::D

## - Watch Video Solution

69. In which compound compounds vacant hybride orbitals take part in bonding:
A. $B_{2} H_{6}$
B. $\mathrm{Al}_{2} \mathrm{Cl}_{6}$
C. $\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{Cl}$
D. $\mathrm{H}_{3} \mathrm{BO}_{3}$

## Answer: A::B

## - Watch Video Solution

70. Which of the following is true for $\mathrm{N}_{2} \mathrm{O}$ ?
A. Its molecule is linear
B. Symmetric $N-O-N$ is a favoured structure as compared to

$$
N-O-N \text { skeleton }
$$

C. Bond orders are fractional for $N-N$ and $N-O$ bonds
D. It is a neutral oxide

## Answer: A::C::D

71. Silane is more reactive than $\mathrm{CH}_{4}$ towards $\mathrm{Nu}^{-}$substitution due to :
A. larger size of Si compared to C which facilitating the attack by nucleophile
B. Polarity of $\mathrm{Si}-\mathrm{H}$ bonds is opposite to that of $C-H$ bond
C. Availability of vacant 3d orbitals in case to form the reaction intermediate easily for nucleophilic attack
D. $\mathrm{Si}-H$ bond energy is lower than that of $C-H$ bonds

## Answer: A::B::C::D

## - Watch Video Solution

72. Which of the following statement(s) is/are not correct for following
$\left(\mathrm{I} \mathrm{SCl}_{2}\left(\mathrm{OCH}_{3}\right)_{2}\right.$ and $(I) S F_{2}\left(\mathrm{OCH}_{3}\right)_{2}$
A. $-\mathrm{OCH}_{3}$ groups in both cases occupy the same position
B. Cl -atoms occupy equitorial position incase of (I) and F-atoms occupy
equitorial position in case of (II)
C. Cl-atoms occupy axial position in case of (II) \& F-atoms occupy equitorial position in case of (II)
D. Cl and F - atoms occupy either axial or equitorial position in case of (I) and (II) respectively

## Answer: A::B::C::D

## - View Text Solution

73. If $N_{B}$ is the number of bonding electron and $N_{A}$ is the number of antibonding electrons of a molecules. Then choose the incorrect statement(s) for the relationship , $N_{B}>N_{A}{ }^{\prime \prime}$
A. Molecule may be stable or unstable
B. Molecule may have any integral, frational or zero value of bond order
C. Molecule is only paramagnetic species
D. Molecule does not exist

## Answer: B::C::D

## - View Text Solution

74. Stepwise hydrolysis of $\mathrm{P}_{4} \mathrm{O}_{10}$ takes place via formation of:
A. tetrmetaphosphoric acid
B. tetrapolyphosphoric acid
C. pyrophosphoric acid
D. Orthophosphoric acid
75. Select the correct statement(s) about the compound $N O\left[B F_{4}\right]$ :
A. It has $5 \sigma$ and $2 \pi$ bond
B. Nitrogen-oxygen bond length is higher than nitric oxide (NO)
C. It is a diamagnetic species
D. $B$ - $F$ bond length in this compound is lower than in $B F_{3}$

## Answer: A:C

## - Watch Video Solution

76. Which of the following molecule has as $O-O$ bonds?
A. $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{8}$
B. $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{7}$
C. $\mathrm{H}_{2} \mathrm{SO}_{5}$
D. $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{6}$

## Answer: A:C

## - Watch Video Solution

77. Which of the following species in paramagnetic:
A. $C N^{-}$
B. $\mathrm{SnCl}_{2}$
C. $\mathrm{C}_{2} \mathrm{H}_{2}$
D. $\mathrm{NO}_{2}$

## Answer: B::D

## - View Text Solution

78. $\mathrm{CO}_{2}$ molecule is not isostructural with :
A. $\mathrm{HgCl}_{2}$
B. $\mathrm{SnCl}_{2}$
C. $\mathrm{C}_{2} \mathrm{H}_{2}$
D. $\mathrm{NO}_{2}$

## Answer: B::D

## - View Text Solution

79. Which of the following have a linear structure?
A. $\mathrm{HgCl}_{2}$
B. $\mathrm{SnCl}_{2}$
C. $\mathrm{ICl}_{2}^{-}$
D. $C S_{2}$

## Answer: A::C::D

80. Which of the following compound (s) is/are non-polar?
A. $\mathrm{NO}_{2}$
B. $B_{2} H_{6}$
C. $\mathrm{PF}_{3} \mathrm{Cl}_{2}$
D. $B_{3} N_{3} H_{6}$

## Answer: B::D

## D View Text Solution

81. Non-polar molecule are:
A. $\mathrm{CH}_{4}$
B. $C_{2} F_{2}$
C. $C_{2} F_{4}$
D. $O F_{2}$

## Answer: A::B::C

## - Watch Video Solution

82. Which of the following molecule species is/are having $\pi_{2 p}$ as H.O.M.O (highest occupied molecular orbital) :
A. $N_{2}^{-}$
B. $\mathrm{O}_{2}^{2+}$
C. $\mathrm{NO}^{+}$
D. $B_{2}^{+}$

## Answer: B::C::D

## - Watch Video Solution

83. Correct order of b.p.t is /are:
A. $\mathrm{H}_{2}<\mathrm{He}$
B. $H_{2}<D_{2}$
C. $\mathrm{H}_{2} \mathrm{O}<\mathrm{D}_{2} \mathrm{O}$
D. $\mathrm{NH}_{3}<\mathrm{SbH}_{3}$

## Answer: B::C::D

## - View Text Solution

84. Incorrect order between following compounds is/are:
A. $\mathrm{O}\left(\mathrm{CH}_{3}\right)_{2}<\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ : number of $s p^{3}$-hybride atoms
B. $\mathrm{O}\left(\mathrm{CH}_{3}\right)_{2}<\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ : Bond angle w.r.t common atom
c. $\mathrm{O}\left(\mathrm{CH}_{3}\right)_{2}<\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}: \%$ s-character of hybrid orbital on central atom
D. $\mathrm{O}\left(\mathrm{CH}_{3}\right)_{2}<\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$ : reactivity towards lewis acid

## Answer: A::D

## - Watch Video Solution

## MATCH THE COLUMN

1. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

## Column-I

(A) $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$
(B) Singlet $\mathrm{CCl}_{2}$
(C) $\mathrm{H}_{4} \mathrm{SiO}_{4}$
(D) $\mathrm{B}\left(\mathrm{NMe}_{2}\right)_{3}$

## Column-II

(P) Hybridization of central atom does not change due to back bonding
(Q) Bond angle of central atom increases due to combined effect of back bonding and steric factor
(R) Anyone of $t_{2 d} d$-orbital is involved in back bonding
(S) Electron density on central atom decreases due to back bonding
(T) Electron density on central atom increases due to back bonding
2. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.
(A) $\mathrm{CO}, \mathrm{CN}^{-}, \mathrm{NO}^{+}, \mathrm{O}_{2}^{2+}$
(B) $\mathrm{N}_{2}^{+}, \mathrm{O}_{2}^{+}, \mathrm{O}_{2}^{-}, \mathrm{NO}$
(C) $\mathrm{NO}^{-}, \mathrm{N}_{2}^{2+}, \mathrm{C}_{2}, \mathrm{~B}_{2}^{2}$
(D) $\mathrm{CN}, \mathrm{C}_{2}^{+}, \mathrm{B}_{2}^{+}, \mathrm{N}_{2}^{-}$

(P) All are paramagnetic
(Q) All are diamagnetic
(R) All have intermixing of $s$ and $p$-orbitals
(S) All have same bond order
(T) All have fractional bond order

## - View Text Solution

3. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of

Column-II.

## Column-I (Reactions)

(A) Formation of cation and anion by self ionization of iodine
(B) Attack of hydroxide ion on boric acid
(C) $\mathrm{Ba}^{2-}(\mathrm{aq})+\mathrm{SO}_{4}^{2-}(\mathrm{aq}) \longrightarrow$ $\mathrm{BaSO}_{4} \downarrow$ (white ppt.)
(D) $\mathrm{MgSO}_{4} \xrightarrow{\mathrm{~T}>800{ }^{\circ} \mathrm{C}} \mathrm{MgO}+\mathrm{SO}_{2}+\frac{1}{2} \mathrm{O}_{2}$

Column-II (Characteristics of final products)
(P) Lone pair(s) is/are present at central atom
(Q) d-orbital(s) involved in hybridization of central atom of either of product
(R) $d$-orbital(s) not involved in hybridization of central atom of either of product
(S) $d \pi-p \pi$ bond(s)
(T) Planar covalent species is formed

## - View Text Solution

4. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

## Column-I (Compounds)

(A) $\mathrm{H}_{4} \mathrm{SiO}_{4}$
(B) $\mathrm{H}_{2} \mathrm{SeO}_{4}$
(C) $\mathrm{H}_{3} \mathrm{BO}_{3}$
(D) $\mathrm{H}_{2} \mathrm{NBF}_{2}$

## Column-II (Characteristics)

(P) Back bond
(Q) Intermolecular hydrogen bond
(R) Hypovalent compound
(S) Proton donor acid
(T) Hypervalent compound
5. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

## Column-I (Characteristics)

(A) The distribution of s-character in hybrid orbitals of central atom is not equal and all bond lenaths ( $\mathrm{CA}-\mathrm{X}$ ) are equivalent
(B) The distribution of s-character in hybrid orbitals of central atom is equal and all bond lengths $(C A-X)$ are equivalent

## Column-II (Species)

(P) $\left(\mathrm{CH}_{3}\right)_{2} \mathrm{O}$
(Q) $\mathrm{NH}_{3}$

## D View Text Solution

6. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

Column-I
(Oxyacids)
(A) $\mathrm{H}_{2} \mathrm{~S}_{4} \mathrm{O}_{6}$
(B) $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{3}$
(C) $\mathrm{H}_{2} \mathrm{SO}_{5}$
(D) $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{3}$

Column-II
(Oxidation state of S-atom)
(P) +6
(Q) $\quad+5$
(R) 0
(S) -2
(T) $\quad+3$
7. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

## Column-I

## Column-II

(A) $\mathrm{NH}_{4} \mathrm{Cl}$
(P) Hydrogen bond
(B) $\mathrm{CuSO}_{4} \cdot 5 \mathrm{H}_{2} \mathrm{O}$
(Q) Co-ordinate bond
(C) HNC
(R) lonic bond
(D) Liquid $\mathrm{H}_{2} \mathrm{O}_{2}$
(S) Covalent bond

## - Watch Video Solution

8. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

## Column-I

## Column-II

(A) $\mathrm{B}_{3} \mathrm{~N}_{3} \mathrm{H}_{6}$
(P) Planar geometry
(B) $\mathrm{S}_{2} \mathrm{Cl}_{2}$
(Q) Non-planar geometry
(C) $\mathrm{B}_{2} \mathrm{H}_{6}$
(D) $\mathrm{I}_{2} \mathrm{Cl}_{6}$
(R) No lone pair
(S) Non-polar molecule
9. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

(A) $\mathrm{NH}_{3}, \mathrm{SbH}_{3}, \mathrm{AsH}_{3}, \mathrm{PH}_{3}$
(B) $\mathrm{HI}, \mathrm{HBr}, \mathrm{HCl}, \mathrm{HF}$
(C) $\mathrm{SnH}_{4}, \mathrm{GeH}_{4}, \mathrm{SiH}_{4}, \mathrm{CH}_{4}$
(D) $\mathrm{H}_{2} \mathrm{O}, \mathrm{H}_{2} \mathrm{Te}, \mathrm{H}_{2} \mathrm{Se}, \mathrm{H}_{2} \mathrm{~S}$

## (Phyalcal properties)

(P) Bond dipole mom"nt
(Q) Reducing property
(R) Enthalpy of fuston
(S) Boiling point

## - View Text Solution

10. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

## Column-I (Speel-a)

## Column-II (Bond angle)

(A) $\mathrm{NO}_{2}^{+}$
(P) $180^{\circ}$
(B) $\mathrm{NO}_{2}^{-}$
(Q) $120^{\circ}$
(C) $\mathrm{NO}_{2}$
(R) $134^{\circ}$
(D) $\mathrm{NO}_{3}$
(S) $115^{\circ}$
11. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

## Column-I

(A) $\mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}$
(B) Singlet $\mathrm{CCl}_{2}$
(C) $\mathrm{H}_{4} \mathrm{SiO}_{4}$
(D) $\mathrm{B}\left(\mathrm{NMe}_{2}\right)_{3}$

## Column-II

(P) Hybridization of central atom does not chanse due to back bonding
(Q) Bond angle of central atom increases due to combined effect of back bonding and steric factor
$(\mathrm{R})$ Anyone of $t_{28} \mathrm{~d}$-orbital is involved in back bonding
(S) Electron density on central atom decreases due to back bonding
(T) Electron density on central atom increases due to back bonding

## - View Text Solution

12. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of
(A) $\mathrm{CO}, \mathrm{CN}^{-}, \mathrm{NO}^{*}, \mathrm{O}_{2}^{2+}$
(B) $\mathrm{N}_{2}^{+}, \mathrm{O}_{2}^{+}, \mathrm{O}_{2}^{-}$, NO
(C) $\mathrm{NO}^{-}, \mathrm{N}_{2}^{2+}, \mathrm{C}_{2}, \mathrm{~B}_{2}^{2}$
(D) $\mathrm{CN}, \mathrm{C}_{2}^{+}, \mathrm{B}_{2}^{+}, \mathrm{N}_{2}^{-}$

## Column-II

(P) All are paramagnetic
(Q) All are diamagnetic
(R) All have intermixing of $s$ and $p$-orbitals
(S) All have same bond order
(T) All have fractional bond order

## View Text Solution

13. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of

## Column-II.

## Column-1 (Reactions)

(A) Formation of cation and anion by self ionization of iodine
(B) Attack of hydroxide ion on boric acid
(C) $\mathrm{Ba}^{2-}(\mathrm{aq})+\mathrm{SO}_{4}^{2-}(\mathrm{aq}) \longrightarrow$ $\mathrm{BaSO}_{4} \downarrow$ (white ppt.)
(D) $\mathrm{MgSO}_{4} \xrightarrow{\mathrm{~T}>800{ }^{\circ} \mathrm{C}} \mathrm{MgO}+\mathrm{SO}_{2}+\frac{1}{2} \mathrm{O}_{2}$

## Column-II (Characteristics of final

 products)(P) Lone pair(s) is/are present at central atom
(Q) $d$-orbital(s) involved in hybridization of central atom of either of product
(R) $d$-orbital(s) not involved in hybridization of central atom of either of product
(S) $d \pi-p \pi$ bond(s)
(T) Planar covalent species is formed
14. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

## Column-I (Compounds)

(A) $\mathrm{H}_{4} \mathrm{SiO}_{4}$
(B) $\mathrm{H}_{2} \mathrm{SeO}_{4}$
(C) $\mathrm{H}_{3} \mathrm{BO}_{3}$
(D) $\mathrm{H}_{2} \mathrm{NBF}_{2}$

## Column-II (Characteristics)

(P) Back bond
(Q) Intermolecular hydrogen bond
(R) Hypovalent compound
(\$) Proton donor acid
(T) Hypervalent compound

## - View Text Solution

15. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.
(A) The distribution of $s$-character in hybrid orbitals of central atom is not equal and all bond lengths ( $\mathrm{CA}-\mathrm{X}$ ) are equivalent
(B) The distribution of s-character in hybrid orbitals of central atom is equal and all bond lengths $(C A-X)$ are equivalent
(C) The distribution of $s$-character in hybrid orbitals of central atom is not equal and bond angle $(X-C A-X)$ is greater than $109^{\circ} 28$
(D) The distribution of s-character in hybrid orbitals of central atom is equal and bond angle $(X-\mathrm{CA}-X)$ is either equal or less than $109^{\circ} 28^{\prime}$
(P) $\left(\mathrm{CH}_{3}\right)_{2} \mathrm{O}$
(Q) $\mathrm{NH}_{3}$
(R) $\mathrm{PBr}_{4}^{+}$
(S) $\mathrm{H}_{2} \mathrm{O}$
(T) $\mathrm{XeO}_{6}^{4-}$

## View Text Solution

16. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.
(A) $\mathrm{NH}_{2} \mathrm{BF}_{2}$
(B) $\mathrm{Be}_{2} \mathrm{Cl}_{4}$
(C) $\mathrm{CH}_{2} \mathrm{SF}_{4}$
(D) $\mathrm{IF}_{7}$

(P) Six-atoms are in same plane
(Q) Polar $(\mu \neq 0)$
(R) Non-planar
(S) All 'CA $-X$ ' $(X=$ halogen $)$ bond lengths are identical
(T) All surrounding atoms contain non bonding electron pair (lone pair)
17. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

(A) $\mathrm{Re}_{2} \mathrm{Cl}_{8}^{2-}$
(B) $\mathrm{NO}_{3}^{-}$
(P) $p \pi \cdot p \pi$ bonding
(C) $\mathrm{SO}_{4}^{2-}$
(Q) $p \pi-d \pi$ bonding
(D) $\mathrm{SO}_{3}$
(R) $d \pi \cdot d \pi$ bonding
(S) $\delta$-bonding

## Column-II

## - View Text Solution

18. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.


Fita
(P) Resulting H. O. M. O. of $\mathrm{O}_{2}$ molecule
(Q) Resulting H. O. M. O. of $\mathrm{C}_{2}$ molecule
(R) Resulting molecular orbital having one nodal plane
(S) Resulting M. O. having lower energy than participating atomic orbitals
19. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.
(A) $\mathrm{XeF}_{5}$

| (B) $\mathrm{MnO}_{4}$ | (P) Non-polar and planar |
| :--- | :--- |
| (C) $\dot{\mathrm{C}} \mathrm{H}_{3}$ | (P)Species having equal bond angle and <br> bond length <br> Both axial $d$-orbicals are involved in <br> hybridisation <br> (D) $\mathrm{I}_{2} \mathrm{Cl}_{6}$ |

## - View Text Solution

20. Column-I and Column-II contains four entries each. Entries of Column I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of

## Column-II.

Column-I
(Axial/sideways combination of appropriate/ inappropriate pure orbitals)

## Column-II

(Types of molecular orbital)
(A) $p+p$ pure orbitals
(P) a borklint; molecular orbital
(B) $s+p$ pure orbitals
(Q) $\pi$ - anti-bonding molecular orbital
(C) (non-axial) $d+p$ pure orbitals
(R) $\sigma \cdot$ anti-bonding molecular orbital
(D) (axial) $d+p$ pure orbitals
(T) Non bonding molecular orbital

## View Text Solution

21. Column-I and Column-II contains four entries each. Entries of Column -I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

## Column-I (Oxyacids)

(A) $\mathrm{H}_{2} \mathrm{~S}_{4} \mathrm{O}_{6}$
(B) $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{3}$
(C) $\mathrm{H}_{2} \mathrm{SO}_{5}$
(D) $\mathrm{H}_{2} \mathrm{~S}_{2} \mathrm{O}_{3}$

Column-II
(Oxidation state of S-atom)
(P) +6
(Q) $\quad+5$
(R) 0
(S) $\quad-2$
(T) $\quad+3$
22. Column-I and Column-II contains four entries each. Entries of Column I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

## Column-I

## Column-II

(A) $\mathrm{NH}_{4} \mathrm{Cl}$
(P) Hydrogen bond
(B) $\mathrm{CuSO}_{4} \cdot 5 \mathrm{H}_{2} \mathrm{O}$
(Q) Co-ordinate bond
(C) HNC
(R) lonic bond
(D) Liquid $\mathrm{H}_{2} \mathrm{O}_{2}$
$(\mathrm{S})$ Covalent bond

## - Watch Video Solution

23. Column-I and Column-II contains four entries each. Entries of Column I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

## Column-I

(A) $\mathrm{B}_{3} \mathrm{~N}_{3} \mathrm{H}_{6}$
(B) $\mathrm{S}_{2} \mathrm{Cl}_{2}$
(P) Planar geometry
(C) $\mathrm{B}_{2} \mathrm{H}_{6}$
(Q) Non-planar geometry
(D) $1_{2} \mathrm{Cl}_{6}$
(R) No lone pair
(S) Non-polar molecule Column-II
24. Column-I and Column-II contains four entries each. Entries of Column I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

Column-I
(Pair of species)
(A) $\mathrm{PCl}, \mathrm{F}_{2}, \mathrm{PCl}_{2} \mathrm{~F}_{3}$
(B) $\mathrm{BF}_{\text {, }}$ and BCl ,
(C) $\mathrm{CO}_{2}$ and $\mathrm{CN}_{2}^{-2}$
(D) $\mathrm{C}_{6} \mathrm{H}_{6}$ and $\mathrm{B}_{3} \mathrm{~N}_{3} \mathrm{H}_{6}$

## Column-II

(Identical Property in pairs of species)
(P) Hybridisation of central atom
(Q) Shape of molecule/ion
(R) $\mu$ (dipole moment)
(S) Total number of electrons

## - View Text Solution

25. Column-I and Column-II contains four entries each. Entries of Column I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

(A) $\mathrm{NH}_{3}, \mathrm{SbH}_{3}, \mathrm{AsH}_{3}, \mathrm{PH}_{3}$
(B) $\mathrm{HI}, \mathrm{HBr}, \mathrm{HCl}, \mathrm{HF}$
(C) $\mathrm{SnH}_{4}, \mathrm{GeH}_{4}, \mathrm{SiH}_{4}, \mathrm{CH}_{4}$
(D) $\mathrm{H}_{2} \mathrm{O}, \mathrm{H}_{2} \mathrm{Te}, \mathrm{H}_{2} \mathrm{Se}, \mathrm{H}_{2} \mathrm{~S}$
$=-$ Column-II (Physical propertiea)
(P) Bond dipole moment
(Q) Reducing property
(R) Enthalpy of Iusion
(S) Boiling point
26. Column-I and Column-II contains four entries each. Entries of Column I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of Column-II.

## Column-I (Specl-a)

(A) $\mathrm{NO}_{2}^{+}$
(P) $180^{\circ}$
(B) $\mathrm{NO}_{2}^{-}$
(Q) $120^{\circ}$
(C) $\mathrm{NO}_{2}$
(R) $134^{\circ}$
(D) $\mathrm{NO}_{3}$
(S) $115^{\circ}$ ) $109^{\circ}$

## - Watch Video Solution

## ASSERTION-REASON TYPE QUESTIONS

1. Assertion : $\mathrm{C}_{3} \mathrm{O}_{2}$ is non-polar molecule.

Reason : Terminal `pi-bonds of the molecule are lying in different planes.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - Watch Video Solution

2. Assertion:- If $d_{x^{2} y^{2}}$ and py orbitals come close together along $z$-axis, then can form $\pi$ - bond by sideways overlapping.

Reason:- Both orbitals do not have electron density along z -axis.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - Watch Video Solution

3. Assertion : $B F_{3}$ undergoes in partial hydrolysis

Reason : Due to strong back bonding in $B F_{3}$ only two flouride groups have come out on nucleaophili attack by $\mathrm{H}_{2} \mathrm{O}$.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: A

## D View Text Solution

4. Assertion : The central catbon atom in $F_{2} C=C=C F_{2}$ and both carbo atoms in $F_{2} B-C=C-B F_{2}$ are sp-hybridized.

Reasom molecules are planar.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: A

5. Assertion : Formation of $\mathrm{PH}_{4}^{+}$ion is relatively difficult in comparison to $\mathrm{NH}_{4}^{+}$ion.

Reason : Lone pair of phosphorus atom in $\mathrm{PH}_{3}$ resides in stereochemically inactive pure s-orbital.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - View Text Solution

6. Assertion : Bond dissociation energy of $B-F$ bond in $B F_{3}$ molecule is lower than $C-F$ bond in $C F_{4}$ molecule. Reason : Atomic size of B -atom is larger than that of C -atom.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - Watch Video Solution

7. Assertion : $\mathrm{PF}_{3}$ is stronger lewis base than $\mathrm{PH}_{3}$.

Reason: I.p. of P -atom in $\mathrm{PF}_{3}$ molecule is present in $s p^{3}$-hybrid orbital,
whereas I.p. of P-atom in $\mathrm{PH}_{3}$ is present in almost pure s-orbital.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## D View Text Solution

8. Assertion : NiO is less than CaO .

Reason : $\mathrm{Ni}^{2+}$ is pseudo noble gas configuration cation whereas $\mathrm{Ca}^{2+}$ is noble gas configuration cation.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: A

## - View Text Solution

9. Assertion : When two gaseous OF molecules are allowed to cool, than they undergoes dimerisation through O-atom.

Reason : Dimer form of OF molecule (i.e., $\mathrm{O}_{2} \mathrm{~F}_{2}$ ) is having one peroxy linkage in its structure.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: A

## - View Text Solution

10. Assertion : bond dissociation energy of $N-F$ bond in $\mathrm{NF}_{3}$ molecule is lower than that of in $\mathrm{NCl}_{3}$ molecule.

Reason : Interelectronic repulsion exists between small size N and F atoms $N-F$ bond of $\mathrm{NF}_{3}$ molecule.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - View Text Solution

11. Assertion:- If $d_{x^{2} y^{2}}$ and py orbitals come close together along $z$-axis, then can form $\pi$ - bond by sideways overlapping.

Reason:- Both orbitals do not have electron density along z -axis.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - Watch Video Solution

12. Assertion : HOF bond angle is higher than HOCl.

Reason : Oxygen is more electronegative than chlorine.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - View Text Solution

13. Assertion : NaCl is more ionic than Nal.

Reason : Chlorine is more electronegative than iodine.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: D

## - Watch Video Solution

14. Assertion : $\mathrm{PbI}_{4}$ doesn't exist and converts into $\mathrm{PbI}_{2}$ and $I_{2}$ spontaneously at room temperature but $\mathrm{PbCl}_{4}$ needs heatin to convert into $\mathrm{PbCl}_{2}$ and $\mathrm{Cl}_{2}$.

Reason : $\mathrm{Pb}^{2+}$ is more stable than $\mathrm{Pb}^{4+}$ due to inert pair effect.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: D

## - Watch Video Solution

15. Statement-1 : Dipole moment of $\mathrm{NF}_{3}$ is less than that of $\mathrm{NH}_{3}$.

Statement-2 : Polarity of $N-F$ bond is less than that of $N-H$ bond.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: A

## - Watch Video Solution

16. Assertion : Solubility of $n$-orbital of $n$-orbital in water decrease with increase in molecular weight .

Reason : The hydrophobic nature of alkyl chain increase.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - View Text Solution

17. Assertion : The unpaired electron of $\mathrm{CH}_{3}^{+}$free radical occupies p oribtal.

Reason: $\mathrm{CH}_{3}^{\dot{+}}$ possesses $s p^{2}$-hybridisation.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - Watch Video Solution

18. Assertion: Nitrogen is unreactive at room temperature but becomes reactive at elevated temperature (on heating or in the presence of catalysts).

Reason: In nitrogen molecule, there is extensive delocalisation of electrons.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion
19. Assertion The p-isomer of dichlorobenzene has higher m.p than oand m isomer

Reason p -isomer is symmetrical and thus shows more closely packed structure .
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - Watch Video Solution

20. Assertion (A): $\mathrm{Na}_{2} \mathrm{SO}_{4}$ is soluble in water while $\mathrm{BaSO}_{4}$ is insoluble. Reason (R): Latice enthalpy of $\mathrm{BaSO}_{4}$ exceeds its hydration enthalpy.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - Watch Video Solution

21. Statement 1: $\mathrm{N}_{2}$ and $\mathrm{NO}^{+}$are both dia-magnetic.

Statement 2: $\mathrm{NO}^{+}$is isoelectronic with $\mathrm{N}_{2}$
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: D

## - Watch Video Solution

22. Assertion : Bond order can assume any value number including zero.

Reason :Higher the bond order, shorter is bond length and greater is bond energy.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: D

## - Watch Video Solution

23. Assertion: $\mathrm{C}_{3} \mathrm{O}_{2}$ has linear structure.

Reason: Each carbon atom in $\mathrm{C}_{3} \mathrm{O}_{2}$ in $s p$-hydridized.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion
24. Assertion : H -bonding occurs in $\mathrm{H}_{2} \mathrm{O}$ due to larger size of O -atom. Reason : The size of O -atom is larger than H -atom.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: A

25. Assertion In case of $\left(\mathrm{CH}_{3}\right)_{3} N$ geometry is pyramidal but in case of $\left(\mathrm{SiH}_{3}\right)_{3} N$ it is planar

Reasoning The maximum covalency of Si is six but that of $C$ is four .
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - Watch Video Solution

26. Assertion : Super-oxides of alkali metals are para-magnetic.

Reason : Super-oxides contain the ion $\mathrm{O}_{2}^{-}$which has one unpaired
electron.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - Watch Video Solution

27. Assertion : The $\mathrm{HF}_{2}^{-}$ion exists in the solid state \& also in liquid state but not in aqueous state.

Reason : The magniture of hydrogen bonds among HF molecules is weaker than that in between HF and $\mathrm{H}_{2} \mathrm{O}$.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - View Text Solution

28. Assertion:- If $d_{x^{2} y^{2}}$ and py orbitals come close together along $z$-axis, then can form $\pi$ - bond by sideways overlapping.

Reason:- Both orbitals do not have electron density along z -axis.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - Watch Video Solution

29. Assertion : The H -bond present in $\mathrm{NH}_{3}$ dissolved in water is best represented by : $H-N H|-H-O H|-H$ and not by

| ${ }_{H}$ |
| :---: |
| $\mathrm{H}-\mathrm{NH}\|--\mathrm{HH}\|-\mathrm{O}$ |

Reason : The $\mathrm{O}-\mathrm{H}$ bond polarity is more compared to that $\mathrm{N}-\mathrm{H}$ bond.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - View Text Solution

30. Assertion : $\mathrm{C}_{3} \mathrm{O}_{2}$ is non-polar molecule.

Reason : Terminal `pi-bonds of the molecule are lying in different planes.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion
31. Assertion: If $d_{x^{2}-y^{2}}$ and $p_{y}$ orbitals come close together along $z$-axis, then they can form $\pi$ - bond by sideways overlapping.

Reason : Both orbitals do not have electron density along $z$-axis.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - View Text Solution

32. Assertion : $\mathrm{BF}_{3}$ undergoes in partial hydrolysis

Reason : Due to strong back bonding in $B F_{3}$ only two flouride groups have come out on nucleaophili attack by $\mathrm{H}_{2} \mathrm{O}$.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: A

## - View Text Solution

33. Assertion : The central catbon atom in $F_{2} C=C=C F_{2}$ and both carbo atoms in $F_{2} B-C=C-B F_{2}$ are sp-hybridized.

Reasom molecules are planar.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: A

## - Watch Video Solution

34. Assertion : Formation of $\mathrm{PH}_{4}^{+}$ion is relatively difficult in comparison to $\mathrm{NH}_{4}^{+}$ion.

Reason : Lone pair of phosphorus atom in $P H_{3}$ resides in stereochemically inactive pure s-orbital.

> A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - View Text Solution

35. Assertion : Bond dissociation energy of $B-F$ bond in $B F_{3}$ molecule is lower than $C$ - $F$ bond in $\mathrm{CF}_{4}$ molecule.

Reason : Atomic size of B -atom is larger than that of C -atom.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - Watch Video Solution

36. Assertion : $P F_{3}$ is stronger lewis base than $\mathrm{PH}_{3}$.

Reason : l.p. of P-atom in $P F_{3}$ molecule is present in $s p^{3}$-hybrid orbital, whereas I.p. of P-atom in $\mathrm{PH}_{3}$ is present in almost pure s-orbital.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - View Text Solution

37. Assertion : NiO is less than CaO .

Reason : $\mathrm{Ni}^{2+}$ is pseudo noble gas configuration cation whereas $\mathrm{Ca}^{2+}$ is noble gas configuration cation.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: A

38. Assertion : When two gaseous OF molecules are allowed to cool, than they undergoes dimerisation through O-atom.

Reason : Dimer form of OF molecule (i.e., $O_{2} F_{2}$ ) is having one peroxy linkage in its structure.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: A

## - View Text Solution

39. Assertion : bond dissociation energy of $N-F$ bond in $\mathrm{NF}_{3}$ molecule is lower than that of in $\mathrm{NCl}_{3}$ molecule.

Reason : Interelectronic repulsion exists between small size N and F atoms $N-F$ bond of $N F_{2}$ molecule.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - View Text Solution

40. Assertion : If $d_{x^{2}-y^{2}}$ and $p_{y}$ orbitals come close together along $z$-axis, they can form $\pi$ - bond by sideways overlapping.

## Reason : Both oritals do not electron density along z-axis.

A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## D View Text Solution

41. Assertion : HOF bond angle is higher than HOCl.

Reason : Oxygen is more electronegative than chlorine.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - View Text Solution

42. Assertion : NaCl is more ionic than NaI .

Reason : Chlorine is more electronegative than iodine.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: D

## D Watch Video Solution

43. Assertion : $\mathrm{PbI}_{4}$ doesn't exist and converts into $P b I_{2}$ and $I_{2}$ spontaneously at room temperature but $\mathrm{PbCl}_{4}$ needs heatin to convert into $\mathrm{PbCl}_{2}$ and $\mathrm{Cl}_{2}$.

Reason : $\mathrm{Pb}^{2+}$ is more stable than $\mathrm{Pb}^{4+}$ due to inert pair effect.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: D

## - Watch Video Solution

44. Assertion : Dipole moment of $\mathrm{NF}_{3}$ is less than that of $\mathrm{NH}_{3}$.

Reason : polarity of $N-F$ bond is less than that of $N-H$ bond.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion
45. Assertion : Solubility of $n$-orbital of $n$-orbital in water decrease with increase in molecular weight .

Reason : The hydrophobic nature of alkyl chain increase.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - View Text Solution

46. Assertion : The unpaired electron of $\mathrm{CH}_{3}^{+}$free radical occupies p oribtal.

Reason : $\mathrm{CH}_{3}^{\cdot}$ possesses $s p^{2}$-hybridisation.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - Watch Video Solution

47. Assertion : Nitrogen in inactive at room temperature but becomes reactive at elevated temperature (on heating or in the presence of

## catalyst).

Reason : In nitrogen molecule, there is delocalization electrons.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: A

## - View Text Solution

48. Assertion The p-isomer of dichlorobenzene has higher m.p than oand $m$ isomer

Reason p-isomer is symmetrical and thus shows more closely packed structure .
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - Watch Video Solution

49. Assertion (A): $\mathrm{Na}_{2} \mathrm{SO}_{4}$ is soluble in water while $\mathrm{BaSO}_{4}$ is insoluble. Reason (R): Latice enthalpy of $\mathrm{BaSO}_{4}$ exceeds its hydration enthalpy.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - Watch Video Solution

50. Assertion : $N_{2}$ and $\mathrm{NO}^{+}$both are diamagnetic substances.

Reason : $\mathrm{NO}^{+}$is isoelectronic with $\mathrm{N}_{2}$.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: D

## - View Text Solution

51. Assertion : Bond order can assume any value number including zero.

Reason :Higher the bond order ,shorter is bond length and greater is bond energy.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: D

## D Watch Video Solution

52. Assertion: $\mathrm{C}_{3} \mathrm{O}_{2}$ has linear structure.

Reason: Each carbon atom in $\mathrm{C}_{3} \mathrm{O}_{2}$ in $s p$-hydridized.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - Watch Video Solution

53. Assertion : H -bonding occurs in $\mathrm{H}_{2} \mathrm{O}$ due to larger size of O -atom. Reason : The size of O -atom is larger than H -atom.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: A

## - View Text Solution

54. Assertion : $\left(\mathrm{CH}_{3}\right)_{3} \mathrm{~N}$ geometry is pyramidal but in case $\left(\mathrm{SiH}_{3}\right)_{3} \mathrm{~N}$ it is planar.

Reason :The maximum covalency of Si is six but that of C is four.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - View Text Solution

55. Assertion : Supeoxides of alkali matels are paramagnetic.

Reason : Superoxides conatain the ion $\mathrm{O}_{2}^{-}$which has one unpaired electron in its anti-bonding molecule orbital.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - View Text Solution

56. Assertion : The $\mathrm{HF}_{2}^{-}$ion exists in the solid state \& also in liquid state but not in aqueous state.

Reason : The magniture of hydrogen bonds among HF molecules is weaker than that in between HF and $\mathrm{H}_{2} \mathrm{O}$.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: C

## - View Text Solution

57. Assertion : If $d_{x^{2}-y^{2}}$ and $p_{y}$ orbitals come close together along $z$-axis, they can form $\pi$ - bond by sideways overlapping.

Reason : Both oritals do not electron density along z-axis.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

58. Assertion : The H -bond present in $\mathrm{NH}_{3}$ dissolved in water is best represented by : $H-N H|-H-O H|-H$ and not by

> I
> H
> H-NH|--- HH|-O

Reason : The $O-H$ bond polarity is more compared to that $N-H$ bond.
A. If assertion is true but the reason is false
B. If assertion is false but reason is true
C. If both assertion and reason are true and the reason is the correct
explanation of assertion
D. If both assertion and reason are true and the reason is not the correct explanation of assertion

## Answer: B

## - View Text Solution

1. There are two groups of compounds A and B. Groups A contains three compounds $\mathrm{Px}_{4}, \mathrm{Qy}_{3}, \mathrm{Rz}_{2}$. Groups B also contains three compounds $S x_{4}, T y_{3}, U z_{2}$. Hybridization of each central atom of group A compounds is same as that of iodine in $\mathrm{IBrCl}^{-}$while in group B compounds it is same as that of iodine $\mathrm{IBrCl}^{+}$. Substituents $\mathrm{X}, \mathrm{Y}$ and Z exhibit covalency of one in ground state. Then find the value of $x / y$.

Where, $x$ and $y$ are total number of lone pair present at central atoms of compounds of group A and B respectively.

## - Watch Video Solution

2. Consider the following three compounds (i) $A X_{2 n}^{n-}$, (ii) $A X_{3 n}$ and (ii) $A X_{4 n}^{n+}$, where central atom $A$ is 15th group element and their maximum covalency is 3 n . If total number of proton in surrounding atom X is n and value of n is one, then calculate value of $x^{3}+y^{2}+z^{2}$. (where $\mathrm{x}, \mathrm{y}$ and z are total number of lone pair at central atom in compounds (i), (ii) and (iii) respectively.
3. Condsider the following combination of atomic orbitals :
combinding orbitals (internuclear axis ) Combindig orbitals (internuclear axis).
(i) $s+p_{x}(x) \quad$ (ii) $d_{x y}+d_{x y}(x) \quad$ (iii) $d_{x y}+P_{x}(z) \quad$ (iv) $s+s(z) \quad(v) d_{y z}+d_{y z}(x)$
$p_{x}+p_{x}(z)($ vii) $) d_{z^{2}}+d_{z^{2}}(z)($ viii $) d_{x y}+d_{x y}(z)(i x) p_{x}+p_{x}(y)(\mathrm{x}) s+p_{z}(x)$
Then calculate value of $a^{2}+b^{2}+2 c d$. (where $a=\sigma M . O ., b=\pi M . O ., C=\delta M . O ., \mathrm{d}=$ non-bonding M.O.)

## - View Text Solution

4. Consider the following six changes
(i) $\mathrm{NO} \rightarrow \mathrm{NO}^{+}$
(ii) $O_{2}^{-} \rightarrow O_{2}^{2-}$
(iii) $\mathrm{O}_{2} \rightarrow \mathrm{O}_{2}^{+}$
(iv) $\mathrm{NO}^{+} \rightarrow \mathrm{NO}^{-}$
$\mathrm{NO}^{+} \rightarrow \mathrm{NO}^{2+}(\mathrm{vi}) \mathrm{CO} \rightarrow \mathrm{CO}^{+}$

Then calculate value of $c^{2}-b^{2}-a^{2}$, where $\mathrm{a}, \mathrm{b}$ and c are total number of transformation in which magnetic property will be changed, bond order increase and bond order decrease respectively.
5. When $B_{2} H_{4}$ is allowed to react with following lewis bases, then how many given lewis bases form adduct through symmetrical cleavage of $\left.B_{2} H_{6}\right)$ ?
$\mathrm{NH}_{3}, \mathrm{MeNH}_{3}$, pyridine, CO, T.H.F., $\mathrm{PH}_{3}, \mathrm{PF}_{3}, \mathrm{Me}_{3} \mathrm{~N}, \mathrm{Me}_{3} \mathrm{NH}$

## - View Text Solution

6. Consider the following elements $\mathrm{A}, \mathrm{B}, \mathrm{C}$ and D and their outer electronic configurtions are $n s^{2} n p^{1}, n s^{2} n p^{3}, n s^{2} n p^{4}$ and $n s^{2} n p^{5}$ respectively. Element E also has same outer electronic configuration like D but shows only single oxidation state(-1). If element $A, B, C$ and $D$ belong to same period as that of sodium. Consider the following compounds.
(i) $C E_{4}$ (ii) $B D_{2} E_{3}$ (iii) $D E_{3}$ (iv) $D E_{2}$ (v) $B D_{3} E_{2}$ (vi) $C_{2} E_{2}$ (vii) $D E$ (viii) $A_{2} D_{6}$.

Then calculate the value of $\mathrm{x}+\mathrm{y}$, (where x and y are total number of polar and non-polar compounds).
7. Consider following four compounds:
(i) $C_{x} O_{y}$
(ii) $C_{x} O_{y+1}$
(iii) $\mathrm{C}_{x+2} \mathrm{O}_{y+1}$ and (iv) $\mathrm{C}_{x+11} \mathrm{O}_{y+8}$,
if " $x=y=1$ ", then calculate the vlaue of $|p-q|$, where $p$ and $q$ are total number of $s p^{2}$ and hybridized carbon atoms respectively in given four compounds.

## - Watch Video Solution

8. Total number of species among following which can use any one $t_{2 g} \mathrm{~d}-$ orbital in back bondin.
$\mathrm{H}_{4} \mathrm{SiO}_{4}, \mathrm{H}_{2} \mathrm{NBF}_{2}, \mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}, \mathbb{C l}_{2}, \mathrm{~N}\left(\mathrm{SiH}_{3}\right)_{2},(\mathrm{NB})_{x}, R_{3} \mathrm{PO}, \mathrm{P}_{4} \mathrm{O}_{10}, \mathbb{C l}_{3}^{-}$

## - View Text Solution

9. Calculate expression $(x+y+z)$ for diatomic molecules.
where $\mathrm{x}=$ Total number of singly occupied molecular orbital (SOMO) in $\mathrm{O}_{2}$.
$\mathrm{y}=$ Total number of singly occupied molecular orbital (SOMO) in $B_{2}$ z=Total number of singly occupied molecular orbital (SOMO) in NO.

## Watch Video Solution

10. If Hund rule violate, then find the total number of species among following which whill be dimagnetic:
$B_{2}, O_{2}, N_{2}^{-}, C_{2}, N O, O F, N_{2}^{2-}, B N$

## Watch Video Solution

11. Consider the following table

| Cempernads (X are momevalont surrounding ateans) |  | Contral atome(A to D) beleng to group | Characteristies of compernads | Number of leme pair(s) at central atem |
| :---: | :---: | :---: | :---: | :---: |
| (i) | $A X_{n}$ | 16 | Planar and polar | $m_{1}$ |
| (ii) | $B X_{n_{2}}$ | 15 | Trigonal pyramidal | $m_{2}$ |
| (iii) | $\mathrm{CX}_{4}$ | 14 | Zero dipole moment | $m_{3}$ |
| (iv) | $D X_{n 4}$ | 13 | All $X-\boldsymbol{D}-X$ bond angle are $120^{\circ}$ | $m_{4}$ |

Than calculate value of experssion $\left|\frac{n_{1}+n_{2}+n_{3}+n_{4}}{m_{1}+m_{2}+m_{3}+m_{4}}\right|^{2}$.
12. Total number of species among following, in which bond angle is equal to or less than $109^{\circ} 28^{\prime}$ and also they act as lewis base :
$\mathrm{NH}_{3}, \mathrm{NMe}_{3}, \mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}, \mathrm{ICl}_{4}^{-}, \mathrm{XeO}_{3}, \mathrm{BF}_{2} \mathrm{Cl}, \mathrm{SiF}_{4}, \mathrm{AsH}_{3}, \mathrm{SO}_{2} \mathrm{~F}_{2}$

## - Watch Video Solution

13. Total number of unpaired electrons(s) present in both cationic and anionic part of compound $\mathrm{O}_{2}\left[\mathrm{PtF}_{6}\right]$.

## - Watch Video Solution

14. Total number of species which has/ have symmetrical electronic distribution in their HOMO and also paramagnetic.
$N_{2}^{+}, O_{2}^{2-}, C_{2}, O_{2}, B_{2}, C_{2}^{2-}, N_{2}^{2-}$.

- Watch Video Solution

15. Total number of molecules, in which each covalent bond is comprised of effective back bond. $\mathrm{BF}_{3}, \mathrm{~N}\left(\mathrm{SiH}_{3}\right)_{3}, \mathrm{PF}_{3}, \mathrm{POF}_{3}, \mathrm{~B}(\mathrm{OH})_{3}, \mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}, \mathrm{BFH}_{2}, \mathrm{BF}_{2}\left(\mathrm{NH}_{2}\right), \mathrm{NH}\left(\mathrm{SiH}_{3}\right)$,

## - View Text Solution

16. Total number of angle in $\mathrm{SeCl}_{4}$ which are less than $90^{\circ}$.

## - Watch Video Solution

$$
\begin{aligned}
& \text { 17. Consider the } \\
& \mathrm{O}(\mathrm{Me})_{2}, \mathrm{~N}\left(\mathrm{SiH}_{3}\right)_{3}, \mathrm{CO}, \mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}, \mathrm{Cl}_{2} \text { (singlet), } \mathrm{Cl}_{3}^{-}, \mathrm{H}_{4} \mathrm{SiO}_{4}, \mathrm{OCl}_{2}, \mathrm{MeNCS} \text {. }
\end{aligned}
$$

Then calculate the number of species which have $\left(p_{\pi}-p_{x}\right)$ back bond or ( $p_{\pi}-d_{\pi}$ back bond.

## - View Text Solution

18. Total number of molecules which can form H -bond among themselves.
$\mathrm{SiH}_{3} \mathrm{OH}, \mathrm{HCN}, \mathrm{B}(\mathrm{OMe})_{3}, \mathrm{NHMe}_{2}, \mathrm{CH}_{3} \mathrm{CONH}_{2}, \mathrm{HCHO}, \mathrm{HCOOH}, \mathrm{NH}_{2} \mathrm{OH}, \mathrm{H}_{4} \mathrm{SiC}$

## - Watch Video Solution

19. Consider two covalent compounds $A L_{n_{1}}$ and $B L_{n_{2}}$, if central atom (A) of first compounds has total six electron pairs and central atom (B) of second compound contains total five electron pairs in its valence shell and both compounds are planar and non-polar then calculate value of experssion $\left(n_{1}-n_{2}\right)^{2}$.
[Where $n_{1}$ and $n_{2}$ are number of monovalent surrounding atom (L)]

## - Watch Video Solution

20. Calculate the $I-I$ distance in (Å) for given compound $\mathrm{H}_{2} \mathrm{C}_{2} I_{2}$ if $C-I$ bond length is $2.35 \AA$. $\left(\sin 60^{\circ}=0.866\right)$

## - Watch Video Solution

21. There are some arrangements of atomic orbitals which are given below:


Then calculate the value of "QtimesR-P'" where P, Q and R are no. of arrangements which give bonding molecular orbitals (positive overlap), antibonding molecular orbitals (negative overlap) and non-bonding molecular orbitals (zero overlap) respectively.

## - View Text Solution

22. Number of hybrid orbital C atoms which have $33 \%$ p-character in $C(C N)_{4}$.

## - Watch Video Solution

23. Max. no. of equal $P-O$ bonds in $P_{2} O_{7}^{4-}$ ion is :

## Watch Video Solution

24. Consider the following species:
(i) $\mathrm{CH}_{3}^{+}$
(ii) $\left(\mathrm{C}_{3} \mathrm{H}_{5}\right)_{3} \mathrm{Al}$
(iii) HCHO
(iv) $\mathrm{CH}_{4}$
(v) $\left(\mathrm{C}_{2} \mathrm{H}_{5}\right)_{3} \mathrm{~N}$
(vl) $\mathrm{TiCl}_{4}$
(vii) $\mathrm{CO}_{2}$
(viii) $\mathrm{SiCl}_{4}$
(ix) $B F_{3}$
the find out total number of species which can act as Lewis acid.

## - Watch Video Solution

25. Calculate value of $|x-y|$, here $x$ and $y$ are the total number of bonds in benzene and benzyne respectively which are formed by overlapping of
hybridized orbitals.

## - Watch Video Solution

26. Consider the following compounds :
(i) $I F_{5}$
(ii) $\mathrm{ClI}_{4}^{-}$
(iii) $\mathrm{XeO}_{2} \mathrm{~F}_{2}$ (iv) $\mathrm{NH}_{2}^{-}$
(v) $\mathrm{BCl}_{3} \quad$ (vi) $\mathrm{BeCl}_{2} \quad$ (vii) $\mathrm{AsCl}_{4}^{+} \quad$ (viii) $\mathrm{B}(\mathrm{OH})_{3}$
(ix) $\mathrm{NO}_{2}^{-} \quad(x) \mathrm{ClO}_{2}^{+}$

Then calculate value of " $x+y-z$ ", here, $x, y$ and $z$ are total number of compounds in given compounds in which central atom used their all three p-orbitals, only two p-orbitals and only one p-orbital in hybridisation respectively.

- Watch Video Solution


Calculate value of $p+q$, here p and q are total number of $d \pi-p \pi$ bonds and total number of $s p^{3}$ hybridised atoms respectively in given molecule.

## - Watch Video Solution

28. Consider the following orbitals (i) $3 p_{x}$ (ii) $4 d_{x^{2}}$ (iii) $3 d_{x^{2}-y^{2}}$ (iv) $3 d_{y z}$

Then, calculate value of " $x+y-z$ " here x is total number of gerade orbital and y is total number of ungerade orbitals and z is total number of axial orbitals in given above orbitals.
29. Consider the following oxyanions:
$\mathrm{PO}_{4}^{3-}, \mathrm{P}_{2} \mathrm{O}_{6}^{4-}, \mathrm{SO}_{4}^{2-}, \mathrm{MnO}_{4}^{-}, \mathrm{CrO}_{4}^{2-}, \mathrm{S}_{2} \mathrm{O}_{5}^{2-}, \mathrm{S}_{2} \mathrm{O}_{7}^{2-}$
and find the value of $R+Q-P$
where P-number of oxy anions having three equivalent X - O bonds per central atom

Q=number of oxy anions having two equivalent $\mathrm{X}-\mathrm{O}$ bonds per central atom.

R=Number of oxy anions having four equivalent $\mathrm{X}-\mathrm{O}$ bonds per central atom.

## - Watch Video Solution

30. Consider the following three compounds (i) $A X_{2 n}^{n-}$, (ii) $A X_{3 n}$ and (ii) $A X_{4 n}^{n+}$, where central atom A is 15 th group element and their maximum covalency is $3 n$. If total number of proton in surrounding atom X is n and value of n is one, then calculate value of $x^{3}+y^{2}+z^{2}$. (where $\mathrm{x}, \mathrm{y}$ and z are
total number of lone pair at central atom in compounds (i), (ii) and (iii) respectively.

## - Watch Video Solution

31. Consider the following compounds and Calculate the value of $\left(\frac{P^{2}-Q^{2}}{R+S}\right)$
(i) $\operatorname{BeF}$ (ii) $I C l$ (iii) $\mathrm{BeF}_{3}$ (iv) $\mathrm{BrF}_{5}$ (v) $I C l_{3}$ (vi) $I F_{3}$ (vii) $I F_{5}$ (viii) $I F_{7}$,

Where P: Total number of polar compounds.

Q: Total number of planar compounds.
R: Total number of non-polar compounds.

S: Total number of non-planar compounds.

## - View Text Solution

32. Consider the following compounds
(1) $\mathrm{H}_{3} \mathrm{CF}(2) \mathrm{H}_{2} \mathrm{CF}_{2}(3) \mathrm{CH}_{4}(4) \mathrm{H}_{3} \mathrm{CCF}_{3}(5) \mathrm{CH}_{3} \mathrm{CH}_{3}(6) \mathrm{C}_{2} \mathrm{H}_{4}$ and calculate value of $\mathrm{Y}+\mathrm{X}$, (where X is the total number of compounds
which have $H-C-H$ bond angles equal to $109^{\circ} 28^{\prime}$ and Y is the total number of compounds which have $H-C-H$ bond angles greater than $109^{\circ} 28^{\prime}$ and less than $120^{\circ}$

## - Watch Video Solution

33. There are some species given below :-
(a) $\mathrm{O}_{2}^{+}$
(b) CO
(c) $B_{2}$
(d) $\mathrm{O}_{2}^{+}$
(e) $\mathrm{NO}^{+}$
(f) $\mathrm{He}{ }_{2}^{+}$
(g) $\mathrm{C}_{2}^{+2}$
(h) $\mathrm{CN}{ }^{-}$
(i) $N_{2}^{-}$

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

## Watch Video Solution

34. Following compounds $A$ and $B$ have similar structure with delocalization of $\pi$-electrons system. (A) $\left(\mathrm{PNCl}_{2}\right)_{\mathrm{x} / 2}(\mathrm{~B})(\mathrm{CH})_{x}$

If value of x is 6 , then calculate value of " $\mathrm{P}+\mathrm{Q}$ ", where ' P ' is total no. of $\sigma$ -
bonds in compounds $A$ and $B$ and ' $Q$ ' is total no. of $\pi$ bonds in compounds $A$ and $B$.

## - Watch Video Solution

35. The hybridization of central atoms of compounds $A, B, C$ and $D$ are $s p^{3} d, s p^{3}, s p^{2}$ and $s p$ respectively. If compounds $A$ and $D$ have same shape like $I_{3}^{-}$and compounds B and C have same shape like water structure. Then calculate value of " $\mathrm{P}+\mathrm{Q}+\mathrm{R}+\mathrm{S}$ ", where $\mathrm{P}, \mathrm{Q}, \mathrm{R}$, and S are number of lone pairs on central atoms of compounds $\mathrm{A}, \mathrm{B}, \mathrm{C}$ and D respectively.

## - Watch Video Solution

36. In compound $P C l_{x} F_{5-x}$, possible values of x are 0 to 5 , then calculate value of $x_{1}+x_{2}+x_{3}$ (where $x_{1}, x_{2}$ and $x_{3} .$. are possible values of x , with zero dipole moment for given compound).

## - Watch Video Solution

37. There are two groups of compounds A and B. Groups A contains three compounds $\mathrm{Px}_{4}, \mathrm{Qy}_{3}, \mathrm{Rz}_{2}$. Groups B also contains three compounds $S x_{4}, T y_{3}, U z_{2}$. Hybridization of each central atom of group A compounds is same as that of iodine in $\mathrm{IBrCl}^{-}$while in group B compounds it is same as that of iodine $\mathrm{IBrCl}^{+}$. Substituents $\mathrm{X}, \mathrm{Y}$ and Z exhibit covalency of one in ground state. Then find the value of $\mathrm{x} / \mathrm{y}$.

Where, $x$ and $y$ are total number of lone pair present at central atoms of compounds of group $A$ and $B$ respectively.

## Watch Video Solution

38. Consider the following three compounds (i) $A X_{2 n}^{n-}$, (ii) $A X_{3 n}$ and (ii)
$A X_{4 n}^{n+}$, where central atom A is 15 th group element and their maximum covalency is $3 n$. If total number of proton in surrounding atom X is n and value of n is one, then calculate value of $x^{3}+y^{2}+z^{2}$. (where $\mathrm{x}, \mathrm{y}$ and z are total number of lone pair at central atom in compounds (i), (ii) and (iii) respectively.
39. Condsider the following combination of atomic orbitals :
combinding orbitals (internuclear axis) Combindig orbitals (internuclear axis).
(i) $s+p_{x}(x)$ (ii) $d_{x y}+d_{x y}(x) \quad$ (iii) $d_{x y}+P_{x}(z) \quad$ (iv) $s+s(z) \quad$ (v) $d_{y z}+d_{y z}(x) \quad$ (vi)
$p_{x}+p_{x}(\mathrm{z})(\mathrm{vii}) d_{z^{2}}+d_{z^{2}}(\mathrm{z})(\mathrm{viii}) d_{x y}+d_{x y}(\mathrm{z})(\mathrm{ix}) p_{x}+p_{x}(y)(\mathrm{x}) s+p_{z}(x)$

Then calculate value of $a^{\wedge}(2)+b^{\wedge}(2)+2 c s$. (where $a=\sigma M . O ., b=\pi M . O ., C=\delta M . O ., \mathrm{d}=$ non-bonding M.O.)

## D View Text Solution

40. Consider the following sic changes
(i) $\mathrm{NO} \rightarrow \mathrm{NO}^{+}$
(ii) $\mathrm{O}_{2}^{-} \rightarrow \mathrm{O}_{2}^{2-}$
(iii)
$\mathrm{O}_{2} \rightarrow \mathrm{O}_{2}^{+} \quad$ (iv) $\mathrm{NO}^{+} \rightarrow \mathrm{NO}^{-}$
$\mathrm{NO}^{+} \rightarrow \mathrm{NO}^{2+}(\mathrm{vi}) \mathrm{CO} \rightarrow \mathrm{CO}^{+}$

Then calculate value of $c^{2}-b^{2}-a^{2}$ ", where $\mathrm{a}, \mathrm{b}$ and c are total number of transformation in which magnetic property will be changed, bond increase and bond order decrease respectively.
41. When $B_{2} H_{4}$ is allowed to react with following lewis bases, then how many given lewis bases form adduct through symmetrical cleavage of $B_{2} H_{6}$ )?
$\mathrm{NH}_{3}, \mathrm{MeNH}_{3}$, pyridine, CO, T.H.F., $\mathrm{PH}_{3}, \mathrm{PF}_{3}, \mathrm{Me}_{3} \mathrm{~N}, \mathrm{Me}_{3} \mathrm{NH}$

## - View Text Solution

42. Consider the following elements $A, B, C$ and $D$ and their outer electronic configurtions are $n s^{2} n p^{1}, n s^{2} n p^{3}, n s^{2} n p^{4}$ and $n s^{2} n p^{5}$ respectively. Element E also has same outer electronic configuration like D but shows only single oxidation state(-1). If element A, B , C and D belong to same period as that of sodium. Consider the following compounds.

$$
\text { (i) } C E_{4} \text { (ii) } B D_{2} E_{3} \text { (iii) } D E_{3} \text { (iv) } D E_{2} \text { (v) } B D_{3} E_{2} \text { (vi) } C_{2} E_{2} \text { (vii) } D E \text { (viii) } A_{2} D_{6} \text {. }
$$

Then calculate the value of $\mathrm{x}+\mathrm{y}$, (where x and y are total number of polar and non-polar compounds).

## - View Text Solution

43. Consider following four compounds:
(i) $C_{x} O_{y}$
(ii) $C_{x} O_{y+1}$
(iii) $C_{x+2} O_{y+1}$ and (iv) $C_{x+11} O_{y+8}$,
if " $x=y=1$ ", then calculate the vlaue of $|p-q|$, where $p$ and $q$ are total number of $s p^{2}$ and hybridized carbon atoms respectively in given four compounds.

## - Watch Video Solution

44. Total number of species among following which can use any one $t_{2 g} \mathrm{~d}-$ orbital in back bondin.
$\mathrm{H}_{4} \mathrm{SiO}_{4}, \mathrm{H}_{2} \mathrm{NBF}_{2}, \mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}, \mathbb{C l}_{2}, \mathrm{~N}\left(\mathrm{SiH}_{3}\right)_{2},(\mathrm{NB})_{x}, R_{3} \mathrm{PO}, \mathrm{P}_{4} \mathrm{O}_{10}, \mathbb{C l}_{3}^{-}$

## - View Text Solution

45. Calculate expression $(x+y+z)$ for diatomic molecules.
where $\mathrm{x}=$ Total number of singly occupied molecular orbital (SOMO) in $\mathrm{O}_{2}$.
$\mathrm{y}=$ Total number of singly occupied molecular orbital (SOMO) in $B_{2}$ z=Total number of singly occupied molecular orbital (SOMO) in NO.

## Watch Video Solution

46. If Hund rule violate, then find the total number of species among following which whill be dimagnetic:
$B_{2}, O_{2}, N_{2}^{-}, C_{2}, N O, O F, N_{2}^{2-}, B N$

## Watch Video Solution

47. Consider the following table

| Cempouseds (X are menevalout surrounding avems) |  | Central abome(A $t o$ D) beleng to group | Characteristies of compounds | Number of leme pair(b) at central atem |
| :---: | :---: | :---: | :---: | :---: |
| (i) | $A X_{n}$ | 16 | Planar and polar | $m_{1}$ |
| (ii) | $B X_{n 2}$ | 15 | Trigonal pyramidal | $m_{2}$ |
| (iii) | CX ${ }_{\text {a }}$ | 14 | Zero dipole moment | $m_{3}$ |
| (iv) | DX ${ }_{4}$ | 13 | All $X-D-X$ bond angle are $120^{\circ}$ | $m_{4}$ |

Than calculate value of experssion $\left|\frac{n_{1}+n_{2}+n_{3}+n_{4}}{m_{1}+m_{2}+m_{3}+m_{4}}\right|^{2}$.
48. Total number of species among following, in which bond angle is equal to or less than $109^{\circ} 28^{\prime}$ and also they act as lewis base :
$\mathrm{NH}_{3}, \mathrm{NMe}_{3}, \mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}, \mathrm{ICl}_{4}^{-}, \mathrm{XeO}_{3}, \mathrm{BF}_{2} \mathrm{Cl}, \mathrm{SiF}_{4}, \mathrm{AsH}_{3}, \mathrm{SO}_{2} \mathrm{~F}_{2}$

## - Watch Video Solution

49. Total number of unpaired electrons(s) present in both cationic and anionic part of compound $\mathrm{O}_{2}\left[\mathrm{PtF}_{6}\right]$.

## - Watch Video Solution

50. Total number of species which has/ have symmetrical electronic distribution in their HOMO and also paramagnetic.
$N_{2}^{+}, O_{2}^{2-}, C_{2}, O_{2}, B_{2}, C_{2}^{2-}, N_{2}^{2-}$.

- Watch Video Solution

51. Total number of molecules, in which each covalent bond is comprised of effective back bond. $B F_{3}, N\left(\mathrm{SiH}_{3}\right)_{3}, \mathrm{PF}_{3}, \mathrm{POF}_{3}, \mathrm{~B}(\mathrm{OH})_{3}, \mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}, \mathrm{BFH}_{2}, \mathrm{BF}_{2}\left(\mathrm{NH}_{2}\right), \mathrm{NH}\left(\mathrm{SiH}_{3}\right)$

## - View Text Solution

52. Total number of angle in $\mathrm{SeCl}_{4}$ which are less than $90^{\circ}$.

## - Watch Video Solution

53. Consider the following species
$\mathrm{O}(\mathrm{Me})_{2}, \mathrm{~N}\left(\mathrm{SiH}_{3}\right)_{3}, \mathrm{CO}, \mathrm{O}\left(\mathrm{SiH}_{3}\right)_{2}, \mathbb{C l}_{2}$ (singlet), $\mathbb{C l}_{3}^{-}, \mathrm{H}_{4} \mathrm{SiO}_{4}, \mathrm{OCl} 2_{2}, \mathrm{MeNCS}$.
Then calculate the number of species which have $\left(p_{\pi}-p_{x}\right)$ back bond or ( $p_{\pi}-d_{\pi}$ back bond.

## - View Text Solution

54. Total number of molecules which can form H -bond among themselves. $\mathrm{SiH}_{3} \mathrm{OH}, \mathrm{HCN}, \mathrm{B}(\mathrm{OMe})_{3}, \mathrm{NHMe}_{2}, \mathrm{CH}_{2} \mathrm{CONH}_{2}, \mathrm{HCHO}, \mathrm{HCOOH}, \mathrm{NH}_{2} \mathrm{OH}, \mathrm{H}_{4} \mathrm{SiC}$

## - View Text Solution

55. Consider two covalent compounds $A L_{n_{1}}$ and $B L_{n_{2}}$, if central atom (A) of first compounds has total six electron pairs and central atom (B) of second compound contains total five electron pairs in its valence shell and both compounds are planar and non-polar then calculate value of experssion $\left(n_{1}-n_{2}\right)^{2}$.
[Where $n_{1}$ and $n_{2}$ are number of monovalent surrounding atom (L)]

## - Watch Video Solution

56. Calculate the $I$-I distance in ( $\AA$ ) for given compound $H_{2} C_{2} I_{2}$ if C-I bond length is $2.35 \AA$. $\left(\sin 60^{\circ}=0.866\right)$

## - Watch Video Solution

57. There are some arrangements of atomic orbitals which are given below:
(i)

(ii)

(ix)


Then
calculate the value of "'QtimesR-P'" where $P, Q$ and $R$ are no. of arrangements which give bonding molecular orbitals (positive overlap), antibonding molecular orbitals (negative overlap) and non-bonding molecular orbitals (zero overlap) respectively.
58. Number of hybrid orbital C atoms which have $33 \%$ p-character in $C(C N)_{4}$.

## Watch Video Solution

59. Max. no. of equal $P-O$ bonds in $\mathrm{P}_{2} \mathrm{O}_{7}^{4-}$ ion is :

## - Watch Video Solution

60. Consider the following species:
(i) $\mathrm{CH}_{3}^{+}$
(ii) $\left(\mathrm{C}_{3} \mathrm{H}_{5}\right)_{3} \mathrm{Al}$
(iii) HCHO
(iv) $\mathrm{CH}_{4}$
(v) $\left(\mathrm{C}_{2} \mathrm{H}_{5}\right)_{3} \mathrm{~N}$
(vl) $\mathrm{TiCl}_{4}$
(vii) $\mathrm{CO}_{2}$
(viii) $\mathrm{SiCl}_{4}$
(ix) $B F_{3}$ the find out total number of species which can act as Lewis acid.

## - Watch Video Solution

61. Calculate value of $|x-y|$, here $x$ and $y$ are the total number of bonds in benzene and benyne respectively which are formed by overlapping of hybridized orbitals .

## - View Text Solution

62. Consider the following compounds :
(i) $I F_{5}$
(ii) $\mathrm{CII}_{4}^{-}$
(iii) $\mathrm{XeO}_{2} \mathrm{~F}_{2}$ (iv) $\mathrm{NH}_{2}^{-}$
(v) $\mathrm{BCl}_{3} \quad$ (vi) $\mathrm{BeCl}_{2} \quad$ (vii) $\mathrm{AsCl}_{4}^{+} \quad\left(\right.$ viii) $B(\mathrm{OH})_{3}$
(ix) $\mathrm{NO}_{2}^{-} \quad(x) \mathrm{ClO}_{2}^{+}$

Then calculate value of " $x+y-z$ ", here, $x, y$ and $z$ are total number of compounds in given compounds in which central atom used their all
three p-orbitals, only two p-orbitals and only one p-orbital in hybridisation respectively.

## - Watch Video Solution

63. Consider
the
following


Calculate value of $p+q$, here p and q are total number of $d \pi-p \pi$ bonds and total number of $s p^{3}$ hybridised atoms respectively in given molecule.
64. Consider the following orbitals (i) $3 p_{x}$ (ii) $4 d_{x^{2}}$ (iii) $3 d_{x^{2}-y^{2}}$ (iv) $3 d_{y z}$

Then, calculate value of " $x+y-z$ " here x is total number of gerade orbital and y is total number of ungerade orbitals and z is total number of axial orbitals in given above orbitals.

## - Watch Video Solution

65. Consider the following oxyanions :
$\mathrm{PO}_{4}^{3-}, \mathrm{P}_{2} \mathrm{O}_{6}^{4-}, \mathrm{SO}_{4}^{2-}, \mathrm{MnO}_{4}^{-}, \mathrm{CrO}_{4}^{2-}, \mathrm{S}_{2} \mathrm{O}_{5}^{2-}, \mathrm{S}_{2} \mathrm{O}_{7}^{2-}$ and find the value of
$R+Q-P$
where
$\mathrm{P}=$ Number of oxy aions having three equivalent
$X-O$ bonds per central atom
O=Number of oxy anions having two equivalent
$X-O$ bonds per central atom
$\mathrm{R}=$ Number of oxy anions having four equivalent
$X-O$ bonds per central atom
66. Consider the following three compounds (i) $A X_{2 n}^{n-}$, (ii) $A X_{3 n}$ and (ii) $A X_{4 n}^{n+}$, where central atom A is 15 th group element and their maximum covalency is $3 n$. If total number of proton in surrounding atom $X$ is $n$ and value of n is one, then calculate value of $x^{3}+y^{2}+z^{2}$. (where $\mathrm{x}, \mathrm{y}$ and z are total number of lone pair at central atom in compounds (i), (ii) and (iii) respectively.

## - Watch Video Solution

67. Consider the following compounds and Calculate the value of $\left(\frac{P^{2}-Q^{2}}{R+S}\right)$
(i) BeF (ii) ICl (iii) $\mathrm{BeF}_{3}$ (iv) $\mathrm{BrF}_{5}$ (v) $\mathrm{ICl}_{3}$ (vi) $\mathrm{IF}_{3}{\text { (vii) } I F_{5} \text { (viii) } I F_{7}, ~}_{\text {, }}$

Where P: Total number of polar compounds.
Q : Total number of planar compounds.
R: Total number of non-polar compounds.
S: Total number of non-planar compounds.
68. Consider the following compounds
(1) $\mathrm{H}_{3} \mathrm{CF}$ (2) $\mathrm{H}_{2} \mathrm{CF}_{2}$ (3) $\mathrm{CH}_{4}(4) \mathrm{H}_{3} \mathrm{CCF}_{3}(5) \mathrm{CH}_{3} \mathrm{CH}_{3}(6) \mathrm{C}_{2} \mathrm{H}_{4}$
and calculate value of $Y+X$, (where $X$ is the total number of compounds which have $H-C-H$ bond angles equal to $109^{\circ} 28^{\prime}$ and $Y$ is the total number of compounds which have $H-C-H$ bond angles greater than $109^{\circ} 28^{\prime}$ and less than $120^{\circ}$

## - Watch Video Solution

69. There are some species given below. (i) $\mathrm{O}_{2}^{+}$(ii) CO (iii) $\mathrm{B}_{2}$ (iv) $\mathrm{O}_{2}^{-}$(v) $\mathrm{NO}^{+}$ (vi) $H e_{2}^{+}$(vii) $C_{2}^{2+}$ (vii) $C N^{-}(\mathrm{ix}) N_{2}^{-}$
total number of species which have fractional bond order.

## - View Text Solution

70. Following compounds A and B have similar structure with delocalization of $\pi$-electrons system. (A) $\left(\mathrm{PNCl}_{2}\right)_{\mathrm{x} / 2}(\mathrm{~B})(\mathrm{CH})_{x}$ If value of x is 6 , then calculate value of " $\mathrm{P}+\mathrm{Q}$ ", where ' P ' is total no. of $\sigma$ bonds in compounds $A$ and $B$ and ' $Q$ ' is total no. of $\pi$ bonds in compounds $A$ and $B$.

## - View Text Solution

71. The hybridization of central atoms of compounds $A, B, C$ and $D$ are $s p^{3} d, s p^{3}, s p^{2}$ and $s p$ respectively. If compounds $A$ and $D$ have same shape like $I_{3}^{-}$and compounds B and C have same shape like water structure. Then calculate value of "P+Q+R+S", where $\mathrm{P}, \mathrm{Q}, \mathrm{R}$, and S are number of lone pairs on central atoms of compounds A, B, C and D respectively.

## - Watch Video Solution

72. In compound $P C l_{x} F_{5-x}$, possible values of x are 0 to 5 , then calculate value of $x_{1}+x_{2}+x_{3}$ (where $x_{1}, x_{2}$ and $x_{3} .$. are possible values of x , with
zero dipole moment for given compound).

Watch Video Solution

