

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

nuclei

D. Increase in interelectronic and internuclear repulsion

Answer: D



2. Identify the correct sequence of increasing number of π -bonds in the structure of the following molecules:

 $({\rm I})H_2S_2O_6~({\rm II})H_2S_2O_3~({\rm III})H_2S_2S_5$

A. I, II and III

B. II, I and III

C. II, III and I

D. I, III and II

Answer: C

- **3.** C_2H_2 is isostructural with
 - A. H_2O_2
 - $B.NO_2$
 - $C. SnCl_2$
 - D. *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



5. Linear structure is assumed by:

(I) NCO^{-} (II) CS_{2} (III) NO_{2} (IV)Solid BeH_{2}

A. all four

B. (II), (III) and (IV)

C. (I), (II) and (III)

D. (II) and (III)

Answer: C



6. Among the oxides of nitrogen N_2O , NO and NO_2 , molecules with unpaired electrons are:

A. N_2O and NO

B. NO and NO₂

 $C. N_2O$ and NO_2

D. NO₂ and Its dimer

Answer: B

Watch Video Solution

7. Which of the following pair consists of only network solid?

A. SiO_2, P_4O_{10}

B. *P*₄*O*₁₀, *SO*₃

C. P₃O₁₀, P₄O₆

D. Diamond, SiO₂

Answer: D

8. Which of the following ions does not have S-S linkage?

A.
$$S_2O_8^{2-}$$

B. $S_2O_6^{2-}$
C. $S_2O_5^{2-}$
D. $S_2O_3^{2-}$

Answer: A



9. Among KO_2 , $KAlO_2$, CaO_2 and NO_2^+ , unpaired electrons is present in :

A. NO_2^+ and CaO_2

B. KO_2 and $KAlO_2$

C. KO₂ only

D. CaO_2 only

Answer: C



```
10. Structure of S_2Cl_2 is analogous to :
```

A. SOCl₂

B. *CO*₂

 $C.H_2S$

 $D.H_2O_2$

Answer: D

11. 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

12. Two hybrid orbitals have a bond angle of 120° . The percentage of scharacter in the hybrid orbitals is nearly:

A. 25%

B. 33%

C. 50%

D. 66%

Answer: B

:



13. The state of hybridisation of central atom in dimer of BH_3 and BeH_2 IS

A. sp², sp²
B. sp³, sp²
C. sp³, sp³
D. sp², sp³

Answer: B

14. In NO₂ molecule N atom undergoes in :

A. sp^3 hybridization

B. sp^2 hybridization

C. sp hybridization

D. sp^2d hybridization

Answer: B

Watch Video Solution

15. The strongest P-O bond is found in the molecules

- A. F_3PO
- B. Cl₃PO
- C. Br₃PO

 $\mathsf{D}.\left(CH_3\right)_3 PO$

Answer: A



16. O_2F_2 is an unstable yellow coloured solid and H_2O_2 is a colourless liquid, both have O - O bond and O - O bond length in H_2O_2 and O_2F_2 respectively is :

A. 1.22Å, 1.48Å

B. 1.48Å, 1.22Å

C. 1.22Å, 1.22Å

D. 1.48Å, 1.48Å

Answer: B

17. The bond length of the S-O bond is maximum in which of the following

compounds?

A. SOCl₂

B. SOBr₂

 $C.SOF_2$

D. All have same length

Answer: B

View Text Solution

18. $\angle FAsF$ bond angle in AsF_3Cl_2 molecule is :

A. 90 $^\circ\,$ and 180 $^\circ\,$

B.120°

C. 90 $^{\circ}$

D. 180 °

Answer: A



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

View Text Solution

22. Out of the two compounds shown below, the vapour pressure of B at

a particular temperature is expected to be :



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 $65 \degree C$, $100 \degree C$ and $34.5 \degree C$. 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 $1.00g \cdot mL^{-1}$, methanol $0.7914g \cdot mL^{-1}$ and

that of diethyl ether is $0.7137g \cdot mL^{-1}$

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.
$$H..., F > H..., O > H..., N$$

B. $H..., N > H..., O > H..., F$
C. $H..., O > H..., N > H..., F$
D. $H..., F > H..., N > H..., O$

Answer: A



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



Answer: D



29. When ice melts to form liquid water at 0 $^{\circ}$ 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

Watch Video Solution

31. In which of the following species the bonds are non-directonal ?

A. NCl₃

B. RbCl

C. $BeCl_2$

D. BCl₃

Answer: B

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 Watch Video Solution 34. Which of the following substance has the highest melting point? . A. NaCl B. KCl C. MgO 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. $(CH_3)_2 CO(\in = 2)$

$$C. CH_3OH (\in = 32)$$

$$\mathsf{D}.\,\mathbb{C}Cl_4(\,\in\,=0)$$

Answer: C

37. Amongst LiCl, RbCl, $BeCl_2$ and $MgCl_2$, the compounds which the greatrest and the least ionic character respecitely are :

A. LiCl and RbCl

B. RbCl and BeCl₂

C. RbCl and MgCl₂

D. $MgCl_2$ and $BeCl_2$

Answer: B

Watch Video Solution

38. The compouds with the highest degree of covalency is :

A. NaCl

B. $MgCl_2$

C. AgCl

D. CsCl

Answer: C



D. $BaSO_4$

Answer: D

View Text Solution

40. The solubility of Na_2 , SO_4 , $BeSO_4$, $MgSO_4$ and $BaSO_4$ will follow the

order

$$A. BaSO_4 > BeSO_4 > MgSO_4 > Na_2SO_4$$

$$B. Na_2SO_4 > BeSO_4 > MgSO_4 > BaSO_4$$

$$C. BeSO_4 > MgSO_4 > BaSO_4 > Na_2SO_4$$

$$\mathsf{D}. MgSO_4 > BeSO_4 > Na_2SO_4 > BaSO_4$$

Answer: B



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 ° C, while that of NaF is 988 ° C. The principla reason that melting point of NaF is much higher than that of RbBr 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. BF_4^-

B.
$$BF_3 \rightarrow NH_3$$

C. BF_3
D. $BF_3 \rightarrow N(CH_3)_3$

Answer: C



45. Which of the following pair of molecules will have permanent dipole moment?

A. NO_2 and CO_2

B. NO_2 and O_3

 $C.SiF_4$ and CO_2

D. SiF_4 and NO_2

Answer: B

46. The observed dipole moment of *HCl* is 1.03*D*. If the bond length of

HCL is 1.3Å, then the percent ionic character of H - Cl bond is

A. 60%

B. 39%

C. 29%

D. 17%

Answer: D

:

Watch Video Solution

47. The dipole moment of o, p and m-dichlorobenzene will be in the order

A. o > p > m

B. p > o > m

 $\mathsf{C}.\,m > o > p$

D. o > m > p

Answer: D

Watch Video Solution

48. Which of the following molecule has highest dipole moment?

A. BF_3

 $B.NH_3$

 $C.NF_3$

 $D.B_2H_6$

Answer: B

49. In terms of polar character the correct, the correct order is .

A.
$$NH_3 < H_2O > HF < H_2S$$

$$\mathsf{B}.\,H_2\mathsf{S} < NH_3 < H_2\mathsf{O} < HF$$

$$C.H_2O < NH_3 < H_2S < HF$$

$$D. HF < H_2O < NH_3 < H_2O$$

Answer: B

Watch Video Solution

50. The correct order of dipole moment is :

A.
$$CH_4 > NF_3 > NH_3 > H_2O$$

B.
$$NF_3 > CH_4 > NH_3 > H_2O$$

 $C. NH_3 > NF_3 > CH_4 > H_2O$

$$D.H_2O > NH_3 > NF_3 > CH_4$$

Answer: A



51. The correct order of S-O bond length is :

A.
$$SO_3^{2^-} > SO_4^{2^-} > SO_3 > SO_2$$

B. $SO_3^{2^-} > SO_4^{2^-} > SO_2 > SO_3$
C. $SO_4^{2^-} > SO_3^{2^-} > SO_2 > SO_3$
D. $SO_4^{2^-} > SO_3^{2^-} > SO_3 > SO_2$

Answer: B



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. $(E_1 + E_2 + E_3) E_0$
- 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 σ and π bonds is in order :

A. A = B < C < D

B.A = B < D < C

$$\mathsf{C}.A = B = C = D$$

D. *C* < *C* < *A* < *B*

Answer: A

56. In a compound

 $\begin{array}{ccc} & & M(CO)_3 \\ & & | & | \\ \end{array}$ The number of sigma and pi bonds respectively are :C | NC = C | C_2H_5 \\ \end{array}

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. H_3O^+

 $B.BF_4$

 $C.HF_2^-$

 $D.NH_4^+$

Answer: C

O Watch Video Solution

58. Which of the following does not contain coordinate bond?

A. PH_4^+

 $B.NO_2$

C. *O*₃

D. CO_3^{2-}

Answer: D

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

A. SiCl₄

B. PCl₃

C. NCl₃

D. NF₃

Answer: D

Watch Video Solution

60. Among the trihalides of nitrogen, which is the least basic ?

A. NF_3

B. NCl₃

 $C.NBr_3$

D. *NI*₃

Answer: A



61. Increasing order of stability of the +2 oxidation of the ions?

A.
$$Ca^{2+} < Ba^{2+} < Sr^{2+}$$

B. $Pb^{2+} < Ge^{2+} < Sn^{2+}$
C. $Ge^{2+} < Sn^{2+} < Pb^{2+}$

D.
$$Cu^{2+}$$
, $tAu^{2+} < Ag^{2+}$

Answer: C

Watch Video Solution

62. The number of three centre two electron bonds in a molecule of diborane is_____.

A. 0	
B. 2	
C . 4	

Answer: B

D. 6

Watch Video Solution

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

Answer: C



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 π -bonds in the

structure of the following molecules:

 $({\rm I})H_2S_2O_6~({\rm II})H_2S_2O_3~({\rm III})H_2S_2S_5$

A. I, II and III

B. II, I and III

C. II, III and I

D. I, III and II

Answer: C



D. *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)CS₂ (III)NO₂ (IV)Solid BeH_2

A. all four

B. (II), (III) and (IV)

C. (I), (II) and (III)

D. (II) and (III)

Answer: C

View Text Solution

70. Among the oxides of nitrogen N_2O , NO and NO_2 , molecules with unpaired electrons are:

A. N_2O and NO

B. NO and NO₂

 $C. N_2O$ and NO_2

D. NO₂ and Its dimer

Answer: B

Watch Video Solution

71. Which of the following pair consists of only network solid?

A. SiO_2 , P_4O_{10}

 ${\sf B}. \, {\cal P}_4 {\cal O}_{10}, \, {\cal SO}_3$

 $C.P_3O_{10}, P_4O_6$

D. Diamond, SiO₂

Answer: D



72. Which of the following ions does not have S-S linkage?

A. $S_2 O_8^2$

- **B**. $S_2 O_6^{2}$
- $C.S_2O_5^2$

D. $S_2 O_3^{2-}$

Answer: A



73. Among KO_2 , $KAlO_2$, CaO_2 and NO_2^+ , unpaired electrons is present in :

A. NO_2^+ and CaO_2

- B. KO₂ and KAlO₂
- C. KO₂ only
- D. CaO_2 only

Answer: C

Watch Video Solution

74. Structure of S_2Cl_2 is analogous to :

A. SOCl₂

B. *CO*₂

 $C.H_2S$

 $D.H_2O_2$

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° . The percentage of scharacter 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 BH_3 and BeH_2 IS

A. sp², sp²
B. sp³, sp²
C. sp³, sp³

D. sp^2 , sp^3

Answer: B

78. In NO₂ molecule N atom undergoes in :

A. sp^3 hybridization

B. sp^2 hybridization

C. sp hybridization

D. sp^2d hybridization

Answer: B

Watch Video Solution

79. The strongest P-O bond is found in the molecules

A. F_3PO

B. Cl₃PO

C. Br₃PO

 $\mathsf{D}.\left(CH_3\right)_3 PO$

Answer: A



80. O_2F_2 is an unstable yellow change solid and H_2O_2 is a colourless liquid, both have O - O bond and O - O bond length in H_2O_2 and O_2F_2 respectively is :

A. 1.22Å, 1.48Å

B. 1.48Å, 1.22Å

C. 1.22Å, 1.22Å

D. 1.48Å, 1.48Å

Answer: B

81. The bond length of the S-O bond is maximum in which of the following

compounds?

A. SOCl₂

B. SOBr₂

 $C.SOF_2$

D. All have same length

Answer: B

View Text Solution

82. $\angle FAsF$ bond angle in AsF_3Cl_2 molecule is :

A.90 $^\circ\,$ and 180 $^\circ\,$

B.120°

C. 90 $^{\circ}$

D. 180 °

Answer: A



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

Watch Video Solution

85. Among the following, which has the lowest enthalpy of fussion?

A. Flourine

B. Hydrogen

C. Chlorine

D. Helium

Answer: D

View Text Solution

86. Out of the two compounds shown below, the vapour pressure of B at

a particular temperature is expected to be :



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

87. 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

88. The boiling points of methanol, water and dimethyl ether are respectively $65 \degree C$, $100 \degree C$ and $34.5 \degree C$. 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 $1.00g \cdot mL^{-1}$, methanol $0.7914g \cdot mL^{-1}$ and

that of diethyl ether is $0.7137g \cdot mL^{-1}$

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.
$$H..., F > H..., O > H..., N$$

B. $H..., N > H..., O > H..., F$
C. $H..., O > H..., N > H..., F$
D. $H..., F > H..., N > H..., O$

Answer: A



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



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



93. When ice melts to form liquid water at 0 °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

Vatch Video Solution

95. In which of the following species the bonds are non-directonal ?

A. NCl₃

B. RbCl

C. $BeCl_2$

D. BCl₃

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 Watch Video Solution 98. Which of the following substance has the highest melting point? . A. NaCl B. KCl C. MgO 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.
$$C_6 H_6 (\in = 0)$$

$$\mathsf{B}.\left(CH_3\right)_2 CO(\in = 2)$$

$$C. CH_3OH (\in = 32)$$

$$D. CCl_4 (\in = 0)$$

Answer: C

101. Amongst LiCl, RbCl, $BeCl_2$ and $MgCl_2$, the compounds which the greatrest and the least ionic character respecitely are :

A. LiCl and RbCl

B. RbCl and BeCl₂

C. RbCl and MgCl₂

D. $MgCl_2$ and $BeCl_2$

Answer: B

Watch Video Solution

102. The compouds with the highest degree of covalency is :

A. NaCl

B. $MgCl_2$

C. AgCl

D. CsCl

Answer: C



- B. $Ba(NO_3)_2$
- $C.MgSO_4$
- D. BaSO₄

Answer: D

View Text Solution

104. The solubility of Na_2 , SO_4 , $BeSO_4$, $MgSO_4$ and $BaSO_4$ will follow the

order

$$A. BaSO_4 > BeSO_4 > MgSO_4 > Na_2SO_4$$

$$B. Na_2SO_4 > BeSO_4 > MgSO_4 > BaSO_4$$

$$C. BeSO_4 > MgSO_4 > BaSO_4 > Na_2SO_4$$

Answer: B



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 $682 \degree C$, while that of NaF is $988 \degree$. 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?

B. $BF_3\bar{r}NH_3$

C. *BF*₃

D.
$$BF_3 \bar{r} N (CH_3)_3$$

Answer: C

Watch Video Solution

109. Which of the following pair of molecules will have permanent dipole moment?

A. NO_2 and CO_2

 $B.NO_2$ and O_3

 $C.SiF_4$ and CO_2

 $\mathsf{D}.\mathit{SiF}_4$ and NO_4

Answer: B
110. The dipole moment of HCl is 1.03D, if H-Cl bond distance is 1.26Å, what is the percentage of ionic character in the H-Cl bond?

A. 0.6

B. 0.39

C. 0.29

D. 0.17

Answer: D

:

D View Text Solution

111. The dipole moment of o, 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. BF_3

 $B.NH_3$

 $C.NF_3$

D. B_2H_6

Answer: B

113. In terms of polar of the following order is correct?

A.
$$NH_3 < H_2O > HF < H_2S$$

B. $H_2S < NH_3 < H_2O < HF$
C. $H_2O < NH_3 < H_2S < HF$
D. $HF < H_2O < NH_3 < H_2O$

Answer: B

View Text Solution

114. The correct order of the dipole moment is :

A.
$$CH_4 > NF_3 > NH_3 > H_2O$$

B. $NF_3 > CH_4 > NH_3 > H_2O$

 $C. NH_3 > NF_3 > CH_4 > H_2O$

 $D.H_2O > NH_3 > NF_3 > CH_4$

Answer: A



115. The correct order of S-O bond length is :

A.
$$SO_3^{2-} > SO_4^{2-} > SO_3 > SO_2$$

B. $SO_3^{2-} > SO_4^{2-} > SO_2 > SO_3$
C. $SO_4^{2-} > SO_3^{2-} > SO_2 > SO_3$
D. $SO_4^{2-} > SO_3^{2-} > SO_2 > SO_3$

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 , respectively. 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. $(E_1 + E_2 + E_3) E_0$
- 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 σ and π 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 : $C \mid NC = C \mid C_2H_5$

A. 19, 11

B. 19, 5

C. 13, 11

D. 7, 3

Answer: A

Watch Video Solution

121. Which of the following does not contain a coordinate bond?

A. $H_{3}O^{+}$

 $B.BF_4^-$

 $C.HF_2^-$

 $D.NH_4^+$

Answer: C

122. Which of the following molecules does not have co-ordinate bond?

A. *PH*₄⁺ B. *NO*₂ C. *O*₃

D. CO_3^{2-}

Answer: D

View Text Solution

123. Which of the following halides is inert towards hydrolysis at room

temperature ?

A. SiCl₄

B. PCl₃

C. NCl₃

D. NF₃

Answer: D



124. Amongst the following trihalides, which one is least basic?

A. NF_3

B. NCl₃

C. NBr₃

 $D.NI_3$

Answer: A

View Text Solution

125. Increasing order of stability of the +2 oxidation of the ions?

A.
$$Ca^{2+} < Ba^{2+} < Sr^{2+}$$

B. $Pb^{2+} < Ge^{2+} < Sn^{2+}$
C. $Ge^{2+} < Sn^{2+} < Pb^{2+}$
D. Cu^{2+} , $tAu^{2+} < Ag^{2+}$

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

Answer: B

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

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 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 H_2^+

B. Curve-2 represents the most stable state of the system for 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



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_2F_2

 $B.N_2O_4$

 $C.Si_2H_6$

D. I_2Cl_6

Answer: A

Watch Video Solution

3. Choose the correct statement regarding SeOCl₂ 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. IO_2F_2

B. HCOO⁻

 $C.SO_3^{2-}$

D. XeO_2F_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. $S_2 O_3^2$

B. (SCN)₂

 $C.Be_2Cl_4$

D. Si_2H_6

Answer: D



- **6.** The incorrect statement (s) regarding $\overline{\cdot}$ (C)X₃
 - 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

7. Consider following compounds,

(i)
$$H_3X - HCS$$
 (ii) $H_3Y - NCS$ (iii) $(H_3Y)_2O$ (iv) $(H_2X)_2O$

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 Y-O-Y bond angle in compounds (iv)

Answer: B

8. The incorrect statement about carbene (CH_2) is :

A. In singler carbene, carbon is sp^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 :CHF > CHCl > CHBr

D. None of the above

Answer: B

Watch Video Solution

9. The lowest O-O bond length in the following molecule is :

A. $O_2 F_2$

B. *O*₂

 $C.H_2O_2$

D. *O*₃

Answer: B



10. Out of $CHCl_3$, CH_4 and SF_4 the molecules having regular geometry are

A. CHCl₃ only

B. $CHCl_3$ and SF_4

 $C. CH_4$

D. CH_4 and SF_4

Answer: B

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^- , CH_3^- , CI_3^- , $SiF_6^2^-$

B. I_3^+ , ICl_4^- , Al_2Cl_6 , $TeCl_4$

C. SCl₂, N₂O₅, SF₄

D. I_2Cl_6 , XeF_2 , BrF_4 , XeF_5

Answer: D



13. Which of the following compounds have the same no. of lone pairs with their central atom?

(I) XeF_5^- (II) BrF_3^- (III) XeF_2^- (IV) H_3S^+ (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) $(CH_3)_2 P(CF_3)_3$ is non-palar and $(CH_3)_3 P(CF_3)_2$ is polar molecule (II) $CH_3 \hat{P}CH_3$ bond angle are equal in $(CH_3)_3 P(CF_3)_2$ molecule

(III) ${\it PF}_3$ will be more soluble in polar solvent than ${\it SiF}_4$

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) PCl_3F_2 (4) PCl_2F_3

16. Which among the followiing molecules is not perfect flat?

A.
$$B_3 N_3 H_6$$

B. $C_3 N_3 (NH_2)_3$
C. SO_3

$$\mathsf{D}. C_3 N_3 \Big(N_3 \Big)_3$$

Answer: D

Watch Video Solution

17. Which of the following structure(s) is /are non-planar?

A. $Na_3B_3O_6$

 $\mathsf{B.}\,I_2Cl_6$

C. Sheet silicate

D. Inorganic graphite layer

Answer: C



18. Nodal planes of π -bonds in $CH_2 = C = C = CH_2$ 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 X-O-X linkage ?

(where X is central atom):

(i) $Cr_2O_7^{2-}$ (ii) $S_2O_3^{2-}$ (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. 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 P_4O_{10}

C. Hybridization of both sulphur in $H_2S_2O_8$ (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:

A. +6, +5, 0 B. +6, +6, +6 C. +6, +4, +2 D. +6, +2, 0

Answer: A



22. Structure of
$$Na_2[B_4O_5(OH)_4] \cdot SH_2O$$
 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. $(CN)_2$

B. OCN⁻

 $C.XeF_2$

D. XeF_4

Answer: D



24. Incorrect match is :

Electron geometry		Possible molecular shape from respective electron geometry	
(a) Tetrahedron	-	Bent	
(b) Trigonal bipyramidal		Triangular planar	
(c) Octahedron	_	Square pyramidal	
(d) Pentagonal bipyramidal	-	Pentagonal planar	

Watch Video Solution

25. Consider the following reactions:

 $MX_4 + X'_2 \rightarrow MX_4X_2'$

If atomic number of M is 52 and X and X' are halogens and X' 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 M-X bond lengths are identical in both MX_4 and MX_4X_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



26. Select the Incorrect statements:

	Statement	Shape	Example
(a)	Bond pair has > .75% <i>p</i> -character	s	HF
(b)	Reduction in axial bond angle is more than that of in equatorial bond angle	\ll	SF4
(c)	Two axial <i>d</i> -orbitals and one non-axial <i>d</i> -orbital are used in hybridization	*	XeF ₅
(d)	Two <i>p</i> -orbitals are used in hybridization	Q	SnCl ₂

Watch Video Solution

27. In which of the following species, d-obitals having xz an yz two nodal planes involved in hybridization of central atoms?

A. $IO_2F_2^-$

B. ClF_4^-

 $C.IF_7$

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) :

 CO_3^2 I XeF₄II I_3 III NCl₃IV BeCl₂(g)V

A. II < III < IV < I < V

 $\mathsf{B}.\,II < IV < III < V < I$

 $\mathsf{C}.\,III < II < I < V < IV$

 $\mathsf{D}.\,II < IV < III < I < V$

Answer: A



29. The shape of MnO_4^- ion and the hybridisation of Mn in MnO_4^- is

A. tetrahedral, sp^3

B. tetrahedral, d^3s

C. square planar, dsp^2

D. square planar, sp^3

Answer: B

Watch Video Solution

30. Which one of the following molecule will have all equal X - F bonds length? (where X=Central atom)

A. $SOCl_2F_2$

B. SeF₄

 $C.PBr_2F_3$

D. *IF*₇

Answer: A

31. Consider the following information (F=F or Cl)

Molecule	P-X(axial) bond length	P-X(Equitorial) bond length
PF ₅	a	b
PF4CH3	Westerlage and Consideration of	at accessing a d hours a pro-
PF3(CH3)2	in an abaddigen an Kaura	more the state of the Sol is
PCl ₅	g	h anter an

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. $CH_3 - CF_3$

- B. $FCH_2 CH_2F$
- $C. F_2 CH CHF_2$
- D. $CF_3 CF_3$

Answer: B

- **33.** In which of the following cases C C bond length will be highest?
- (I) In N_2F_4 , d-orbitals are contracted by electronegative flourine atoms,
- but d-orbitals contraction is not possible by H-atoms in N_2H_4
- (II) The N N bond energy in N_2F_4 is more than N N bond energy in N_2H_4
- (III) The N N bond length in N_2F_4 is more than that of in N_2F_4
- (IV) The N N bond length in N_2F_4 is less than that of in N_2H_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) H_2CSF_4

A. III > II > I

 $\mathsf{B}.\, I > III > II$

 $\mathsf{C}.\,I > II > III$

 $\mathsf{D}.\,II > III > I$
Answer: D



35. Incorrect orders of bond angle is :

A.
$$Ocl_2 > SF_2 > AsH_2 > H_2Se$$

B. $NH_3 > PF_3 > PH_3 > H_2S$
C. $XeO_4 > ClO_4^- > SO_4^- > CF_4$
D. $N(SiH_3)_3 > O(SiH_3)_2 > OMe_2$

Answer: C::D

View Text Solution

36. Minimum *F* - *S* - *F* bond angle present in :

 $B.SF_6$

 $C.SF_2$

D. F_3SSF

Answer: D

Watch Video Solution

37. The correct order of increasing bond angle is

$$A. OF_2 < ClO_2 < H_2O < Cl_2O$$

$$B. OF_2 < H_2O < Cl_2O < ClO_2$$

$$C.OF_2 < H_2O < ClO_2 < Cl_2O$$

$$\mathsf{D.} ClO_2 < OF_2 < H_2O < Cl_2O$$

Answer: B

Watch Video Solution

38. The correct order for bond angles is :

A.
$$NO_{2}^{-} > NO_{2}^{+} > NO_{2}^{-}$$

B. $NO_{2}^{+} > NO_{2}^{+} > NO_{2}^{-}$
C. $NO_{2} > NO_{2}^{+} > NO_{2}^{-}$
D. $NO_{2}^{+} > NO_{2} > NO_{2}^{-}$

Answer: D

Watch Video Solution

39. Which one is correct for bond angle?

A. $PF_3 > PCl_3$

 $B.OCl_2 = ClO_2$

 $C.NF_3 > NH_3$

 $D.PCl_3 > PF_3$

Answer: D

Watch Video Solution

40. In molecules of the type AX_2I_n (where L represents lone pair and n is its number) there exists a bond between element A and X. The $\angle XAX$ 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. SiO_2

Answer: D

Watch Video Solution

42. The melting points of AlF_3 is 104 ° and that of SiF_4 is -77 ° (it sublimes) because:

A. there is a very large difference in the ionic character of the Al-F and

Si-F bonds

B. in AlF_3 , Al^{3+} interacts very strongly with the neighbouring F^- ions

to given a three dimenstional structure but in SiF_4 no such interaction is possible

C. the silicon ion in the tetrahedral SiF_4 molecules is not shielded

effectively from the flouride ions whereas in AlF_3 , the Al^{3+} ion is shielded on all sides

D. the attractive forces between the SiF_4 molecules are strong

whereas those between the 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.Xe < Ar < He

D. m-nitrophenol > o-nitrophenol

Answer: D

 $K_{a_{1}}\left(-H^{+}\right) \quad K_{a_{2}}\left(-H^{+}\right)$ $\xrightarrow{\rightarrow} \qquad \xrightarrow{\rightarrow}$ $44. \text{ Cis butene dioic acid} \qquad \leftarrow \qquad X_{1}^{-} \qquad \leftrightarrow \qquad X_{2}^{-}$ $K_{a_{1}}\left(-H^{+}\right) \quad K_{a_{2}}\left(-H^{+}\right)$ $\xrightarrow{\rightarrow} \qquad \xrightarrow{\rightarrow}$ $\text{Trans-butene dioic acid} \qquad \leftarrow \qquad Y_{1}^{-} \qquad \leftrightarrow \qquad Y_{2}^{-}$

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}
- D. K_{a_2} is greater than K'_{a_2}

Answer: B

Watch Video Solution

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



Answer: C

Watch Video Solution

46. The H-Bonds in solid HF can be best represented as :

A.
$$H - F \dots H - F \dots H - F$$

B. (b) $H_{F} H_{F} H_{F} H_{F}$
(c) $H^{F} H_{F} H^{F}$
C.



Answer: C



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

Watch Video Solution

48. Which of the following interaction lies in the range of 8-42kH/mol?

 $\mathsf{A}.\,H_2\!.\,.\,H_2O$

B. HCl. . HCl

C.*F*[−]...*HF*

D. $HCN...NH_3$

Answer: D

Watch Video Solution

49. The incorrect order is :

- A. Covalent character : $PbCl_4 > CaCl_2 > SrCl_2 > BaCl_2$
- B. Thermal stability : $PbF_4 > PbCl_4 > PbBr_4 > PbI_4$

C. Melting point : KF > KCl > KBr > KI

D. Boiling point : $CHCl_3 > CH_3Cl > CCl_4$

Answer: D



51. Which order are correct?

(I) Thermal stability : $BeSO_4 < MgSO_4 < CaSO_4 < SrSO_4 < BaSO_4$

(II) Basic nature : ZnO > BeO > MgO > CaO

(III) Solubility in water : *LiOH > NaOH > KOH > RbOH > CsOH*

(IV)Melting point : *NaCl* > *KCl* > *RbCl* > *CaCl* > *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) $CaCO_3 > SrCO_3 > BaCO_3$ (II) $Li_2CO_3 < Na_2CO_3 > K_2CO_3$

 $(III)K_2CO_3 < Rb_2CO_3 < Cs_2CO_3 (IV)Na_2CO_3 > K_2CO_3 > Rb_2CO_3$

A. II, IV

B. I, IV

C. II, III, IV

D. I, II, III

Answer: D

View Text Solution

53. On heating to $400 - 500 \degree C$, relatively unstable hydrides and carbonates decompose. Which of the following will decompose when heated to $400 - 500 \degree C$

A. II, III

B. I, II, III

C. I, III

D. III, IV

Answer: A

Watch Video Solution

54. Both $N(SiH_3)_3$ and $NH(SiH_3)_2$ compounds have trigonal planar skeleton. Incorrect statement about both compounds is :

- A. SiNSi bond angle in $NH(SiH_3)_2 > SiNSi$ bond angle in $N(SiH_3)_3$ B. N - Si bond length in $NH(SiH_3)_2 > N - Si$ bond length in $N(SiH_3)_3$
- C. N Si bond length in $NH(SiH_3)_2 < N Si$ bond length in $N(SiH_3)_3$
- D. Back bonding strength in $NH(SiH_3)_2 > Back$ bonding strength in $N(SiH_3)_3$

Answer: B



55. The incorrect statement regarding $O(SiH_3)_2$ and OCl_2 molecule

is/are

A. The strength of back bonding is more in $O(SiH_3)_2$ molecule than

Ocl₂ molecule

- B. Si O Si bond angle in $O(SiH_3)_2$ is greater than Cl O Cl bond angle in OCl_2
- C. The nature of back in both molecules is $2p_x 3d_\pi$
- D. Hybridisation of central O-atom in both molecules is same

Answer: D

View Text Solution

56. Among following molecule *N* - *Si* bond length is shortest:

A.
$$N(SiH_3)_3$$

B. $NH(SiH_3)_2$
C. $NH_2(SiH_3)$

D. All have equal N - Si bond length

Answer: C



57. Which of the following molecule has weakest $(p\pi - d\pi)$ back bonding?

A. OCl₂

$$\mathsf{B.} N \Big(SiH_3 \Big)_3$$

C. SiF₃

D. $O(SiH_3)_2$

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) $\mathbb{C}l_3^-$ (ii) $\mathbb{C}l_2$ (iii) $O(SiH_3)_2$ (iv) $N(SiH_3)_3$ A. (i) and (ii)

B. (i) and (iii)

C. (ii) and (iii)

D. All

Answer: A

Watch Video Solution

59. The geometry with respect of the central atom of the following molecules are

 $N(SiH_3)_3, Me_3N, (SiH_3)_3P$

A. planar, pyramidal, planar

B. planar, pyramidal, pyramidal

C. pyramidal, pyramidal, pyramidal

D. pyramidal, planar, pyramidal

Answer: A

Watch Video Solution

60. Incorrect statement regarding *BF*₃*NH*₃ molecule is :

A. FBF bond angle $< 120^{\circ}$

B. HNH bond angle $> 109^{\circ} 28'$

C. Exhibits intermolecular H-bond

D. hybridization of N-atom is sp^3

Answer: D

> Watch Video Solution

61. In which of the following molecules μ (oberved) is found to be greater than μ (theoretical):

A. CHCl₃

В. 📄

C.





Answer: D

D.



62. Among the following, the molecule with the highest dipole moment is

A. CH₃Cl

:

B. CH_2Cl_2

C. CHCl₃

D. CCl_4

Answer: A



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. O - O

Answer: D

Watch Video Solution

65. The bond having the minimum bond energy is :

A. C - C

В. О - О

C. S - S

D. P - P

Answer: B



66. Arrange in increasing order of extent of hydrolysis $\begin{bmatrix} CCl_4, MgCl_2, AlCl_3, PCl_5, SiCl_4 \end{bmatrix}.$ A. $CCl_4 < MgCl_2 < AlCl_3 < SiCl_4 < PCl_5$ B. $CCl_4 < AlCl_3 < MgCl_2 < PCl_5 < SiCl_4$ C. $CCl_4 < SiCl_4 < PCl_5 < AlCl_3 < MgCl_2$ D. $CCl_4 < PCl_5 < SiCl_4 < AlCl_3 < MgCl_2$

Answer: A



67. Inorganic benzene reacts with HCl to form a compounds $B_3N_3H_9Cl_3$.

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 BCl_3 and NCl_3 :

A. NCl₃ is hydrolysed and gives HOCl but BCl₃ is not hydrolysed

B. Both NCl₃ and BCl₃ on hydrolysis gives HCl

C. NCl₃ on hydrolysis give HOCl but BCl₃ gives HCl

D. Both NCl₃ and BCl₃ on hydrolysis gives HOCl

Answer: C

Watch Video Solution

- 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 σ bonding molecular orbital does not contain nodal planes containing the internuclear axis
 - D. The δ -bonding molecular orbitals possesses three nodal planes containing the internuclear axis

Answer: D

View Text Solution

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. N₂

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 $P_2 \rightarrow T_2$





Answer: A



72. Which of the following facts given is not correct?

- (I) Bond length order, $H_2^- H_2^+ > H_2$
- (II) O_2^+ , NO, N_2^- have same bond order of $2\frac{1}{2}$

(II) Bond order can assume any value including zero upto four

(IV) NO_3^- and BO_3^- have same order for X - 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 O_2^+ , the O-O bond order increase

C. In O_2^+ , the paramagnetism decrease

 $D.N_2^+$ becomes diamagnetic

Answer: D



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. $NO^- \rightarrow NO$ C. $O_2 \rightarrow O_2^+$ 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 $B_3N_3H_6$ is as follows:



How may derivations structures of $B_3N_3H_4X_2$ can be derived from the basic structure, by the replacement of two hydrogen atoms?

A. 2

B. 3

C. 4

D. 5

Answer: C



77. Correctly match is:

A. $d_{x^2-y^2}$ atomic orbital -one nodal plane

B. p_{v} atomic orbital -Two nodal planes

C. σ_{p_x} - ψ (gerade)

D. Π_{p_y} - ψ (ungerade)

Answer: C

Watch Video Solution

78. Select correct statement (s) :

A. Acidic strength of HBr > HCl but reverse is true for their reducing

property

B. Basic strength of $PH_3 > AsH_3$ but reverse is true for their bond

angle

C. Dipole moment of $CH_3Cl > CH_3F$ but reverse is true for their $H\hat{C}H$

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

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 H_2^+

B. Curve-2 represents the most stable state of the system for 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. *N*₂*O*₄

 $C.Si_2H_6$

 $D.I_2Cl_6$

Answer: A

View Text Solution

81. Choose the correct statement regarding $SeOCl_2$ 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 View Text Solution 82. In which species, X-O bond order is 1.5 and contains $p\pi - d\pi$ bond(s)

A. IO_2F_2

B. HCOO⁻

 $C.SO_3^{2-}$

D. XeO_2F_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. $S_2 O_3^2$

B. (SCN)₂

 $C.Be_2Cl_4$

D. Si_2H_6

Answer: D

View Text Solution

84. The incorrect statement (s) regarding $\overline{\cdot}$ (C)X₃

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)
$$H_3X - HCS$$
 (ii) $H_3Y - NCS$ (iii) $(H_3Y)_2O$ (iv) $(H_2X)_2O$

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 Y-O-Y bond angle in compounds (iv)

Answer: B



86. The incorrect statement about carbene (CH_2) is :

A. In singler carbon, carbon is sp^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 :CHF > CHCl > CHBr

D. None of the above

Answer: B



87. The lowest O-O bond length in the following molecule is :

A. $O_2 F_2$

B. *O*₂

 $C.H_2O_2$

D. *O*₃

Answer: B

Watch Video Solution

88. Out of $CHCl_3$, CH_4 and SF_4 the molecules do not having regular geometry are:

A. CHCl₃ only

B. $CHCl_3$ and SF_4

 $C.CH_4$

D. CH_4 and 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.
$$I_3^-$$
, CH_3^- , CI_3^- , SiF_6^{2-}

B. *I*₃⁺, *ICl*₄⁻, *Al*₂*Cl*₆, *TeCl*₄

C. SCl₂, N₂O₅, SF₄

D. I_2Cl_6 , XeF_2 , BrF_4 , 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) XeF_5^- (II) BrF_3^- (III) XeF_2^- (IV) H_3S^+ (V) Triple methylene

A. (IV) and (V)

B. (I) and (III)

C. (I) and (II)

D. II, IV and V

Answer: C

Watch Video Solution

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) $(CH_3)_2 P(CF_3)_3$ is non-palar and $(CH_3)_3 P(CF_3)_2$ is polar molecule (II) $CH_3 \hat{P} CH_3$ bond angle are equal in $(CH_3)_3 P(CF_3)_2$ molecule (III) PF_3 will be more soluble in polar solvent than SiF_4

A. TTF

B. FFT

C. FFF

D. FTT

Answer: D



93. The correct sequence of polarity of the following molecule

(1)Benzene (2)Inorganci Benzene





A. $B_3 N_3 H_6$ B. $C_3 N_3 (NH_2)_3$

$$C.SO_3$$

D.
$$C_3 N_3 (N_3)_3$$

Answer: B

Watch Video Solution

95. Which of the following structure(s) is /are non-planar?

A. $Na_3B_3O_6$

 $B.I_2Cl_6$

C. Sheet silicate

D. Inorganic graphite layer

Answer: C

Watch Video Solution

96. Nodal planes of π -bonds in $CH_2 = C = C = CH_2$ 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



97. Which of the following have X-O-X linkage ?

(where X is central atom):

(i) $Cr_2O_7^{2-}$ (ii) $S_2O_3^{2-}$ (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. 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 P_4O_{10}

C. Hybridization of both sulphur in $H_2S_2O_8$ (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



100. Structure of $Na_2[B_4O_5(OH)_4] \cdot 8H_2O$ 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



101. Which of the following molecular species is not linear?

A. (CN)₂

B. OCN⁻

 $C.XeF_2$

D. XeF_2

Answer: D

Watch Video Solution

102. Incorrect match is :

Electron	geometry	Possible molecular shape from respective electron geometry
(a) Tetrahedron	-	Bent
(b) Trigonal bipyramidal		Triangular planar
(c) Octahedron	_	Square pyramidal
(d) Pentagonal bipyramidal		Pentagonal planar



103. Consider the following reactions:

 $MX_4 + X'_2 \rightarrow MX_4X_2'$

If atomic number of M is 52 and X and X' are halogens and X' 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 M-X bond lengths are identical in both MX_4 and $MX_4X'_2$ compounds
- C. Central atom 'M' does not use anyone valence non-axial set of dorbitals 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)	Bond pair has > .75% p-character	s	HF
(b)	Reduction in axial bond angle is more than that of in equatorial bond angle	\ll	SF4
(c)	Two axial <i>d</i> -orbitals and one non-axial <i>d</i> -orbital are used in hybridization	*	XeF ₅
(d)	Two p-orbitals are used in hybridization	Q	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. IO_2F_2

B. ClF_4^-

 $C.IF_7$

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 : $(I)CO_3^{2-}$ (II) XeF_4 (III) I_3^- (IV) NCl_3 (V) $BeCl_2$

A. II < III < IV < I < V

B. II < IV < III < V < I

 $\mathsf{C}.III < II < I < V < IV$

 $\mathsf{D}.\,II < IV < III < I < V$

Answer: A

View Text Solution

107. The shapes of MnO_4^- ion and the hybridization of Mn in MnO_4^- is :

A. tetrahedral, sp^3

B. tetrahedral, d^3s

C. square planar, dsp^2

D. square planar, sp^3

Answer: B

View Text Solution

108. Which one of the following molecule will have all equal X - F bonds

length? (where X=Central atom)

A. $SOCl_2F_2$

B. SeF_4

 $C.PBr_2F_3$

D. IF_7

Answer: A

View Text Solution

109. Consider the following information (F=F or Cl)

Molecule	P-X(axial) bond length	P-X(Equitorial) bond length
PF ₅	a	b
PF4CH3	A set of a Constant of the	of account of a difference of the
PF ₃ (CH ₃) ₂	"I se abriddler an fair a	more the state of the Sol of
PCl ₅	g	h ani conserva

According to given information choose the incorrect order of bond length :

A. g > a > d > bB. g > e > f > bC. f > d > a > b

D. c > f > d > b

Answer: C

View Text Solution

110. In which of the following cases C - C bond length will be highest?

A. $CH_3 - CF_3$

B. $FCH_2 - CH_2F$

 $C. F_2CH - CHF_2$

 $D.CF_3 - CF_3$

Answer: B

View Text Solution

111. In which of the following cases C - C bond length will be highest? (I) In N_2F_4 , d-orbitals are contracted by electronegative flourine atoms, but d-orbitals contraction is not possible by H-atoms in N_2H_4 (II) The N - N bond energy in N_2F_4 is more than N - N bond energy in N_2H_4

(III) The N - N bond length in $N_2 {\cal F}_4$ is more than that of in $N_2 {\cal F}_4$

(IV) The N - N bond length in N_2F_4 is less than that of in N_2H_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 following compound.

(I) SF_4 (II) OSF_4 (III) H_2CSF_4

A. III > II > I

 $\mathsf{B}.\,I > III > II$

 $\mathsf{C}.\,I > II > III$

 $\mathsf{D}.\,II > III > I$

Answer: D



113. Incorrect orders of bond angle is :

$$A. Ocl_2 > SF_2 > AsH_2 > H_2Se$$

B.
$$NH_3 > PF_3 > PH_3 > H_2S$$

$$C. XeO_4 > ClO_4 > SO_4 > CF_4$$

$$\mathsf{D}.\,N\Big(SiH_3\Big)_3 > O\Big(SiH_3\Big)_2 > OMe_2$$

Answer: C::D

View Text Solution

114. Minimum F - S - F bond angle present in :

A. SSF_2

 $B.SF_6$

 $C.SF_2$

 $D.F_3SSF$

Answer: D



115. The correct order of increasing bond angle is

A.
$$OF_2 < ClO_2 < H_2O < Cl_2O$$

 $B.OF_2 < H_2O < Cl_2O < ClO_2$

 $C.OF_2 < H_2O < ClO_2 < Cl_2O$

D. $ClO_2 < OF_2 < H_2O < Cl_2O$

Answer: B

View Text Solution

116. The correct order of bond anlge is :

A.
$$NO_{2}^{-} > NO_{2}^{+} > NO_{2}^{-}$$

B. $NO_{2}^{+} > NO_{2}^{+} > NO_{2}^{-}$
C. $NO_{2} > NO_{2}^{+} > NO_{2}^{-}$
D. $NO_{2}^{+} > NO_{2} > NO_{2}^{-}$

Answer: D

View Text Solution

117. Which one is correct for bond angle?

A. $PF_3 > PCl_3$

 $B.OCl_2 = ClO_2$

 $C.NF_3 > NH_3$

 $D.PCl_3 > PF_3$

Answer: D

View Text Solution

118. In molecules of the type AX_2I_n (where L represents lone pair and n is its number) there exists a bond between element A and X. The $\angle XAX$ 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. SiO_2

Answer: D

View Text Solution

120. The melting points of AlF_3 is 104° and that of SiF_4 is -77° (it sublimes) because:

A. there is a very large difference in the ionic character of the Al-F and

Si-F bonds

- B. in AlF_3 , Al^{3+} interacts very strongly with the neighbouring F^- ions
 - to given a three dimenstional structure but in SiF_4 no such interaction is possible
- C. the silicon ion in the tetrahedral SiF_4 molecules is not shielded effectively from the flouride ions whereas in AlF_3 , the Al^{3+} ion is

shielded on all sides

D. the attractive forces between the SiF_4 molecules are strong

whereas those between the 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

 $\mathsf{C}. Xe < Ar < He$

D. m-nitrophenol > o-nitrophenol

Answer: D

View Text Solution

$$K_{a_1}\left(-H^+\right) \qquad K_{a_2}\left(-H^+\right)$$

122. Cis butene dioic acid $\leftarrow X_1 \rightarrow X_2$

Trans-butene dioic acid $\leftarrow Y_1^- \leftrightarrow Y_2^-$

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}

D. K_{a_2} is greater than K'_{a_2}

Answer: B

View Text Solution

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



Answer: C



124. The H-bonds in solid HF can be best represented as :

A.
$$H - F \dots H - F \dots H - F$$

B. (b) $H_{p} H_{p} H_{p} H_{p}$
(c) $H^{F} H_{p} H^{F}$
C. (d) $F^{H} H_{p} H^{F}$
D.

Answer: C

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

View Text Solution

126. Which of the following interaction lies in the range of 8-42kH/mol?

A. *H*₂. . *H*₂*O*

B. HCl. . HCl

 $C. F^- \dots HF$

 $D.HCN...NH_3$

Answer: D

View Text Solution

127. The incorrect order is :

A. Covalent character : $PbCl_2 > CaCl_2 > SrCl_2 > BaCl_2$

B. Thermal stability : $PbF_4 > PbCl_4 > PbBr_4 > PbI_4$

C. Melting point : KF > KCl > KBr > KI

D. Boiling point : $CHCl_3 > CH_3Cl > CCl_4$

Answer: D



128. If CdI_2 is pink in colour, then the $CdCl_2$ will be '____' coloured.

A. Yellow

B. Red

C. Blue

D. connot be predicted

Answer: D



129. Which order are correct?

(I) Thermal stability : $BeSO_4 < MgSO_4 < CaSO_4 < SrSO_4 < BaSO_4$

(II) Basic nature : *ZnO* > *BeO* > *MgO* > *CaO*

(III) Solubility in water : *LiOH* > *NaOH* > *KOH* > *RbOH* > *CsOH*

(IV)Melting point : NaCl > KCl > RbCl > CaCl > LiCl

A. (I), (IV)

B. (I), (II) and (IV)

C. (II), (III)

D. All correct

Answer: A

View Text Solution

130. The correct solubility order is/are

(I) $CaCO_3 > SrCO_3 > BaCO_3$ (II) $Li_2CO_3 < Na_2CO_3 > K_2CO_3$

 $(\mathsf{III})K_2CO_3 < Rb_2CO_3 < Cs_2CO_3 \ (\mathsf{IV})Na_2CO_3 > K_2CO_3 > Rb_2CO_3$

A. II, IV

B. I, IV

C. II, III, IV

D. I, II, III

Answer: D

View Text Solution

131. On heating to $400 - 500 \degree C$, relatively unstable hydrides and carbonates decompose. Which of the following will decompose when heated to $400 - 500 \degree C$

A. II, III

B. I, II, III

C. I, III

D. III, IV

Answer: A

Watch Video Solution

132. Both $N(SiH_3)_3$ and $NH(SiH_3)_2$ compounds have trigonal planar skeleton. Incorrect statement about both compounds is :

- A. SiNSi bond angle in $NH(SiH_3)_2 > SiNSi$ bond angle in $N(SiH_3)_3$ B. N - Si bond length in $NH(SiH_3)_2 > N - Si$ bond length in $N(SiH_3)_3$ C. N - Si bond length in $NH(SiH_3)_2 < N - Si$ bond length in $N(SiH_3)_3$
- D. Back bonding strength in $NH(SiH_3)_2 > Back$ bonding strength in $N(SiH_3)_3$

Answer: B

View Text Solution

- **133.** The incorrect statement regarding $O(SiH_3)_2$ and OCl_2 molecule is/are
 - A. The strength of back bonding is more in $O(SiH_3)_2$ molecule than
 - Ocl₂ molecule
 - B. Si O Si bond angle in $O(SiH_3)_2$ is greater than Cl O Cl bond angle in OCl_2
 - C. The nature of back in both molecules is $2p_x 3d_\pi$
 - D. Hybridisation of central O-atom in both molecules is same

Answer: D

View Text Solution

134. Among following molecule N - Si bond length is shortest:

A.
$$N(SiH_3)_3$$

B. $NH(SiH_3)_2$

 $C. NH_2 (SiH_3)$

D. All have equal N - Si bond length

Answer: C

Watch Video Solution

135. Which of the following molecule has weakest $(p\pi - d\pi)$ back bonding?

A.
$$OCl_2$$

B. $N(SiH_3)_3$
C. SiF_3

D.
$$O(SiH_3)_2$$

Answer: A

View Text Solution

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) $O(SiH_3)_2$ (iv) $N(SiH_3)_3$

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 :

$$N(SiH_3)_3$$
: Me_3N : $(SiH_3)_3P$

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 BF_3NH_3 molecule is :

A. FBF bond angle $< 120^{\circ}$

B. HNH bond angle $> 109^{\circ} 28'$

C. Exhibits intermolecular H-bond

D. hybridization of N-atom is sp^3

Answer: D

Watch Video Solution

139. In which of the following molecules μ (oberved) is found to be greater

than μ (theoretical):

A. CHCl₃



Β.





Answer: D

Niew Text Solution

140. Among the following, the molecule with the highest dipole moment

is :

A. CH₃Cl

B. CH_2Cl_2

C. CHCl₃

D. CCl_4

Answer: A

Watch Video Solution

141. Which of the following compounds has dipole moment approximately

equal to that of chlorobenzene?

A. 0-dichlorobenzene

B. m-dichlorobenzene

C. p-dichlorobenzene

D. p-chloronitrobenzene

Answer: B



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

В. О - О

C. S - S

D. P - P

Answer: B

Watch Video Solution

144. The correct increasing order of extent of hydrolysis is

$$A. CCl_4 < MgCl_2 < AlCl_3 < SiCl_4 < PCl_5$$

$$B. CCl_4 < AlCl_3 < MgCl_2 < PCl_5 < SiCl_4$$

Answer: A

Watch Video Solution

145. Inorganic benzene reacts with HCl to form a compounds $B_3N_3H_9Cl_3$.

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 *BCl*₃ and *NCl*₃:

A. *NCl*₃ is hydrolysis and gives HOCl but *BCl*₃ is not hydrolysed

B. Both NCl₃ and BCl₃ on hydrolysis gives HCl

C. NCl_3 on hydrolysis give HOCl but BCl_3 gives HCl

D. Both NCl_3 and 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 σ -bonding molecular orbital does not contains the internuclear axis
- D. The δ -bonding molecular orbitals possesses three nodal planes containing the internuclear axis

Answer: D



148. 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



149. If ${\sf P}$ to ${\sf T}$ are second period p-block elements then which of the

following graph show corrrect relation between valence electrons in

 $P_2 \rightarrow T_2$



D.

Answer: A

View Text Solution

150. Which of the following facts given is not correct?

- (I) Bond length order, $H_2^- H_2^+ > H_2$
- (II) O_2^+ , NO, N_2^- have same bond order of $2\frac{1}{2}$

(II) Bond order can assume any value including zero upto four

(IV) NO_3^- and BO_3^- have same order for X - 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

O View Text Solution

151. N_2 and O_2 are converted to monocations N_2^+ and O_2^+ respectively,

which is wrong statement:

A. In N_2^+ , the N-N bond weakens

B. In O_2^+ , the O-O bond order increase

C. In 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. $NO^- \rightarrow NO$
C. $O_2 \rightarrow O_2^+$
D. $N_2 \rightarrow N_2^+$

Answer: A

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

D View Text Solution

154. The structure of $B_3N_3H_6$ is as follows:



How may derivations structures of $B_3N_3H_4X_2$ can be derived from the basic structure, by the replacement of two hydrogen atoms?

A. 2

B. 3

C. 4

D. 5

Answer: C



155. Correctly match is:

A. $d_{x^2-y^2}$ atomic orbital -one nodal plane

B. p_{v} atomic orbital -Two nodal planes

C. σ_{p_x} - ψ (gerade)

D. P_{p_v} - ψ (ungerade)

Answer: C

View Text Solution

156. Select correct statement (s) :

A. Acidic strength of HBr > HCl but reverse is true for their reducing

property

B. Basic strength of $PH_3 > AsH_3$ but reverse is true for their bond

angle

C. Dipole moment of $CH_3Cl > CH_3F$ but reverse is true for their $H\hat{C}H$

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

View Text Solution

Level 3

1. 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
$$KFe^{II} \bigg[Fe_{III} \bigg(CN_6 \bigg) \bigg]$$
 and $KFe^{III} \bigg[Fe_{II} \bigg(CN_6 \bigg) \bigg]$ 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 Fe^{II} and Fe^{III} cation
- C. Both are blue coloured compounds because in complexes Fe^{II}

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 *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 d-

d 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 following generalized representation of hydrogen bond.

 $\begin{array}{l} \delta - & \delta + \\ X - H \dots Y \end{array}$

Bond dissociation energy of H-bond ranges from 8 and 42kJ/ol, and the

most commonly encountred hydrogen bonds are O - H...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

8kJ/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.

 $\begin{array}{ccc} \delta - & \delta + \\ X - H \dots Y \end{array}$

Bond dissociation energy of H-bond ranges from 8 and 42kJ/ol, and the

most commonly encountred hydrogen bonds are O - H...O, N - H...O and F - H..E.

Q.Which of the following interaction has energy between 8-42kJ/mol?

A. Na⁺: CCl_4

B. CHCl₃: Br⁻

 $C. C_6H_6: CCl_4$

 $D.H_2O:HCN$

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



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

Answer: D

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. $N_{3}H < CH_{3}N_{3}$

$$B. Me_2SO_4 < H_2SO_4$$

 $C. Me_3BO_3 < B(OH)_3$

D. $BF_3 < BI_3$

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. 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. $R = O_2^+$

 $C.S = CO^+$

D. $T = CN^+$

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. 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

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

Compound, MX_n type $(n = 2$ or 3 or 4)	Value of cos θ (θ = bond angle between equivalent hybrid orbitals)
Р	-0.241
Q	- 0.292
R	-0.5
S	-0.325
Т	-0.469

12.

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

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) H_2 Se, H_2 Te and PH_3

(ii) NO_2^- and NH_2^-

(iii) POF_3 and $POCl_3(X - P - X \text{ angle})$

(iv) OSF_2Cl_2 and $SF_2(CH_3)_2$ (F - S - F angle)

A. H_2Se , NH_2POF_3 and OSF_2Cl_2

B.
$$H_2Te$$
, NO_2^- , POF_3 and $SF_2(CH_3)_2$
C. PH_3 , NH_2^- , $POCl_3$ and $SF_2(CH_3)_2$
D. H_2Te , NH_2^- , POF_3 and $SF_2(CH_3)_2$

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 BrF_3 , maximum three halogen atoms can lie in same plane

B. In $CH_2SF_2(CH_3)_2$ molecule all hydrogen atoms which bonded to

 $s - sp^2$ overlapping, lie in equitorial plane

C. In OSCl₄, Cl - S - Cl equitorial bond angle is greater than 120 °

D. Molecules IOF_5 and XeO_2F_4 have similar shape but have different

number of lone pairs in whole molecule

Answer: B



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 $XeO_{n_1}F_{n_2}$, central atom has no lone pair and ratio of n_2

 $\frac{1}{n_1}$ is two, then which of the following orbitals does not participate in

bonding $(n_1 \text{ and } n_2 \text{ are natural numbers})$:

A. d_{x^2}

 $\mathbf{B}. p_x$

C. $d_{x^2-y^2}$

D. None of these

Answer: D



16. 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 ≤ 2.5 .

Q. In which of the following molecule central atom has higher % scharacter in its bond pair:

A. AsH₃

B. GeH_3

 $C.P_4$

 $D.H_2Se$

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 s-orbital, and the bonding will be through p-orbitals and bond angles will be nearly 90 ° if the electronegativity of the surrounding atoms is ≤ 2.5 . Q. Correct order of bond angle is :

A.
$$PH_4^+ > OF_2 > SF_2 > SbH_3 > H_2Te$$

B. $OF_2 > SF_2 > PH_4^+ > SbH_3 > H_2Te$

 $C.PH_4^+ > SF_2 > OF_2 > SbH_3 > H_2Te$

 $D. SF_2 > OF_2 > PH_4^+ > SbH_3 > H_2Te$

Answer: A

View Text Solution

18. According to hybridisation theory, the % s-character in sp, sp^2 and sp^3 hybrid orbitals is 50, 33.3 and 25 respectively, but this is not true for all the species. When θ is the bond angle between equivalent hybrid orbitals then % 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. sp^2

 $B. sp^3$

C. *sp*⁴

D. *sp*⁵

Answer: C

Watch Video Solution

19. According to hybridisation theory, the % s-character in sp, sp^2 and sp^3 hybrid orbitals is 50, 33.3 and 25 respectively, but this is not true for all the species. When θ is the bond angle between equivalent hybrid orbitals then % 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 OSO bond angle is found in :

A. SO_2F_2

 $B.SO_2Cl_2$

C.
$$SO_2(CF_3)_2$$

D. $SO_2(CH_3)_2$

Answer: D

Watch Video Solution

20. According to hybridisation theory, the % s-character in sp, sp^2 and sp^3 hybrid orbitals is 50, 33.3 and 25 respectively, but this is not true for all the species. When θ is the bond angle between equivalent hybrid orbitals then % 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.
$$P_2F_4 < P_2(CH_3)_4 < P_2(CF_3)_4 < P_2H_4$$

B. $P_2F_4 < P_2(CF_3)_4 < P_2(CH_3)_4 < P_2H_4$
C. $P_2F_4 < P_2H_4 < P_2(CH_3)_4 < P_2(CF_3)_4$
D.
$$P_2F_4 < P_2(CH_3)_4 < P_2H_4 < P_2(CF_3)_4$$

Answer: B



21. The correct statement is :

A. in CH_2F_2 the F - C - F bond angle is larger 109 $^{\circ}$ 28'

B. in CH_2F_2 the C - F bond has more than 25% s-character

C. in CH_2F_2 the H - C - H bond angle is larger 109 ° 28'

D. in CH_2F_2 the C - H bond has more than 25% s-character

Answer: C,D



22. PCl_5 is an example of a molecule having sp^3d -hybridisation. Three out of the orbitals in sp_xp_y -hybridisation while remaining two have $p_xd_{x^{2-}}$ hybridisation. If P-atom is attached to substitutuents differ in electronegativity, as in PCl_xF_{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 $PCl_2F_2^-$ 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. PCl_5 is an example of a molecule having sp^3d -hybridisation. Three out of the orbitals in sp_xp_y -hybridisation while remaining two have $p_xd_{x^2}$ -hybridisation. If P-atom is attached to substitutuents differ in electronegativity, as in PCl_xF_{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. CH_2F_2

B. CH_4

 $C. CH_3F$

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.

$$O_2 + PtF_6 \rightarrow O_2^+ \left[PtF_6 \right]^-$$

The first ionization energy for $O_2 \rightarrow O_2$ is $1165kJ \cdot mol^{-1}$, which is almost as the value of $1170kJ \cdot mol^{-1}$ for $Xe \rightarrow Xe^+$. It was predicated that xenon should react with PtF_6 . Experimental showed that when deep of red PtF_6 vapour was mixed with an equal volume of Xe the gases combined immediately at room temperature to produce a solid.

$$Xe + PtF_6 \rightarrow Xe \left[PtF_6 \right]$$

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.

$$O_2 + PtF_6 \rightarrow O_2^+ \left[PtF_6 \right]^+$$

The first ionization energy for $O_2 \rightarrow O_2$ is $1165kJ \cdot mol^{-1}$, which is almost as the value of $1170kJ \cdot mol^{-1}$ for $Xe \rightarrow Xe^+$. It was predicated that xenon should react with PtF_6 . Experimental showed that when deep of red PtF_6 vapour was mixed with an equal volume of Xe the gases combined immediately at room temperature to produce a solid.

$$Xe + PtF_6 \rightarrow Xe\left[PtF_6\right]$$

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.

 $O_2 + PtF_6 \rightarrow O_2^+ \left[PtF_6 \right]^-$

The first ionization energy for $O_2 \rightarrow O_2$ is $1165kJ \cdot mol^{-1}$, which is almost as the value of $1170kJ \cdot mol^{-1}$ for $Xe \rightarrow Xe^+$. It was predicated that xenon should react with PtF_6 . Experimental showed that when deep of red PtF_6 vapour was mixed with an equal volume of Xe the gases combined immediately at room temperature to produce a solid.

$$Xe + PtF_6 \rightarrow Xe\left[PtF_6\right]$$

Q. Which of the following species is not having perfect octahedron structure?

A. XeF_6

B. SiF_6^{2-}

 $C.PCl_6^-$

D. XeO_6^{4-}

Answer: A

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 Δ . This known as the stabilization energy. The energy of

antibonding molecular orbital in increased by Δ' (destabilisation energy). Q. The bond order of N_2^- is equal to that of

A. O_2 B. O_2^{2-} C. 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 Δ . This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by Δ' (destabilisation energy). Q. Which among the following pairs contains both paramagnetic species.

A.
$$O_2^2$$
 and N_2
B. O_2^- and N_2
C. O_2^- and N_2^-
D. O_2^- and 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 Δ . This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by Δ' (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 Δ . This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by Δ' (destabilisation energy). Q. Which of the following pairs of molecule can exist?

A. He_2 and Be_2 B. O_2^{2-} and Na_2 C. O_2^{2-} and H_2^{2-} D. Be_2 and 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 Δ . This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by Δ' (destabilisation energy). Q. How many nodal plane is present in $\sigma_{s \text{ and } p}$ bonding molecular orbital ?

A. zero

B. 1

C. 2

D. 3

Answer: A



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 Δ . This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by Δ' (destabilisation energy). Q. which of the following combination of orbitals is corrects?



 $\mathsf{B.}^{(b)} \xrightarrow{(b)} \xrightarrow{(-)} \xrightarrow{$





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 Δ . This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by Δ' (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 nucleiC. 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



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 Δ . This known as the stabilization energy. The energy of antibonding molecular orbital in increased by Δ' (destabilisation energy). Q. If x-axis is the molecular axis, then π -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



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} 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. XeF_4

 $B.BF_3$

 $C.I_2Cl_6$

D. PCl_2F_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 1.0×10^{-8} cm, what fraction of charge does exist each atom?

A. 0.1

B. 0.2

C. 0.25

D. 0.3

Answer: C



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.
$$IV < I < II < III$$

 $\mathsf{B}.\, I < IV < II < III$

C. IV < I < III < II

 $\mathsf{D}.\,IV < II < I < III$

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. μ of the AX_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

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} 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 $C_2H_2F_2$ 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 ° *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.
$$CH_2 - CH_2 - (CH_2)_2 - CH_2OH$$

B. $CH_3 - CH_2 - CH_2 - CH | OH - CH_3$
C. $CH_3 - CH_2 - CH | OH - CH_2 - CH_3$
 $CH_3 | D. CH_3 - C | OH - CH_2 - CH_3$

Answer: A



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 ° *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 ° *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

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



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. AlI_3

B. AlCl₃

 $C.AlBr_3$

 $D.AlF_3$

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. BeCl₂ (dimer)

B. BeH_2 (dimer)

C. BeH_2 (s)

D. $BeCl_2$ (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. SO_2

 $B.P_4O_{10}$

 $C.PF_3$

D. $B_3N_3H_6$

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 $KFE^{II}\left[Fe_{II}(CN_6)\right]$ and $KFE^{III}\left[Fe_{III}(CN_6)\right]$ complex compounds?

A. Both are blue coloured compounds because colour arises due to d-

d 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 Fe^{II} and FE^{III} cation

C. Both are blue coloured compounds because in complexes Fe^{II}

cation shows same d-d transition bond

D. Complex (I) has blue colour becouse (II) has brown colour

Answer: B

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 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

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.

 $\begin{array}{ccc} \delta - & \delta + \\ X - H \dots Y \end{array}$

Bond dissociation energy of H-bond ranges from 8 and 42kJ/ol, and the most commonly encountred hydrogen bonds are

- *O H*...*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

8kJ/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.

 $\begin{array}{ccc} \delta - & \delta + \\ X - H \dots Y \end{array}$

Bond dissociation energy of H-bond ranges from 8 and 42kJ/ol, and the

most commonly encountred hydrogen bonds are O - H...O, N - H...O and F - H..E.

Q.Which of the following interaction has energy between 8-42kJ/mol?

A. Na $^+$: CCl₄

B. CHCl₃: Br⁻

 $C. C_6H_6: CCl_4$

 $D.H_2O:HCN$

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

View Text Solution

:

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. $N_2H < CH_3N_3$

 $B.Me_2SO_4 < H_2SO_4$

 $C.Me_3BO_3 < B(OH)_3$

 $D.BF_3 < BI_2$

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. S - CO⁺

D. $T = CN^{+}$

Answer: C

View Text Solution

55. 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 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

order remains same

Answer: C

View Text Solution

Compound, MX_n type ($n = 2$ or 3 or 4)	Value of $\cos \theta (\theta = \text{bond angle between} equivalent hybrid orbitals})$
Р	- 0.241
Q	- 0.292
R	- 0.5
S	- 0.325
Т	-0.469

57.

In all expected compounds each central atom only uses its s and porbitals in hybridization. The relationship between bond angle ' θ ' and decimal fraction of s and p character present in the equivalent orbitals is given by :

 $\cos\theta = \frac{S}{S-1} = \frac{P-1}{P}$, S=decimal fraction of s-character in the equivalent hybrid orbital and 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 > RB. S > R > T > P > QC. P > Q > S > R > TD. P > Q > S > T > R

Answer: D

View Text Solution

Compound, MX_n type ($n = 2$ or 3 or 4)	Value of $\cos \theta$ ($\theta =$ bond angle between equivalent hybrid orbitals)
Р	-0.241
Q	- 0.292
R	-0.5
S	-0.325
Т	-0.469

In all expected compounds each central atom only uses its s and porbitals in hybridization. The relationship between bond angle ' θ ' and decimal fraction of s and p character present in the equivalent orbitals is given by :

 $\cos\theta = \frac{S}{S-1} = \frac{P-1}{P}$, S=decimal fraction of s-character in the equivalent hybrid orbital and 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

59.

View Text Solution

Compound, MX_n type ($n = 2$ or 3 or 4)	Value of $\cos \theta (\theta = \text{bond angle between} equivalent hybrid orbitals)$
Р	-0.241
Q	-0.292
R	- 0.5
S	-0.325
Т	-0.469

In all expected compounds each central atom only uses its s and porbitals in hybridization. The relationship between bond angle ' θ ' and decimal fraction of s and p character present in the equivalent orbitals is given by :

 $\cos\theta = \frac{S}{S-1} = \frac{P-1}{P}$, S=decimal fraction of s-character in the equivalent hybrid orbital and 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 % 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) H_2Se , H_2Te and PH_3

(ii) NO_2^- and NH_2^-

(iii)
$$POF_3$$
 and $POCl_3 (X - P - X \text{ angle})$
(iv) OSF_2Cl_2 and $SF_2(CH_3)_2$ ($F - S - F$ angle)
A. H_2Se , $NH_2^-POF_3$ and OSF_2Cl_2
B. H_2Te , NO_2^- , POF_3 and $SF_2(CH_3)_2$
C. PH_3 , NH_2^- , $POCl_3$ and $SF_2(CH_3)_2$
D. H_2Te , NH_2^- , POF_3 and $SF_2(CH_3)_2$

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 BrF_3 , maximum three halogen atoms can lie in same plane

B. In $CH_2SF_2(CH_3)_2$ molecule all hydrogen atoms which bonded to

 $s - sp^2$ overlapping, lie in equitorial plane

C. In OSCl₄, Cl - S - Cl equitorial bond angle is greater than 120 °

D. Molecules IOF_5 and XeO_2F_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 $XeO_{n_1}F_{n_2}$, central atom has no lone pair and ratio of $\frac{n_2}{n_1}$ 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



63. 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 ° if the electronegativity of the surrounding atoms is ≤ 2.5 . Q. In which of the following molecule central atom has higher % s-character in its bond pair:

A. AsH_3

B. GeH_3

C. *P*₄

 $D.H_2Se$

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 ° if the electronegativity of the surrounding atoms is ≤ 2.5 . Q. Correct order of bond angle is :

A.
$$PH_{4}^{+} > OF_{2} > SF_{2} > SbH_{3} > H_{2}Te$$

B. $OF_{2} > SF_{2} > PH_{4}^{+} > SbH_{3} > H_{2}Te$
C. $PH_{4}^{+} > SF_{2} > OF_{2} > SbH_{3} > H_{2}Te$
D. $SF_{2} > OF_{2} > PH_{4}^{+} > SbH_{3} > H_{2}Te$

Answer: A

View Text Solution

65. According to hybridisation theory, the % s-character in sp, sp^2 and sp^3 hybrid orbitals is 50, 33.3 and 25 respectively, but this is not true for all the species. When θ is the bond angle between equivalent hybrid orbitals then % 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. *sp*² B. *sp*³ C. *sp*⁴

D. sp^5

Answer: C

Watch Video Solution

66. According to hybridisation theory, the % s-character in sp, sp^2 and sp^3 hybrid orbitals is 50, 33.3 and 25 respectively, but this is not true for all the species. When θ is the bond angle between equivalent hybrid orbitals then % 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. SO_2F_2 B. SO_2Cl_2 C. $SO_2(CF_3)_2$ D. $SO_2(CH_3)_2$

Answer: D



67. According to hybridisation theory, the % s-character in sp, sp^2 and sp^3 hybrid orbitals is 50, 33.3 and 25 respectively, but this is not true for all the species. When θ is the bond angle between equivalent hybrid orbitals then % 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.
$$P_2F_4 < P_2(CH_3)_4 < P_2(CF_3)_4 < P_2H_4$$

B. $P_2F_4 < P_2(CF_3)_4 < P_2(CH_3)_4 < P_2H_4$
C. $P_2F_4 < P_2H_4 < P_2(CH_3)_4 < P_2(CF_3)_4$
D. $P_2F_4 < P_2(CH_3)_4 < P_2(CF_3)_4$

Answer: B



68. PCl_5 is an example of a molecule having sp^3d -hybridisation. Three out of the orbitals in sp_xp_y -hybridisation while remaining two have $p_xd_{x^2}$ hybridisation. If P-atom is attached to substitutuents differ in electronegativity, as in PCl_xF_{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 CH_2F_2 the F - C - F bond angle is larger 109 $^{\circ}$ 28'

B. in CH_2F_2 the C-F bond has more than 25% c-character

C. in CH_2F_2 the H - C - H bond angle is larger 109 ° 28'

D. in CH_2F_2 the C-H bond has more than 25% c-character

Answer: C

View Text Solution

69. PCl_5 is an example of a molecule having sp^3d -hybridisation. Three out of the orbitals in sp_xp_y -hybridisation while remaining two have $p_xd_{x^{2^-}}$ hybridisation. If P-atom is attached to substitutuents differ in electronegativity, as in PCl_xF_{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 PCl_2F_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. PCl_5 is an example of a molecule having sp^3d -hybridisation. Three out of the orbitals in sp_xp_y -hybridisation while remaining two have $p_xd_{x^{2^-}}$ hybridisation. If P-atom is attached to substitutuents differ in electronegativity, as in PCl_xF_{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. CH_2F_2

B. CH_4

C. CH_3F

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.

 $O_2 + PtF_6 \rightarrow O_2^+ \left[PtF_6 \right]^-$

The first ionization energy for $O_2 \rightarrow O_2$ is $1165kJ \cdot mol^{-1}$, which is almost as the value of $1170kJ \cdot mol^{-1}$ for $Xe \rightarrow Xe^+$. It was predicated that xenon should react with PtF_6 . Experimental showed that when deep of red PtF_6 vapour was mixed with an equal volume of Xe the gases combined immediately at room temperature to produce a solid.

 $Xe + PtF_6 \rightarrow Xe[PtF_6]$

Q. IUPAC name of first xenon-compounds synthesized by secientist Barlett

A. xenonhexaflouroplatinate(IV)

B. xenonhexaflouroplatinate(V)

C. hexafluoroplatinum(V) xenon

D. xenoniumhexafluoroplatinum(V)

Answer: B



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.

 $O_2 + PtF_6 \rightarrow O_2^+ \left[PtF_6 \right]^-$

The first ionization energy for $O_2 \rightarrow O_2$ is $1165kJ \cdot mol^{-1}$, which is almost as the value of $1170kJ \cdot mol^{-1}$ for $Xe \rightarrow Xe^+$. It was predicated that xenon should react with PtF_6 . Experimental showed that when deep of red PtF_6 vapour was mixed with an equal volume of Xe the gases combined immediately at room temperature to produce a solid. $Xe + PtF_6 \rightarrow Xe\left[PtF_6\right]$

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.

$$O_2 + PtF_6 \rightarrow O_2^+ \left[PtF_6 \right]^-$$

The first ionization energy for $O_2 \rightarrow O_2$ is $1165kJ \cdot mol^{-1}$, which is almost as the value of $1170kJ \cdot mol^{-1}$ for $Xe \rightarrow Xe^+$. It was predicated that xenon should react with PtF_6 . Experimental showed that when deep of red PtF_6 vapour was mixed with an equal volume of Xe the gases combined immediately at room temperature to produce a solid.

$$Xe + PtF_6 \rightarrow Xe\left[PtF_6\right]$$

Q. Which of the following species is not having perfect octahedron structure?

A. XeF_6

 $B.SiF_6^2$

 $C.PCl_6^-$

D. XeO_6^{4-}

Answer: A



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. the energy of bonding molecular orbital is less than that of the pure atomic orbital by an amount Δ . this is known as the stabilization energy. the energy of antibonding molecular orbital is increased by ' Δ ' (destabilisation energy)

The bond order of N_2^- is equal to that of

A. O_2 B. O_2^{2-} C. O_2^{+}

D. None

Answer: C



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 Δ . This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by Δ' (destabilisation energy). Q. Which among the following pairs contains both paramagnetic species.

A. O_2^2 and N_2^2 B. O_2^- and N_2 C. O_2 and N_2 D. O_2 and 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 Δ . This known as the stabilization energy. The energy of antibonding molecular orbital in increased by Δ' (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 Δ . This known as the stabilization energy. The energy of antibonding molecular orbital in increased by Δ' (destabilisation energy). Q. Which of the following pairs of molecule can exist?

A.
$$He_2$$
 and Be_2

B. O_2^{2-} and Na_2

$$C. O_2^{2^-}$$
 and $H_2^{2^-}$

D. Be_2 and 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 Δ . This known as the stabilization energy. The energy of antibonding molecular orbital in increased by Δ' (destabilisation energy). Q. How many nodal plane is present in $\sigma_{s \text{ and } p}$ 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 Δ . This known as the stabilization energy. The energy of antibonding molecular orbital in increased by Δ' (destabilisation energy). Q. which of the following combination of orbitals is corrects?

A. (a) $(-) + (-) \rightarrow (-) \rightarrow (-)$

 $\mathsf{B.}^{(b)} \underbrace{}^{(b)} \underbrace{}^{(-)} \underbrace{$

 $\mathsf{C}_{\bullet} (\mathsf{c}) \xrightarrow{\bullet} \mathsf{c} \xrightarrow{\bullet} \mathsf{c$

 $\mathbf{D} \quad \stackrel{(d)}{\overset{\frown}{\overset{\frown}{\overset{\frown}{\overset{\frown}{\overset{\frown}}}}}} - \stackrel{\frown}{\overset{\frown}{\overset{\frown}{\overset{\frown}{\overset{\frown}{\overset{\frown}{\overset{\frown}}}}}} - \stackrel{\frown}{\overset{\frown}{\overset{\frown}{\overset{\frown}{\overset{\bullet}{\overset{\bullet}}}}} - \stackrel{\frown}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}} - \stackrel{\bullet}{\overset{\bullet}{\overset{\bullet}}} - \stackrel{\bullet}{\overset{\bullet}} - \stackrel{$

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 Δ . This known as the stabilization energy. The energy of antibonding molecular orbital in increased by Δ' (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



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 Δ . This known as the stabilization energy. The enerby of antibonding molecular orbital in increased by Δ' (destabilisation energy). Q. If x-axis is the molecular axis, then π -moleulcar orbitals are formed by the overlap of :

A. $S + p_x$

 $\mathsf{B.}\, p_x + p_y$

 $C.P_z + p_x$

 $D. p_x + p_x$

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. XeF_4

 $B.BF_3$

 $C.I_2Cl_6$

D. PCl_2F_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} 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 1.0×10^{-8} 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} 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. IV < I < II < IIIB. I < IV < II < IIIC. IV < I < III < IIID. 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. μ of the AX_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 $C_2H_2F_2$ 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



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 $^{\circ}$ 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.
$$CH_2 - CH_2 - (CH_2)_2 - CH_2OH$$

B. $CH_3 - CH_2 - CH_2 - CH | OH - CH_2 - CH_3$
C. $CH_3 - CH_2 - CH | OH - CH_2 - CH_3$
 CH_3
D. $CH_3 - C | OH - CH_2 - CH_3$

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 ° *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

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 ° *C*., It is therefore concluded that hydrogen bonding palys a vutal role in explaning many observable facts.

Q. $K_{a_{\gamma}}$ of maleic acid is lesser than $K_{a_{\gamma}}$ 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



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. All_3

B. AlCl₃

 $C.AlBr_3$

 $D.AlF_3$

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. BeCl₂ (dimer)

B. BeH_2 (dimer)

C. BeH_2 (s)

D. $BeCl_2$ (s)

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. SO_2

B. P₄O₁₀

 $C.PF_3$

D. $B_3N_3H_6$

Answer: D

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 O - O bond length in $O_2[AsF_4]$ is shorter than KO_2

D. In $CF_2 = C = CF_2$ molecule all the four flourine atoms are in the

same plane

Answer: A::B::C



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 NaCl > 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 σ and π bonds :

A. σ -bond lies on the line joining the nuclei of bonded atoms

B. π - electron cloud lies on either side to the line joining the nuclei of

bonded atoms

C. $(2p\pi - 3d\pi)\pi$ -bond is stronger than $(2p\pi - 2\pi)\pi$ -bond

D. σ -bond has primary effect to decide direction of covalent bond,

which π - bond has no primery effect in direction of bond.

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

Watch Video Solution

4. Which of the following molecule species is/are having π_{2p} as H.O.M.O (highest occupied molecular orbital) :

A. N_2^-

B. $O_2^{2^+}$

C. *NO* ⁺

D. B_2^+

Answer: B::C::D

Watch Video Solution

5. Select correct order between given compounds .

A. $COCl_2 > COF_2 : XCX$ bond angle B. $NO_2F > NO_2Cl : ONO$ bond angle C. $SO_2F_2 < SOF_2 : FSF$ bond angle D. $N_2F_2 < N_2(CH_3)_2 : N - N$ bond length

Answer: A::B::D

View Text Solution

6. Select the correct statement(s) regarding BF_2NH_2 molecule:

A. FBF bond angle $< 120^{\circ}$

B. HNH bond angle $> 109^{\circ} 28'$

C. HNH bond angle $< 109^{\circ} 28'$

D. FBF bond angle $> 120^{\circ}$

Answer: A::B



7. Correct statement (s) about dipole moment of R_3NO and R_3PO is /are:

A. dipole moment of $R_3NO >$ dipole moment of R_3PO

B. dipole moment of $R_3NO <$ dipole moment of R_3PO

C. Experimental dipole moment of $R_3NO >$ Experimental dipole moment of R_3PO

D. Experimental dipole moment of $R_3NO <$ Experimantal dipole

moment of R_3PO

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.
$$N(SiH_3)_3$$

B. $N(CH_3)_3$
C. $O(CH_3)_2$
D. $O(SiH_3)_2$

Answer: B::C



9. Two compounds PX_2Y_3 and PX_3Y_2 (Where 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 PX_2Y_3 is non-zero

B. The dipole moment of product obtained from PX_2Y_3 is zero

C. The dipole moment of product obtained from PX_3Y_2 is zero

D. The dipole moment of product obtained from PX_3Y_2 is non-zero

Answer: A::C



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



- **11.** The correct statement(s) is /are :
 - A. Boiling point of m-hydroxybenzaldehyde is greater than o-

hydroxybenzaldehyde

B. Boiling point of CHCl₃ is higher than CCl₄

C. Melting point of $BeCl_2$ is higher than BeF_2

D. Boiling point of HF is greater than CH_3F

Answer: A::B::D

Watch Video Solution

12. Consider of following reactions

$$CHF_{3} \rightarrow CF_{3}^{-} + H^{+}$$

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

$$CHCl_{3}^{-} \rightarrow CCl_{3}^{-} + H^{+}$$

Then regarding given reactions which of the following statement(s) is /are correct:

A.
$$K_a > K'_a$$

B. CHF₃ act as a stronger bronsted acid than CHCl₃

C. CCl_3^- is more stable than CF_3^-

D. CCl_3 is weaker lewis base than CF_3

Answer: C::D

Watch Video Solution

13. In which of the following molecules μ_{exp} (observed dipole moment) is

found to be greater than μ_{μ} (expected dipole moment)?

A. POCl₃

B. `##BLJ_VKJ_ORG_CHE_C03_E04_013_O01.png" width="30%">

C. HNC

D. `##BLJ_VKJ_ORG_CHE_C03_E04_013_002.png" width="30%">

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



14. Correct statement (s) regarding $As(CH_3)F_2Cl_2$ 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 As - F bond length .

D. Maximum five atoms can lie in equatorial plane.

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



15. Which of the following species is/are having 'N - N' bond order =2?

A. N_3^-

B. N_2F_2

 $C. N_2 O_4$

 $D.N_2O$

Answer: A::B

Watch Video Solution

16. Which of the following statements is correct?

A. ClF₃ molecule is bent T shape

B. In SF_4 molecule, F - S - F equatorial bond angle is 103 ° due to lp-lp

repulsion

C. In
$$\begin{bmatrix} Cl_4 \end{bmatrix}^-$$
 molecular ion, Cl - I - Cl bond angle is 90 °

D. In OBr_2 , the bond angle is less than OCl_2

Answer: A::C

17. Which of the following species is/are not know?

A. FeI₃

 $B.SH_6$

 $C.PbI_4$

D. *PI*₅

Answer: A::B::C

D Watch Video Solution

18. Select correct order between following compounds:

A. $NH_3 > NF_3$: bond angle

B. $NH_3 > NF_3$: dipole moment

C. $NH_3 > NF_3$ %s-character of lone pair

D. $NH_3 > NF_3$: reactivity towards lewis acid

Answer: A::B::D



19. Which of the following is (are) V-shaped?

A. S_3^2

 $\mathsf{B}.I_3^-$

 $C.N_3^-$

D. I_{3}^{+}

Answer: A::D

Watch Video Solution

20. Select correct order between given compounds .

A. $COCl_2 > COF_2 : \hat{XCX}$ bond angle

B. $NO_2F > NO_2Cl : O\hat{N}O$ bond angle

C. $SO_2F_2 < SOF_2 : F\hat{S}F$ bond angle

D. $N_2F_2 < N_2(CH_3)_2 : N - N$ bond length

Answer: A::B::D



21. Which of the following equlibria would have highest and lowest value

of K_p at a commone temperature?

- A. $BeCO_3 \rightarrow BeO + CO_2$
- $B. CaCO_3 \rightarrow CaO + CO_2$
- $C.SrCO_3 \rightarrow SrO + CO_2$
- $D.BaCO_3 \rightarrow BaO + CO_2$

Answer: A::D

22. Which of the following process is/are assciated with change of hybridisation of the underlined compounds?

A. $Al(OH)_3$ pp. dissolved in NaOH

B. B_2H_6 is dissolved in THF

C. SiF₄ vapour is passed through liq. HF

D. solidifaction PCl₅ 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

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



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

```
NO \rightarrow NO^+ and CO \rightarrow CO^+
```

Answer: C



Answer: C::D



26. In the structure of H_2CSF_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 π -

bonds

Answer: A::C::D

Watch Video Solution

27. In which compound compounds vacant hybride orbitals take part in bonding:

A. B_2H_6 B. Al_2Cl_6 C. C_2H_5Cl

 $D.H_3BO_3$

Answer: A::B



28. Which of the following is true for N_2O ?

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



29. Silane is more reactive than CH_4 towards Nu^- substitution due to :

- A. larger size of Si compared to C which facilitating the attack by nucleophile
- B. Polarity of Si 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. Si - 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?

$$(I)SCl_2(OCH_3)_2$$
 and $(II)SF_2(OCH_3)_2$

A. - 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

order

C. Molecule is only paramagnetic species

D. Molecule does not exist

Answer: B::C::D

Watch Video Solution

32. Stepwise hydrolysis of P_4O_{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 $NO[BF_4]$:

A. It has 5σ and 2π 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 BF_3

Answer: A::C

Watch Video Solution

34. Which of the following molecule has as O_O bonds?

A. $H_2 S_2 O_8$

 $\mathsf{B}.H_2S_2O_7$

 $C.H_2SO_5$

 $D.H_2S_2O_6$

Answer: A, C Watch Video Solution 35. Which of the following species in paramagnetic: A. CN⁻ B. SnCl₂ $C. C_2 H_2$ $D.NO_2$ Answer: B::D View Text Solution

36. CO_2 is not isostructural with

A. HgCl₂

B. SnCl₂

 $C. C_2 H_2$

 $D.NO_2$

Answer: B::D

Watch Video Solution

37. Which of the following have a linear structure?

A. $HgCl_2$

B. SnCl₂

 $C. ICl_2^-$

D. *CS*₂

Answer: A::C::D

Watch Video Solution

38. Which of the following compound (s) is/are non-polar?

A. *NO*₂

B. B_2H_6

 $C.PF_3Cl_2$

D. $B_3N_3H_6$

Answer: B::D

Watch Video Solution

39. Non-polar molecule are:

A. CH_4

B. C_2F_2

 $C. C_2 F_4$

 $D.OF_2$

Answer: A::B::C



40. Which of the following molecule species is/are having π_{2p} as H.O.M.O (highest occupied molecular orbital) :

A. N_2^- B. O_2^{2+} C. NO^+ D. B_2^+

Answer: B::C::D



41. Correct order of b.p.t is /are:

A. $H_2 < He$

B. $H_2 < D_2$

 $\mathsf{C}.\,H_2\mathsf{O} < \mathsf{D}_2\mathsf{O}$

 $D. NH_3 < SbH_3$

Answer: B::C::D

View Text Solution

42. Incorrect order between following compounds is/are:

A.
$$O(CH_3)_2 < O(SiH_3)_2$$
: number of sp^3 -hybride atoms
B. $O(CH_3)_2 < O(SiH_3)_2$: Bond angle w.r.t common atom
C. $O(CH_3)_2 < O(SiH_3)_2$:% s-character of hybrid orbital on central atom

D.
$$O(CH_3)_2 < O(SiH_3)_2$$
: reactivity towards lewis acid

Answer: A::D


- 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 O O bond length in $O_2[AsF_4]$ is shorter than KO_2
- D. In $CF_2 = C = CF_2$ molecule all the four flourine atoms are in the

same plane

Answer: A::B::C

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 *NaCl* > *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

45. Select correct statement(s) regarding σ and π bonds :

A. σ -bond lies on the line joining the nuclei of bonded atoms

B. π - electron cloud lies on either side to the line joining the nuclei of

bonded atoms

C. $(2p\pi - 3d\pi)\pi$ -bond is stronger than $(2p\pi - 2\pi)\pi$ -bond

D. σ -bond has primary effect to decide direction of covalent bond,

which π - bond has no primery effect in direction of bond.

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

C	Watch	Video	Solution
	valui	video	Jointion

46. Which of the following molecule species is/are having π_{2p} as H.O.M.O (highest occupied molecular orbital) :

A. N_2^- B. $O_2^{2^+}$ C. NO^+

D. B_2^+

Answer: B::C::D

Watch Video Solution

47. Select correct order between given compounds .

A. $COCl_2 > COF_2 : XCX$ bond angle

B. $NO_2F > NO_2Cl : ONO$ bond angle

 $C.SO_2F_2 < SOF_2 : FSF$ bond angle

D. $N_2F_2 < N_2(CH_3)_2 : N - N$ bond length

Answer: A::B::D

View Text Solution

48. Select the correct statement(s) regarding BF_2NH_2 molecule:

A. FBF bond angle $< 120^{\circ}$

- B. HNH bond angle $> 109^{\circ}28'$
- C. HNH bond angle $< 109^{\circ} 28'$

D. FBF bond angle $> 120^{\circ}$

View Text Solution

49. Correct statement (s) about dipole moment of R_3NO and R_3PO is /are:

A. dipole moment of $R_3NO >$ dipole moment of R_3PO

B. dipole moment of $R_3NO < \text{dipole moment of } R_3PO$

C. Experimental dipole moment of $R_3NO >$ Experimantal dipole

moment of R_3PO

D. Experimental dipole moment of $R_3NO <$ Experimantal dipole

moment of R_3PO

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. $N(SiH_3)_3$ B. $N(CH_3)_3$ C. $O(CH_3)_2$ D. $O(SiH_3)_2$

Answer: B::C

Watch Video Solution

51. Two compounds PX_2Y_3 and PX_3Y_2 (Where 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 PX_2Y_3 is non-zero

B. The dipole moment of product obtained from PX_2Y_3 is zero

C. The dipole moment of product obtained from PX_3Y_2 is zero

D. The dipole moment of product obtained from PX_3Y_2 is non-zero

Answer: B::D



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



A.
$$\gamma < \gamma'$$

- **B**. $\gamma < \beta = \alpha$
- $C. \alpha > \alpha'$

 $D. \beta > \beta'$

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

View Text Solution

53. The correct statement(s) is /are :

A. Boiling point of m-hydroxybenzaldehyde is greater than o-

hydroxybenzaldehyde

B. Boiling point of $CHCl_3$ is higher than $\mathbb{C}l_4$

C. Melting point $BeCl_2$ is higher than BeF_2

D. Boiling point HF is greater than CH_3F

Answer: A::B::D

View Text Solution

54. Consider of following reactions

$$CHF_{3} \rightarrow CF_{3}^{-} + H^{+}$$

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

$$CHCl_{3}^{-} \rightarrow CCl_{3}^{-} + H^{+}$$

Then regarding given reactions which of the following statement(s) is

/are correct:

A. $K_a > K'_a$

B. CHF₃ act as a stronger bronsted acid than CHCl₃

C. CCl_3^- is more stable than CF_3^-

D. CCl_3 is weaker lewis base than CF_3

Answer: C::D

Watch Video Solution

55. In which of the following molecules μ_{exp} (observed dipole moment) is found to be greater than μ_{μ} (expected dipole moment)?

A. POCl₃



C. HNC



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

D.

View Text Solution

56. Correct statement (s) regarding $As(CH_3)F_2Cl_2$ 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 As - F bond length .

D. Maximum five atoms can lie in equatorial plane.

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



57. Which of the following species is/are having 'N - N' bond order =2?

A. N_{3}^{-}

B. N_2F_2

 $C. N_2 O_4$

 $D.N_2O$

Answer: A::B

Watch Video Solution

58. Which of the following statements is correct?

A. ClF₃ molecule is bent 'T' shape

B. In SF_4 molecule, F - S - F equatorial bond angle is 103 $^\circ\,$ due to lp-lp

repulsion

C. In $[Cl_4]^-$ molecular ion, Cl - I - Cl bond angle is 90 °

D. In OBr_2 , the bond angle is less than OCl_2

Answer: A::C



59. Which of the following species is/are not know?

A. FeI_3

- $B.SH_6$
- $C. PbI_4$
- D. *PI*₅

Answer: A::B::C

Watch Video Solution

60. Select correct order between following compounds:

A. $NH_3 > NF_3$: bond angle

- B. $NH_3 > NF_3$: dipole moment
- C. $NH_3 > NF_3$ %s-character of lone pair
- D. $NH_3 > NF_3$: reactivity towards lewis acid

Answer: A::B::D

Watch Video Solution

61. Which of the following is (are) V-shaped?

A.
$$S_3^{2-}$$

В. *I*₃

 $C. N_{3}^{-}$

D. I_{3}^{+}

Answer: A::D

Watch Video Solution

62. Select correct order between given compounds .

A.
$$COCl_2 > COF_2 : X\hat{C}X$$
 bond angle
B. $NO_2F > NO_2Cl : O\hat{N}O$ bond angle
C. $SO_2F_2 < SOF_2 : F\hat{S}F$ bond angle
D. $N_2F_2 < N_2(CH_3)_2 : N - N$ bond length

Answer: A::B::D

View Text Solution

63. Which of the following equilbria would have highest and lowest value

of K_p at a commone temperature?

- A. $BeCO_3 \rightarrow BeO + CO_2$
- $B. CaCO_3 \rightarrow CaO + CO_2$

 $C.SrCO_3 \rightarrow SrO + CO_2$

D. $BaCO_3 \rightarrow BaO + CO_2$

Answer: A::D



64. Which of the following process is/are assciated with change of hybridisation of the underlined compounds?

A. Al(OH)₃ pp. dissolved in NaOH

B. B_2H_5 is dissolved in THF

C. SiF₄ vapour is passed through liq. HF

D. solidifaction PCl₅ 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. O_2 is paramagnetic, O_3 is also paramagnetic

B. O_2 is paramagnetic, O_2 is diamagnetic

C. B_2 is paramagnetic, C_2 is also paramagnetic

D. Different obervation is found in their bond length when $NO \rightarrow NO^+$ and $CO \rightarrow CO^+$

Answer: A::B::D

View Text Solution

67. Which of the following statements are not correct?

A. All C - O bonds in CO_3^{2-} are equal but not in H_2CO_3

B. All C - O bonds in HCO_2^- are equal but not in HCO_2H

C. C - O bond length in HCO_2^- is longer than C - O bond length in

$$CO_{3}^{2}$$

D. C - O bond length in HCO_2^- and C - O bond length in $CO_3^{2^-}$ are equal

Answer: C::D

68. In the structure of H_2CSF_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 π -

bonds

Answer: A::C::D



69. In which compound compounds vacant hybride orbitals take part in bonding:

A. B_2H_6

 $B.Al_2Cl_6$

 $C. C_2H_5Cl$

 $D.H_3BO_3$

Answer: A::B

Watch Video Solution

70. Which of the following is true for N_2O ?

A. Its molecule is linear

B. Symmetric N - O - N is a favoured structure as compared to

N - O - N 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 CH_4 towards Nu^- substitution due to :

A. larger size of Si compared to C which facilitating the attack by

nucleophile

- B. Polarity of Si 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. Si - H bond energy is lower than that of C - H bonds

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



72. Which of the following statement(s) is/are not correct for following

compounds?

$$(I)SCl_2(OCH_3)_2$$
 and $(II)SF_2(OCH_3)_2$

- A. 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, $N_B > N_A$ "

- 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 P_4O_{10} takes place via formation of :

A. tetrmetaphosphoric acid

B. tetrapolyphosphoric acid

C. pyrophosphoric acid

D. Orthophosphoric acid

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



D. B - F bond length in this compound is lower than in BF_3

Answer: A::C

Watch Video Solution

76. Which of the following molecule has as *O* - *O* bonds?

A. $H_2 S_2 O_8$

 $B.H_2S_2O_7$

 $C.H_2SO_5$

 $D.H_2S_2O_6$

Answer: A::C



77. Which of the following species in paramagnetic:

A. *CN*⁻

B. SnCl₂

 $C. C_2 H_2$

 $D.NO_2$

Answer: B::D

View Text Solution

78. CO₂ molecule is not isostructural with :

A. HgCl₂

B. SnCl₂

 $C. C_2 H_2$

 $D.NO_2$

Answer: B::D

View Text Solution

79. Which of the following have a linear structure?

A. HgCl₂

B. SnCl₂

 $C.ICl_2^-$

D. *CS*₂

Answer: A::C::D

Watch Video Solution

80. Which of the following compound (s) is/are non-polar?

A. NO_2

 $B.B_2H_6$

 $C.PF_3Cl_2$

D. $B_3N_3H_6$

Answer: B::D

View Text Solution

81. Non-polar molecule are:

A. CH_4

B. C_2F_2

C. $C_2 F_4$

 $D.OF_2$

Answer: A::B::C



82. Which of the following molecule species is/are having π_{2p} as H.O.M.O (highest occupied molecular orbital) :

A. N_2^- B. O_2^{2+} C. NO^+ D. B_2^+

Answer: B::C::D

Watch Video Solution

83. Correct order of b.p.t is /are:

A. *H*₂ < *He*

B. $H_2 < D_2$

 $\mathsf{C}.\,H_2\mathsf{O} < \mathsf{D}_2\mathsf{O}$

 $D. NH_3 < SbH_3$

Answer: B::C::D

View Text Solution

84. Incorrect order between following compounds is/are:

A.
$$O(CH_3)_2 < O(SiH_3)_2$$
: number of sp^3 -hybride atoms
B. $O(CH_3)_2 < O(SiH_3)_2$: Bond angle w.r.t common atom
C. $O(CH_3)_2 < O(SiH_3)_2$:% s-character of hybrid orbital on central

atom

D.
$$O(CH_3)_2 < O(SiH_3)_2$$
: 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	Column-II
(A) $O(SiH_3)_2$	(P) Hybridization of central atom does not change due to back bonding
(B) Singlet CCl ₂	(Q) Bond angle of central atom increases due to combined effect of back bonding and steric factor
(C) H_4SiO_4	(R) Anyone of t _{2g} d-orbital is involved in back bonding
(D) $B(NMe_2)_3$	(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.





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.



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) H₄SiO₄
 (B) H₂SeO₄
 (C) H₃BO₃
 (D) H₂NBF₂

View Text Solution

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

View Text Solution

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)	Column-II (Species)
(A) The distribution of s-character in hybrid orbitals of central atom is not equal and all bond lengths (CA—X) are equivalent	(P) (CH ₃) ₂ O
(B) The distribution of s-character in hybrid orbitals of central atom is equal and all bond lengths (CA-X) are equivalent	(Q) NH,
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)		Column-II (Oxidation state of S-atom)
(A) $H_{2}S_{4}O_{6}$		(P)	+6
(B) H ₂ S ₂ O ₃		(Q)	+5
(C) H ₂ SO ₅		(R)	0
(D) $H_2S_2O_5$		(S)	-2
		(T)	+3

7. Column-Land Column-II contains four entries each. Entries of Column-L 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) NH₄CI (B) CuSO 4.5H 20 (R) Ionic bond (C) HNC (D) Liquid H₂O₂

Column-II (P) Hydrogen bond (Q) Co-ordinate bond (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.

	s. 1	Column-I	5.1	Column-II
(A)	B ₃ N ₃ H ₆		(P)	Planar geometry
(B)	S ₂ Cl ₂		(Q)	Non-planar geometry
(C)	B ₂ H ₆		(R)	No lone pair
(D)	l ₂ Cl ₆		(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.



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 (Specien)	Column-II (Bond angle)
(A)	NO ⁺ ₂		(P) 180°	
(B)	NO ₂		(Q) 120°	
(C)	NO ₂		(R) 134°	
(D)	NO ₃		(S) 115°	
) 109°	



View Text Solution

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	Column-II
(A) $O(SiH_3)_2$	(P) Hybridization of central atom does not change due to back bonding
(B) Singlet CCl ₂	(Q) Bond angle of central atom increases due to combined effect of back bonding and steric factor
(C) H_4SiO_4	(R) Anyone of t _{2e} d-orbital is involved in back bonding
(D) $B(NMe_2)_3$	 (S) Electron density on central atom decreases due to back bonding (T) Electron density on central atom
	increases due to back bonding

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

Column-II.





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-I (Reactions)Column-II (Characteristics of final
products)(A) Formation of cation and anion by self
ionization of iodine(P) Lone pair(s) is/are present at central
atom(B) Attack of hydroxide ion on boric acid(P) Lone pair(s) is/are present at central
atom(C) Ba²⁺ (aq) + SO²/₄ (aq)
$$\longrightarrow$$

BaSO₄ \downarrow (white ppt.)(Q) d-orbital(s) involved in hybridization of
central atom of either of product(D)
MgSO₄ $\xrightarrow{T \times BOPC} \rightarrow MgO + SO_2 + \frac{1}{2}O_2$ (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)	Column-II (Characteristics)
(A) H ₄ SiO ₄	(P) Back bond
(B) H ₂ SeO ₄	(Q) Intermolecular hydrogen bond
(C) H ₁ BO ₁	(R) Hypovalent compound
(D) $H_2 NBF_2$	(\$) 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)	Column-I (Characteristics) The distribution of <i>s</i> -character in hybrid orbitals of central atom is not equal and all bond lengths (CA—X) are equivalent	Column-II (Species) (P) (CH ₃) ₂ O
(B)	The distribution of s-character in hybrid orbitals of central atom is equal and all bond lengths (CA— X) are equivalent	(Q) NH ₃
(C)	The distribution of s-character in hybrid orbitals of central atom is not equal and bond angle $(X-CA-X)$ is greater than $109^{\circ}28'$	(R) PBr ₄ ⁺
(D)	The distribution of s-character in hybrid orbitals of central atom is equal and bond angle $(X-CA-X)$ is either equal or less than $109^{\circ}28'$	(\$) H ₂ O
		(T) 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.

 Column
 Column-II

 (A) NH₂BF₂
 (P) Six-atoms are in same plane

 (B) Be₂Cl₄
 (Q) Polar (μ ≠ 0)

 (C) CH₂SF₄
 (R) Non-planar

 (D) IF₇
 (S) All 'CA--X' (X= halogen) bond lengths are identical

 (T) All surrounding atoms contain non-bonding electron pair (lone pair)

View Text Solution

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.

۲.		Colum	ın-l	Column-II	L.
	(A) Re ₂ Cl ²⁻			(P) $p\pi \cdot p\pi$ bonding	
	(B) NO 3			(Q) $p\pi - d\pi$ bonding	
	(C) SO 4			(R) $d\pi - d\pi$ bonding	
	(D) SO 3			(S) δ-bonding	



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.



View Text Solution

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) XeF; (B) MnO; (C) CH,	 (P)_Non-polar and planar (Q) Species having equal bond angle and bond length (D) Bath spicies is in the second second			
(D) 1 ₂ Cl ₆	 (S) All non-axial <i>d</i>-orbitals are involved in hybridisation 			

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)

- (A) p + p pure orbitals
- (B) s + p pure orbitals
- (C) (non-axial) d + p pure orbitals
- (D) (axial) d + p pure orbitals

Column-II (Types of molecular orbital)

- (P) σ bonding molecular orbital
- (Q) π anti-bonding molecular orbital
- (R) σ anti-bonding molecular orbital
- (S) π bonding molecular orbital
- (T) Non- bonding molecular orbital



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)		Column-II (Oxidation state of S-ate	om)
(A) H ₂ S ₄ O ₆		(P)	+6	
(B) H ₂ S ₂ O ₃		(Q)	+5	
(C) H ₂ SO ₅		(R)	0	
(D) H ₂ S ₂ O ₅		(S)	-2	
		(T)	+3	

Watch Video Solution

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-l			122.21
	C1	NULL	()

0.07	
(B)	CuSO ₄ ·5H ₂ O

- (C) HNC
- (D) Liquid H₂O₂

(P) Hydrogen bond(Q) Co-ordinate bond(R) Ionic bond

Column-II

(S) Covalent bond



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-IColumn-II(A) $B_3N_3H_6$ (P) Planar geometry(B) S_2Cl_2 (Q) Non-planar geometry(C) B_2H_6 (R) No lone pair(D) l_2Cl_6 (S) Non-polar molecule



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)	Column-II (Identical Property in pairs of species)
(A) PCl_3F_2 , PCl_2F_3	(P) Hybridisation of central atom
(B) BF ₃ and BCl ₃	(Q) Shape of molecule/ion
(C) CO ₂ and CN $\frac{1}{2}$	(R) µ (dipole moment)
(D) C_6H_6 and $B_3N_3H_6$	(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.



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 (Speci*1)		Column-II (Bond angle)
(A)	NO ⁺ ₂		(P)	180-
(B)	NO ₂		(Q)	120°
(C)	NO ₂		(R)	134*
(D)	NO ₃		(\$)	115°
			0	109°



ASSERTION-REASON TYPE QUESTIONS

1. Assertion : C_3O_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 $d_{x^2y^2}$ and py orbitals come close together along z-axis, then can form π - 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

3. Assertion : *BF*₃ undergoes in partial hydrolysis

Reason : Due to strong back bonding in BF_3 only two flouride groups have come out on nucleaophili attack by H_2O .

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



4. Assertion : The central catbon atom in $F_2C = C = CF_2$ and both carbo atoms in $F_2B - C = C - BF_2$ 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 PH_4^+ ion is relatively difficult in comparison to NH_4^+ ion.

Reason : Lone pair of phosphorus atom in 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



6. Assertion : Bond dissociation energy of B - F bond in BF_3 molecule is lower than C - F bond in 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

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 : PF_3 is stronger lewis base than PH_3 .

Reason : l.p. of P-atom in PF_3 molecule is present in sp^3 -hybrid orbital,

whereas l.p. of P-atom in 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

8. Assertion :NiO is less than CaO.

Reason : Ni^{2+} is pseudo noble gas configuration cation whereas 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



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., O_2F_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 NF_3 molecule is lower than that of in NCl_3 molecule.

Reason : Interelectronic repulsion exists between small size N and F atoms N - F bond of 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

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

11. Assertion:- If $d_{x^2y^2}$ and py orbitals come close together along z-axis,

then can form π - 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 : PbI_4 doesn't exist and converts into PbI_2 and I_2 spontaneously at room temperature but $PbCl_4$ needs heatin to convert into $PbCl_2$ and Cl_2 .

Reason : Pb^{2+} is more stable than 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 NF_3 is less than that of 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



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

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

17. Assertion : The unpaired electron of CH_3^{\bullet} free radical occupies p-oribtal.

Reason : CH_3^{\bullet} possesses sp^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

Answer: A

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): Na_2SO_4 is soluble in water while $BaSO_4$ is insoluble. Reason (R): Latice enthalpy of $BaSO_4$ 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: N_2 and NO^+ are both dia-magnetic.

Statement 2: NO^+ is isoelectronic with 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

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

23. Assertion: C_3O_2 has linear structure.

Reason: Each carbon atom in C_3O_2 in sp -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

24. Assertion : H-bonding occurs in H_2O 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

25. Assertion In case of $(CH_3)_3 N$ geometry is pyramidal but in case of $(SiH_3)_3 N$ 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 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



27. Assertion : The 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 H_2O .

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 $d_{x^2y^2}$ and py orbitals come close together along z-axis,

then can form π - 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

29. Assertion : The H-bond present in NH_3 dissolved in water is best represented by : H - NH | - H - OH | - H and not by $|_H$ 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

30. Assertion : C_3O_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

31. Assertion: If $d_{x^2-y^2}$ and p_y orbitals come close together along z-axis, then they can form π - 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 : *BF*₃ undergoes in partial hydrolysis

Reason : Due to strong back bonding in BF_3 only two flouride groups have come out on nucleaophili attack by H_2O .

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 $F_2C = C = CF_2$ and both carbo

atoms in $F_2B - C = C - BF_2$ 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 PH_4^+ ion is relatively difficult in comparison to NH_4^+ ion.

Reason : Lone pair of phosphorus atom in 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

35. Assertion : Bond dissociation energy of B - F bond in BF_3 molecule is

lower than C - F bond in 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

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

36. Assertion : PF_3 is stronger lewis base than PH_3 .

Reason : I.p. of P-atom in PF_3 molecule is present in sp^3 -hybrid orbital,

whereas l.p. of P-atom in 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



37. Assertion :NiO is less than CaO.

Reason : Ni^{2+} is pseudo noble gas configuration cation whereas 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

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_2F_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



39. Assertion : bond dissociation energy of N - F bond in NF_3 molecule is lower than that of in NCl_3 molecule.

Reason : Interelectronic repulsion exists between small size N and F atoms N - F bond of NF_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



40. Assertion : If $d_{x^2-y^2}$ and p_y orbitals come close together along z-axis, they can form π - 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

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 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

43. Assertion : PbI_4 doesn't exist and converts into PbI_2 and I_2 spontaneously at room temperature but $PbCl_4$ needs heatin to convert into $PbCl_2$ and Cl_2 .

Reason : Pb^{2+} is more stable than 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

44. Assertion : Dipole moment of NF_3 is less than that of 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

Answer: A

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 CH_3^{\bullet} free radical occupies poribtal.

Reason : CH_3^{\bullet} possesses sp^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): Na_2SO_4 is soluble in water while $BaSO_4$ is insoluble.

Reason (R): Latice enthalpy of $BaSO_4$ 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 NO^+ both are diamagnetic substances.

Reason : NO^+ is isoelectronic with 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



52. Assertion: C_3O_2 has linear structure.

Reason: Each carbon atom in C_3O_2 in sp -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 H_2O 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 : $(CH_3)_3 N$ geometry is pyramidal but in case $(SiH_3)_3 N$ 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 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

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

56. Assertion : The 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 H_2O .

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 π - 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

View Text Solution

58. Assertion : The H-bond present in NH_3 dissolved in water is best represented by : H - NH | - H - OH | - H and not by $|_H$ 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

SUBJECTIVE PROBLEMS

1. There are two groups of compounds A and B. Groups A contains three compounds Px_4 , Qy_3 , Rz_2 . Groups B also contains three compounds Sx_4 , Ty_3 , Uz_2 . Hybridization of each central atom of group A compounds is same as that of iodine in $IBrCl^-$ while in group B compounds it is same as that of iodine $IBrCl^+$. Substituents X, 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*) AX_{2n}^{n-} , (ii) AX_{3n} and (ii) AX_{4n}^{n+} , where central atom A is 15th group element and their maximum covalency is 3n. 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 x, 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)
$$s + p_x(x)$$
 (ii) $d_{xy} + d_{xy}(x)$ (iii) $d_{xy} + P_x(z)$ (iv) $s + s(z)$ (v) $d_{yz} + d_{yz}(x)$ (vi)
 $p_x + p_x(z)$ (vii) $d_{z^2} + d_{z^2}(z)$ (viii) $d_{xy} + d_{xy}(z)$ (ix) $p_x + p_x(y)$ (x) $s + p_z(x)$

Then calculate value of $a^2 + b^2 + 2cd$. (where $a = \sigma M. O., b = \pi M. O., C = \delta M. O., d=$ non-bonding M.O.)

View Text Solution

4. Consider the following six changes

(i) $NO \rightarrow NO^+$ (ii) $O_2^- \rightarrow O_2^{2^-}$ (iii) $O_2 \rightarrow O_2^+$ (iv) $NO^+ \rightarrow NO^-$ (v) $NO^+ \rightarrow NO^{2^+}$ (vi) $CO \rightarrow CO^+$

Then calculate value of $c^2 - b^2 - a^2$ ", where a, b and c are total number of transformation in which magnetic property will be changed, bond order increase and bond order decrease respectively.

Watch Video Solution

5. When B_2H_4 is allowed to react with following lewis bases, then how many given lewis bases form adduct through symmetrical cleavage of B_2H_6 ?

 NH_3 , $MeNH_3$, pyridine, CO, T.H.F., PH_3 , PF_3 , Me_3N , Me_3NH

View Text Solution

6. Consider the following elements A, B, C and D and their outer electronic configurtions are ns^2np^1 , ns^2np^3 , ns^2np^4 and ns^2np^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) CE_4 (ii) BD_2E_3 (iii) DE_3 (iv) DE_2 (v) BD_3E_2 (vi) C_2E_2 (vii)DE (viii) A_2D_6 .

Then calculate the value of x+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) $C_{x+2} O_{y+1}$ 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 sp^2 and hybridized carbon atoms respectively in given four
compounds.



8. Total number of species among following which can use any one t_{2q} d-

orbital in back bondin. $H_4SiO_4, H_2NBF_2, O\left(SiH_3\right)_2, Cl_2, N\left(SiH_3\right)_2, (NB)_x, R_3PO, P_4O_{10}, Cl_3^-$

View Text Solution

9. Calculate expression (x + y + z) for diatomic molecules.

where x=Total number of singly occupied molecular orbital (SOMO) in O_2 .

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:

 $B_2, O_2, N_2^-, C_2, NO, OF, N_2^{2-}, BN$

Watch Video Solution

11. Consider the following table

Compounds (X are monovalent surrounding atoms)		Central atoms(A to D) belong to group	Characteristics of compounds	Number of lone pair(s) at central atom
(i)	AX 2	16	Planar and polar	m,
(iii)	BX "2	15	Trigonal pyramidal	/m ₂
(iii)	α.,	14	Zero dipole moment	m 3
(iv)	DX "	13	All X — D — X bond angle are 120°	π4

Than calculate value of experssion

$$\left|\frac{n_1 + n_2 + n_3 + n_4}{m_1 + m_2 + m_3 + m_4}\right|^2$$

Watch Video Solution

12. Total number of species among following, in which bond angle is equal to or less than $109^{\circ}28'$ and also they act as lewis base :

$$NH_3$$
, NMe_3 , $O(SiH_3)_2$, ICl_4^- , XeO_3 , BF_2Cl , SiF_4 , AsH_3 , SO_2F_2

Watch Video Solution

13. Total number of unpaired electrons(s) present in both cationic and

anionic part of compound $O_2[PtF_6]$.



14. Total number of species which has/ have symmetrical electronic distribution in their HOMO and also paramagnetic.

 $N_2^+, O_2^{2-}, C_2, O_2, B_2, C_2^{2-}, N_2^{2-}.$



18. Total number of molecules which can form H-bond among themselves.

SiH₃OH, HCN, B(OMe)₃, NHMe₂, CH₃CONH₂, HCHO, HCOOH, NH₂OH, H₄SiC

Watch Video Solution

19. Consider two covalent compounds AL_{n_1} and BL_{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 $(n_1 - n_2)^2$.

[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 $H_2C_2I_2$ if C - I

bond length is 2.35Å. $(\sin 60^\circ = 0.866)$

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.



22. Number of hybrid orbital C atoms which have 33% p-character in $C(CN)_4$.

Watch Video Solution

23. Max. no. of equal P - O bonds in $P_2O_7^{4-}$ ion is :

24. Consider the following species:

(i) CH_3^+ (ii) $(C_3H_5)_3Al$

(iii) HCHO

(iv) *CH*₄

- $(\mathsf{v})\left(C_2H_5\right)_3N$
- (vI) $TiCl_4$
- (vii) CO₂

(viii) SiCl₄

(ix) BF_3

the find out total number of species which can act as Lewis acid.

O 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) IF_5 (ii) ClI_4^- (iii) XeO_2F_2 (iv) NH_2^- (v) BCl_3 (vi) $BeCl_2$ (vii) $AsCl_4^+$ (viii) $B(OH)_3$ (ix) NO_2^- (x) 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



and total number of sp^3 hybridised atoms respectively in given molecule.

Watch Video Solution

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

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:

$$PO_4^{3-}, P_2O_6^{4-}, SO_4^{2-}, MnO_4^{-}, CrO_4^{2-}, S_2O_5^{2-}, S_2O_7^{2-}$$

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 X-O bonds per central atom.

R=Number of oxy anions having four equivalent X-O bonds per central atom.

Watch Video Solution

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



31. Consider the following compounds and Calculate the value of

$$\left(\frac{P^2 - Q^2}{R + S}\right)$$

(i)BeF (ii)ICl (iii)BeF₃ (iv)BrF₅ (v)ICl₃ (vi)IF₃ (vii)IF₅ (viii)IF₇,

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.



32. Consider the following compounds

(1) H_3CF (2) H_2CF_2 (3) CH_4 (4) H_3CCF_3 (5) CH_3CH_3 (6) C_2H_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°28′ and Y is the total number of compounds which have H - C - H bond angles greater than 109°28′ and less than 120°



33. There are some species given below :-

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

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

Watch Video Solution

34. Following compounds A and B have similar structure with delocalization of π -electrons system. (A) $\left(PNCl_2\right)_{x/2}$ (B)(CH)_x

If value of x is 6, then calculate value of "P+Q", where 'P' is total no. of σ -
bonds in compounds A and B and 'Q' is total no. of π bonds in compounds

A and B.

Watch Video Solution

35. The hybridization of central atoms of compounds A, B, C and D are $sp^{3}d$, sp^{3} , sp^{2} and sp 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 P, Q, R, and S are number of lone pairs on central atoms of compounds A, B, C and D respectively.

Watch Video Solution

36. In compound PCl_xF_{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).



37. There are two groups of compounds A and B. Groups A contains three compounds Px_4 , Qy_3 , Rz_2 . Groups B also contains three compounds Sx_4 , Ty_3 , Uz_2 . Hybridization of each central atom of group A compounds is same as that of iodine in $IBrCl^-$ while in group B compounds it is same as that of iodine $IBrCl^+$. Substituents X, 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

38. Consider the following three compounds $(i)AX_{2n}^{n-}$, $(ii)AX_{3n}$ and (ii) AX_{4n}^{n+} , where central atom A is 15th group element and their maximum covalency is 3n. 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 x, 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) $d_{xy} + d_{xy}(x)$ (iii) $d_{xy} + P_x(z)$ (iv) $s + s(z)$ (v) $d_{yz} + d_{yz}(x)$ (vi)
 $p_x + p_x(z)$ (vii) $d_{z^2} + d_{z^2}(z)$ (viii) $d_{xy} + d_{xy}(z)$ (ix) $p_x + p_x(y)$ (x) $s + p_z(x)$
Then calculate value of $a^{(2)+b^{(2)+2cs.}}$ (where $a = \sigma M. O., b = \pi M. O., C = \delta M. O.$, d=non-bonding M.O.)

View Text Solution

40. Consider the following sic changes

(i) $NO \rightarrow NO^+$ (ii) $O_2^- \rightarrow O_2^{2^-}$ (iii) $O_2 \rightarrow O_2^+$ (iv) $NO^+ \rightarrow NO^-$ (v) $NO^+ \rightarrow NO^{2^+}$ (vi) $CO \rightarrow CO^+$

Then calculate value of $c^2 - b^2 - a^2$ ", where a, 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_2H_4 is allowed to react with following lewis bases, then how many given lewis bases form adduct through symmetrical cleavage of B_2H_6 ?

 NH_3 , $MeNH_3$, pyridine, CO, T.H.F., PH_3 , PF_3 , Me_3N , Me_3NH

View Text Solution

42. Consider the following elements A, B, C and D and their outer electronic configurtions are ns^2np^1 , ns^2np^3 , ns^2np^4 and ns^2np^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) CE_4 (ii) BD_2E_3 (iii) DE_3 (iv) DE_2 (v) BD_3E_2 (vi) C_2E_2 (vii)DE (viii) A_2D_6 . Then calculate the value of x+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 sp^2 and hybridized carbon atoms respectively in given four compounds.



44. Total number of species among following which can use any one t_{2q} d-

orbital in back bondin. $H_4SiO_4, H_2NBF_2, O\left(SiH_3\right)_2, \mathbb{C}l_2, N\left(SiH_3\right)_2, (NB)_x, R_3PO, P_4O_{10}, \mathbb{C}l_3^-$



45. Calculate expression (x + y + z) for diatomic molecules.

where x=Total number of singly occupied molecular orbital (SOMO) in O_2 .

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:

 $B_2, O_2, N_2^-, C_2, NO, OF, N_2^{2-}, BN$

Watch Video Solution

47. Consider the following table

Compounds (X are monovalent surrounding atoms)		Central atoms(A to D) belong to group	Characteristics of compounds	Number of lone pair(s) at central atom
(i)	AX 2	16	Planar and polar	m,
(iii)	BX "2	15	Trigonal pyramidal	/m 2
(iii)	α.,	14	Zero dipole moment	m 3
(iv)	DX "	13	All X — D — X bond angle are 120°	π4

Than calculate value of experssion

$$\left|\frac{n_1 + n_2 + n_3 + n_4}{m_1 + m_2 + m_3 + m_4}\right|^2$$

Watch Video Solution

48. Total number of species among following, in which bond angle is equal to or less than $109^{\circ}28'$ and also they act as lewis base :

$$NH_3$$
, NMe_3 , $O(SiH_3)_2$, ICl_4^- , XeO_3 , BF_2Cl , SiF_4 , AsH_3 , SO_2F_2

Watch Video Solution

49. Total number of unpaired electrons(s) present in both cationic and

anionic part of compound $O_2[PtF_6]$.



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 , $C_2^{2^-}$, $N_2^{2^-}$.



54. Total number of molecules which can form H-bond among themselves.

SiH₃OH, HCN, B(OMe)₃, NHMe₂, CH₂CONH₂, HCHO, HCOOH, NH₂OH, H₄SiC

View Text Solution

55. Consider two covalent compounds AL_{n_1} and BL_{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 $(n_1 - n_2)^2$.

[Where n_1 and n_2 are number of monovalent surrounding atom (L)]

Watch Video Solution

56. Calculate the I - I distance in (Å) for given compound $H_2C_2I_2$ if C - I

bond length is 2.35Å. $(\sin 60^\circ = 0.866)$

57. 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. **58.** Number of hybrid orbital C atoms which have 33% p-character in $C(CN)_4$.



60. Consider the following species:

(i) *CH*₃⁺

(ii)
$$\left(C_3H_5\right)_3Al$$

(iii) HCHO

(iv) CH_4

 $\text{(v)} \left(C_2 H_5 \right)_3 N$

(vI) $TiCl_4$

(vii) CO₂

(viii) SiCl₄

(ix) BF_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) IF_5 (ii) CII_4^- (iii) XeO_2F_2 (iv) NH_2^-

(v) BCl_3 (vi) $BeCl_2$ (vii) $AsCl_4^+$ (viii) $B(OH)_3$

(ix) NO_2^- (x) 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.



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

Watch Video Solution

64. Consider the following orbitals (i) $3p_x$ (ii) $4d_{x^2}$ (iii) $3d_{x^2-y^2}$ (iv) $3d_{yz}$ 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 :

 PO_4^{3-} , $P_2O_6^{4-}$, SO_4^{2-} , MnO_4^{-} , CrO_4^{2-} , $S_2O_5^{2-}$, $S_2O_7^{2-}$ and find the value of R + Q - P

where

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

R=Number of oxy anions having four equivalent

X - O bonds per central atom

View Text Solution

66. Consider the following three compounds $(i)AX_{2n}^{n-}$, $(ii)AX_{3n}$ and $(ii) AX_{4n}^{n+}$, where central atom A is 15th group element and their maximum covalency is 3n. 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 x, 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)BeF₃ (iv)BrF₅ (v)ICl₃ (vi)IF₃ (vii)IF₅ (viii)IF₇,

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) H_3CF (2) H_2CF_2 (3) CH_4 (4) H_3CCF_3 (5) CH_3CH_3 (6) C_2H_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°28′ and Y is the total number of compounds which have H - C - H bond angles greater than 109°28′ and less than 120°

Watch Video Solution

69. There are some species given below. (i) O_2^+ (ii)CO (iii) B_2 (iv) O_2^- (v) NO^+

(vi) He_2^+ (vii) C_2^{2+} (vii) CN^- (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 π -electrons system. $(A)(PNCl_2)_{x/2}$ (B)(*CH*)_x If value of x is 6, then calculate value of "P+Q", where 'P' is total no. of σ -bonds in compounds A and B and 'Q' is total no. of π bonds in compounds A and B and 'Q' is total no. of π bonds in compounds A and B.

View Text Solution

71. The hybridization of central atoms of compounds A, B, C and D are $sp^{3}d$, sp^{3} , sp^{2} and sp 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 P, Q, 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 PCl_xF_{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).

