

CHEMISTRY

BOOKS - VK JAISWAL ENGLISH

CHEMICAL BONDING (ADVANCED)

Level 1

1. On decreasing intermolecular distance below the optimum distance (where potential energy is minimum), there is steep 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 finding bonding electrons near to either of nuclei

D. Increase in interelectronic and internuclear repulsion

Answer: D

 [Watch Video Solution](#)

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

(I) $H_2S_2O_6$ (II) $H_2S_2O_3$ (III) $H_2S_2S_5$

A. I, II and III

B. II, I and III

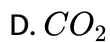
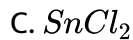
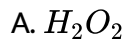
C. II, III and I

D. I, III and II

Answer: C

 [Watch Video Solution](#)

3. C_2H_2 is isostructural with



Answer: D



Watch Video Solution

4. The shapes of nitrite and nitrile respectively are:

A. Linear and angular

B. Angular and linear

C. Both angular

D. Both linear

Answer: B

 [Watch Video Solution](#)

5. Linear structure is assumed by:

(I) $NC\bar{O}$ (II) CS_2 (III) $\overset{+}{N}O_2$ (IV) Solid BeH_2

A. all four

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

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

D. (II) and (III)

Answer: C

 [Watch Video Solution](#)

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 NO_2

C. N_2O and NO_2

D. NO_2 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_4O_{10} , SO_3

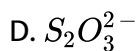
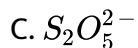
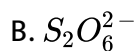
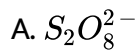
C. P_3O_{10} , P_4O_6

D. Diamond, SiO_2

Answer: D

 [Watch Video Solution](#)

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



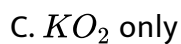
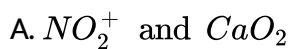
Answer: A



Watch Video Solution

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

in :



D. CaO_2 only

Answer: C

 [Watch Video Solution](#)

10. Structure of S_2Cl_2 is analogous to :

A. $SOCl_2$

B. CO_2

C. H_2S

D. H_2O_2

Answer: D

 [Watch Video Solution](#)

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 s-character in the hybrid orbitals is nearly:

A. 0.25

B. 0.33

C. 0.5

D. 0.66

Answer: B

 [Watch Video Solution](#)

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

IS :

A. sp^2 , sp^2

B. sp^3 , sp^2

C. sp^3 , sp^3

D. sp^2 , sp^3

Answer: B

 [Watch Video Solution](#)

14. In NO_2 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. Cl_3PO
- C. Br_3PO
- D. $(CH_3)_3PO$

Answer: A

 [Watch Video Solution](#)

16. O_2F_2 is an unstable yellow orange 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

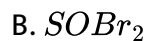
C. 1.22Å, 1.22Å

D. 1.48Å, 1.48Å

Answer: B

 [Watch Video Solution](#)

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



D. All have same length

Answer: B



[Watch Video Solution](#)

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

A. 90° and 180°

B. 120°

C. 90°

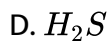
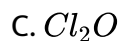
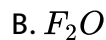
D. 180°

Answer: A



Watch Video Solution

19. Which of the following has largest bond angle ?



Answer: C



Watch Video Solution

20. The boiling points of noble gases are illustrative of the operation of forces of the type :

- A. ion-dipole
- B. dipole-induced dipoles
- C. ion-induced dipole
- D. London dispersion forces

Answer: D

 [Watch Video Solution](#)

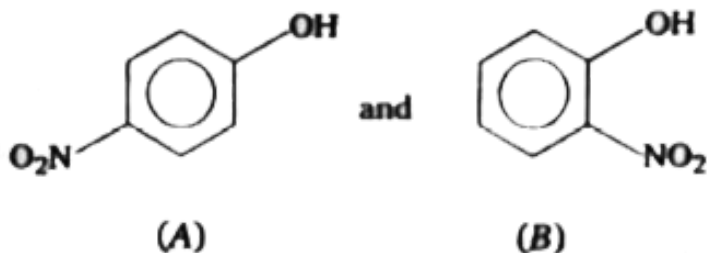
21. Among the following, which has the lowest enthalpy of fusion?

- A. Fluorine
- B. Hydrogen
- C. Chlorine
- D. Helium

Answer: D

 [Watch Video 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 $65^{\circ}C$, $100^{\circ}C$ and $34.5^{\circ}C$. Which of the following best explains these wide variations in b.p. ?

- A. The molecular mass increases from water (18) to methanol(32) to dimethyl ether(74)
- B. The extent of H-bonding decreases from water to methanol while it is absent in ether

C. The extent of intramolecular H-bonding decreases 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 dimethyl 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

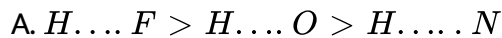
C. is same as that of covalent bonds

D. can be less greater or same as that of covalent bonds

Answer: B

 [Watch Video Solution](#)

26. The correct order of the strength of H-bonds is :



Answer: A



Watch Video Solution

27. o-nitrophenol can be easily steam distilled whereas p-nitrophenol cannot be. This is because of :

A. Strong intermolecular hydrogen bonding in o-nitrophenol

B. Strong intramolecular hydrogen bonding in o-nitrophenol

C. Strong intramolecular hydrogen bonding in p-nitrophenol

D. dipole moment of p-nitrophenol is larger than that of o-nitrophenol

Answer: B

 [Watch Video Solution](#)

28. What is not true about ice ?

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

Answer: D

 [Watch Video Solution](#)

29. 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 air into the water during the melting process

Answer: B



[Watch Video 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-directional ?

A. NCl_3

B. $RbCl$

C. $BeCl_2$

D. BCl_3

Answer: B

 [Watch Video Solution](#)

32. Which of the following when dissolved in water forms a solution which is non-conducting?

- A. Green vitriol
- B. Chile or Indian salt petre
- C. Alcohol
- D. Potash alum

Answer: C



Watch Video Solution

33. Which of the following statements about LiCl 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_6H_6 ($\epsilon = 0$)

B. $(CH_3)_2CO$ ($\epsilon = 2$)

C. CH_3OH ($\epsilon = 32$)

D. CCl_4 ($\epsilon = 0$)

Answer: C

 [Watch Video Solution](#)

37. Among $LiCl$, $RbCl$, $BeCl_2$, $MgCl_2$, the compounds with greatest and least ionic character respectively are

- A. $LiCl$ and $RbCl$
- B. $RbCl$ and $BeCl_2$
- C. $RbCl$ and $MgCl_2$
- D. $MgCl_2$ and $BeCl_2$

Answer: B



[Watch Video Solution](#)

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

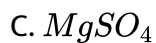
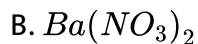
- A. $NaCl$
- B. $MgCl_2$
- C. $AgCl$
- D. $CsCl$

Answer: C



Watch Video Solution

39. The salt having the least solubility in water is :

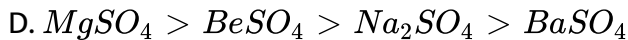
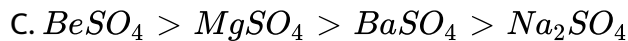
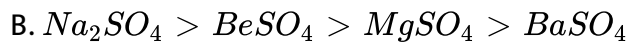
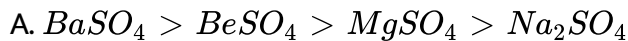


Answer: D



Watch Video Solution

40. The solubility of Na_2SO_4 , $BeSO_4$, $MgSO_4$ and $BaSO_4$ will follow the order



Answer: B

 [Watch Video Solution](#)

41. "Solubility of alkali metal fluorides increases down the group " Select correct explanation for given statement :

A. Hydration energy increases and lattice energy decreases 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

 [Watch Video Solution](#)

43. The melting point of $RbBr$ is $682^{\circ}C$, while that of NaF is $988^{\circ}C$.

The principle reason that melting point of NaF is much higher than that of $RbBr$ is that :

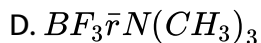
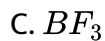
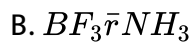
- A. The molar mass of NaF is smaller than that of $RbBr$
- B. The bond of $RbBr$ has more covalent character than the bond in NaF
- C. The difference in electronegativity between Rb and Br is smaller than the difference between Na and F
- D. The inter-nuclear distance, $r_c + r_a$ is greater for $RbBr$ than for NaF

Answer: D



[Watch Video Solution](#)

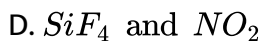
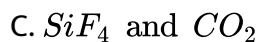
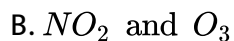
44. In which of the following compounds B-F bond length is shortest?



Answer: C

 [Watch Video Solution](#)

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



Answer: B

 [Watch Video Solution](#)

46. The observed dipole moment of HCl is $1.03D$. If the bond length of HCl is 1.275\AA , then the percent ionic character of $H - Cl$ bond is

- A. 0.6
- B. 0.39
- C. 0.29
- D. 0.17

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. $p > o > m$

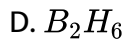
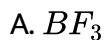
C. $m > o > p$

D. $o > m > p$

Answer: D

 [Watch Video Solution](#)

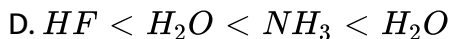
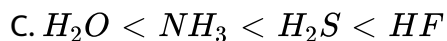
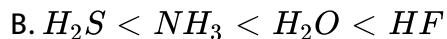
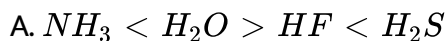
48. Which of the following molecule has highest dipole moment?



Answer: B

 [Watch Video Solution](#)

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

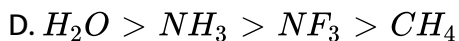
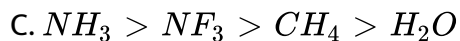
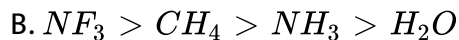
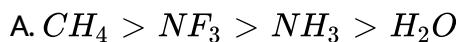


Answer: B



Watch Video Solution

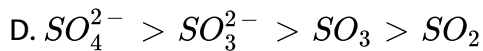
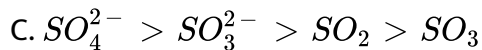
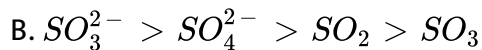
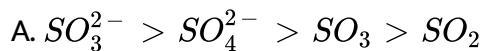
50. The correct order of dipole moment is :



Answer: A

 [Watch Video Solution](#)

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



Answer: B

 [Watch Video Solution](#)

52. What is not true about resonance?

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

 [Watch Video Solution](#)

55. For compounds ,

A : Tetracyanoethene

B : Carbon dioxide

C: Benzene

D : 1, 3-Butadiene .

Ratio of σ and π bonds is in order :

A. $A = B < C < D$

B. $A = B < D < C$

C. $A = B = C = D$

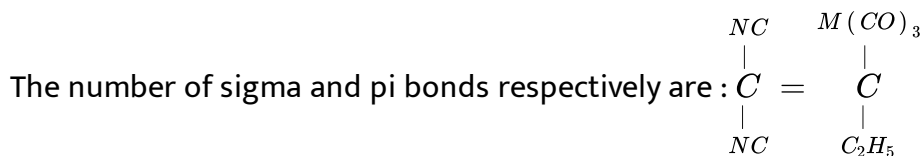
D. $C < C < A < B$

Answer: A



Watch Video Solution

56. In a compound



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^+

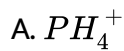
B. BF_4^-



Answer: C

 [Watch Video Solution](#)

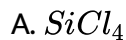
58. Which of the following does not contain coordinate bond?



Answer: D

 [Watch Video Solution](#)

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



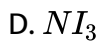
Answer: D



[Watch Video Solution](#)

60. Which of the following trihalides of nitrogen behaves as weakest base?

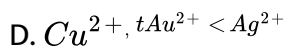




Answer: A

 Watch Video Solution

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



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
- D. 6

Answer: B



Watch Video Solution

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

- | | | | | | |
|----|------------|----------------|-----------|-------------------|------------------|
| A. | Al_2Cl_6 | $Al_2(CH_3)_6$ | AlF_3 | Dimer of $BeCl_2$ | Dimer of BeH_2 |
| | <i>IC</i> | <i>IC</i> | <i>IC</i> | <i>C</i> | <i>C</i> |
| B. | Al_2Cl_6 | $Al_2(CH_3)_6$ | AlF_3 | Dimer of $BeCl_2$ | Dimer of BeH_2 |
| | <i>C</i> | <i>IC</i> | <i>IC</i> | <i>C</i> | <i>IC</i> |
| C. | Al_2Cl_6 | $Al_2(CH_3)_6$ | AlF_3 | Dimer of $BeCl_2$ | Dimer of BeH_2 |
| | <i>C</i> | <i>IC</i> | <i>C</i> | <i>IC</i> | <i>IC</i> |

D. Al_2Cl_6 $Al_2(CH_3)_6$ AlF_3 Dimer of $BeCl_2$ Dimer of BeH_2
IC *C* *IC* *IC* *IC*

Answer: C

 [Watch Video Solution](#)

64. In which of the following metal to metal bond is present ?

- A. Cupric chloride
- B. Stannous chloride
- C. Mercurous chloride
- D. Mercuric chloride

Answer: C

 [Watch Video Solution](#)

65. On decreasing intermolecular distance below the optimum distance (where potential energy is minimum), there is steep 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 finding bonding electrons near to either of nuclei
- D. Increase in interelectronic and internuclear repulsion

Answer: D



[Watch Video Solution](#)

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

(I) $H_2S_2O_6$ (II) $H_2S_2O_3$ (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

 [Watch Video Solution](#)

67. C_2H_2 is isostructural with :

A. H_2O_2

B. NO_2

C. $SnCl_2$

D. CO_2

Answer: D

 [Watch Video Solution](#)

68. The shapes of nitrite and nitrile respectively are:

- A. Linear and angular
- B. Angular and linear
- C. Both angular
- D. Both linear

Answer: B



[Watch Video Solution](#)

69. Linear structure is assumed by:

(I) NCO (II) CS_2 (III) $\overset{+}{N}O_2$ (IV) Solid BeH_2

- A. all four
- B. (II), (III) and (IV)
- C. (I), (II) and (III)

D. (II) and (III)

Answer: C

 [Watch Video 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 NO_2

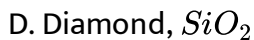
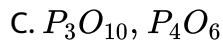
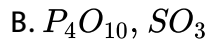
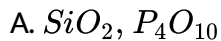
C. N_2O and NO_2

D. NO_2 and its dimer

Answer: B

 [Watch Video Solution](#)

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

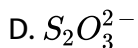
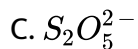
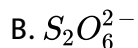
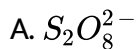


Answer: D



Watch Video Solution

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



Answer: A

 [Watch Video Solution](#)

73. 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 $KAlO_2$

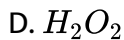
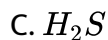
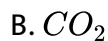
C. KO_2 only

D. CaO_2 only

Answer: C

 [Watch Video Solution](#)

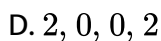
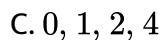
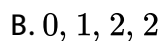
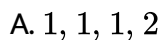
74. Structure of S_2Cl_2 is analogous to :



Answer: D

 [Watch Video Solution](#)

75. Number of P-H, P-O-P, P-O-H and P-O bonds in sodium dihydrogen pyrophosphate respectively are:



Answer: C

 [Watch Video Solution](#)

76. Two hybrid orbitals have a bond angle of 120° . The percentage of s-character in the hybrid orbitals is nearly:

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. sp^2, sp^2

B. sp^3 , sp^2

C. sp^3 , sp^3

D. sp^2 , sp^3

Answer: B

 [Watch Video Solution](#)

78. In NO_2 molecule N atom undergoes in :

A. sp^3 hybridization

B. sp^2 hybridization

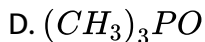
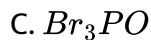
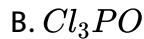
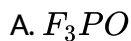
C. sp hybridization

D. sp^2d hybridization

Answer: B

 [Watch Video Solution](#)

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

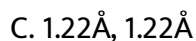
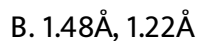
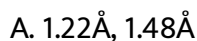


Answer: A



[Watch Video Solution](#)

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 :



D. 1.48\AA , 1.48\AA

Answer: B

 [Watch Video Solution](#)

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

A. SOCl_2

B. SOBr_2

C. SOF_2

D. All have same length

Answer: B

 [Watch Video Solution](#)

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

A. 90° and 180°

B. 120°

C. 90°

D. 180°

Answer: A



[Watch Video Solution](#)

83. Which of the following has largest bond angle ?

A. H_2O

B. F_2O

C. Cl_2O

D. H_2S

Answer: C

 [Watch Video Solution](#)

84. The boiling points of noble gases are illustrative of the operation of forces of the type :

- A. ion-dipole
- B. dipole-induced dipoles
- C. ion-induced dipole
- D. London dispersion forces

Answer: D

 [Watch Video Solution](#)

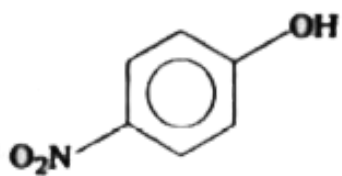
85. Among the following, which has the lowest enthalpy of fusion?

- A. Flourine
- B. Hydrogen
- C. Chlorine
- D. Helium

Answer: D

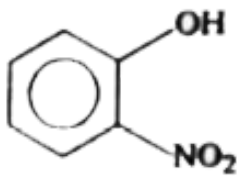
 [Watch Video Solution](#)

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



(A)

and



(B)

- A. higher than that of A
- B. lower than that of A

C. same as that of A

D. can be higher or lower depending upon the size of the vessel

Answer: A

 [Watch Video Solution](#)

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°C , 100°C and 34.5°C . Which of the following best explains these wide variations in b.p. ?

- A. The molecular mass increase from water (18) to methanol(32) to diethyl ether(74)
- B. The extent of H-bonding decrease from water too methanol while it is absent in ether
- C. The extent of intramolecular H-bondin decrease from ether to methanol to water
- D. The density of water is $1.00\text{g} \cdot \text{mL}^{-1}$, methanol $0.7914\text{g} \cdot \text{mL}^{-1}$ and that of diethyl ether is $0.7137\text{g} \cdot \text{mL}^{-1}$

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



Watch Video Solution

90. The correct order of the strength of H-bonds is :

- A. $H \dots F > H \dots O > H \dots N$
- B. $H \dots N > H \dots O > H \dots F$
- C. $H \dots O > H \dots N > H \dots F$
- D. $H \dots F > H \dots N > H \dots O$

Answer: A



[Watch Video Solution](#)

91. o-nitrophenol can be easily steam distilled whereas p-nitrophenol cannot be. This is because of :

- A. Strong intermolecular hydrogen bonding in o-nitrophenol
- B. Strong intramolecular hydrogen bonding in o-nitrophenol
- C. Strong intramolecular hydrogen bonding in p-nitrophenol
- D. dipole moment of p-nitrophenol is larger than that of o-nitrophenol

Answer: B



[Watch Video Solution](#)

92. What is not true about ice ?

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

Answer: D

 [Watch Video Solution](#)

93. When ice melts to form liquid water at 0°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 air into the water during the melting process

Answer: B



Watch Video Solution

94. In an ionic compound A^+X^- the degree of covalent bonding is greatest when

- A. A^+ and X^- ion are small
- B. A^+ is small and X^- is large
- C. A^+ and X^- ions are approximately of the same size
- D. X^- is small and A^+ is large

Answer: B



Watch Video Solution

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

A. NCl_3

B. $RbCl$

C. $BeCl_2$

D. BCl_3

Answer: B



Watch Video Solution

96. Which of the following when dissolving in water forms a solution which is non-conducting?

A. Green vitriol

B. Chile or Indian salt petre

C. Alcohol

D. Potash alum

Answer: C

 [Watch Video Solution](#)

97. Which of the following statements about LiCl 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](#)

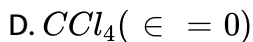
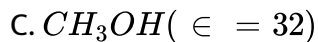
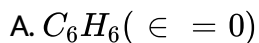
99. The stability of ionic crystal principally depends on :

- 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](#)

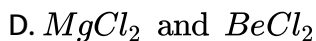
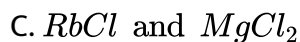
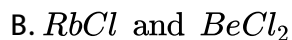
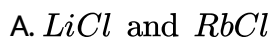
100. In which of the following solvents, KI has highest solubility?



Answer: C

 [Watch Video Solution](#)

101. Amongst $LiCl$, $RbCl$, $BeCl_2$ and $MgCl_2$, the compounds with the greatest and the least ionic character respectively are :



Answer: B

 [Watch Video Solution](#)

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

- A. $NaCl$
- B. $MgCl_2$
- C. $AgCl$
- D. $CsCl$

Answer: C

 [Watch Video Solution](#)

103. The salt having the least solubility in water is :

- A. $BaCl_2$
- B. $Ba(NO_3)_2$
- C. $MgSO_4$

D. $BaSO_4$

Answer: D

 [Watch Video Solution](#)

104. The solubility of Na_2SO_4 , $BeSO_4$, $MgSO_4$ and $BaSO_4$ in water follow the order :

A. $BaSO_4 > BeSO_4 > MgSO_4 > Na_2SO_4$

B. $Na_2SO_4 > BeSO_4 > MgSO_4 > BaSO_4$

C. $BeSO_4 > MgSO_4 > BaSO_4 > Na_2SO_4$

D. $MgSO_4 > BeSO_4 > Na_2SO_4 > BaSO_4$

Answer: B

 [Watch Video Solution](#)

105. "Solubility of alkali metal fluorides 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](#)

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

 [Watch Video Solution](#)

107. The melting points RbBr is $682^{\circ}C$, while that of NaF is 988° . 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 smaller than the difference between Na and F

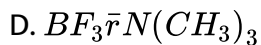
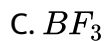
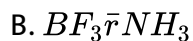
D. the intermolecular distance, $r_c + r_a$ is greater for RbBr than for

NaF

Answer: D

 [Watch Video Solution](#)

108. In which of the following compounds B-F bond length is shortest?



Answer: C

 [Watch Video Solution](#)

109. Which of the following is wheat fruit?

A. NO_2 and CO_2

B. NO_2 and O_3

C. SiF_4 and CO_2

D. SiF_4 and NO_4

Answer: B



Watch Video Solution

110. The observed dipole moment of HCl is 1.03 D. If the H-Cl bond length is 1.275 Å, calculate the per cent ionic character in HCl.

A. 0.6

B. 0.39

C. 0.29

D. 0.17

Answer: D

 [Watch Video Solution](#)

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

:

A. $o > p > m$

B. $p > o > m$

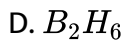
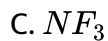
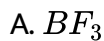
C. $m > o > p$

D. $o > m > p$

Answer: D

 [Watch Video Solution](#)

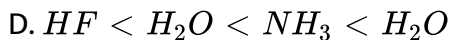
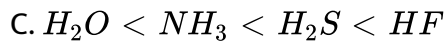
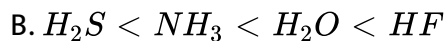
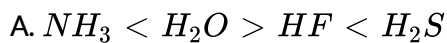
112. Which of the following molecules has highest dipole moment ?



Answer: B

 [Watch Video Solution](#)

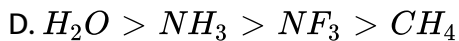
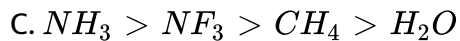
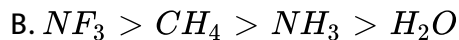
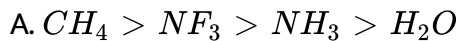
113. In terms of polar of the following order is correct ?



Answer: B

 [Watch Video Solution](#)

114. The correct order of the dipole moment is :

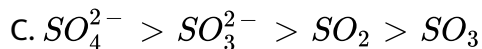
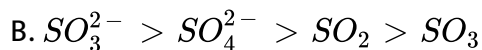
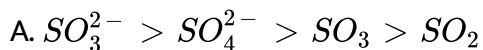


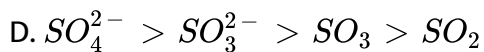
Answer: A



Watch Video Solution

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





Answer: B

 [Watch Video Solution](#)

116. What is not true about resonance?

- 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 experimental 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



Watch Video Solution

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 :
$$\begin{array}{c} NC \\ | \\ C \\ | \\ NC \end{array} = \begin{array}{c} M(CO)_3 \\ | \\ C \\ | \\ C_2H_5 \end{array}$$

A. 19, 11

B. 19, 5

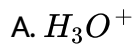
C. 13, 11

D. 7, 3

Answer: A

 Watch Video Solution

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

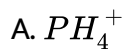


Answer: C



Watch Video Solution

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

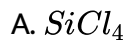


Answer: D



Watch Video Solution

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



Answer: D



Watch Video Solution

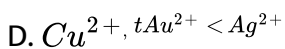
124. Amongst the following trihalides, which one is least basic?



Answer: A

 [Watch Video Solution](#)

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



Answer: C

 [Watch Video 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

 Watch Video Solution

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

- | | | | | | |
|----|------------|----------------|---------|-------------------|------------------|
| A. | Al_2Cl_6 | $Al_2(CH_3)_6$ | AlF_3 | Dimer of $BeCl_2$ | Dimer of BeH_2 |
| | IC | IC | IC | C | C |
| B. | Al_2Cl_6 | $Al_2(CH_3)_6$ | AlF_3 | Dimer of $BeCl_2$ | Dimer of BeH_2 |
| | C | IC | IC | C | IC |

C.	Al_2Cl_6	$Al_2(CH_3)_6$	AlF_3	Dimer of $BeCl_2$	Dimer of BeH_2
	C	IC	C	IC	IC
D.	Al_2Cl_6	$Al_2(CH_3)_6$	AlF_3	Dimer of $BeCl_2$	Dimer of BeH_2
	IC	C	IC	IC	IC

Answer: C

 [Watch Video Solution](#)

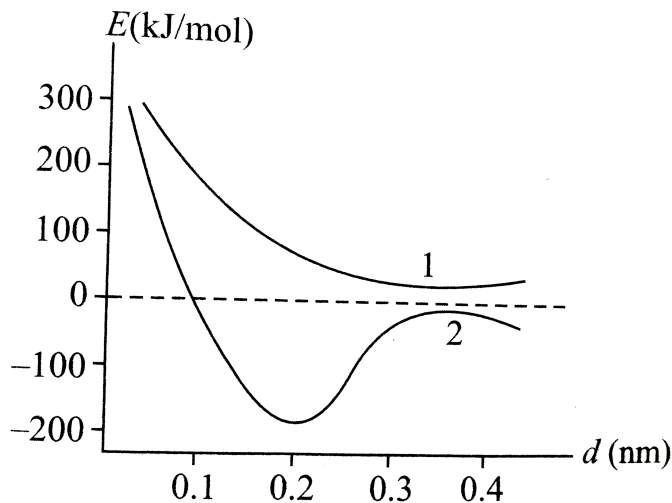
128. In Which of the following metal to metal bond is present?

- A. Cupric chloride
- B. Stannous chloride
- C. Mercurous chloride
- D. Mercuric chloride

Answer: C

 [Watch Video Solution](#)

1. Consider the given figure showing the formation of H_2^+ ion depending on internuclear distance versus potential energy of the system.



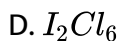
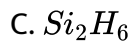
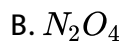
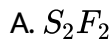
- A. Curve-1 represents the most stable state of the system for H_2^+
- B. Curve-2 represents the most stable state of the system for H_2^+
- C. Curve-1 indicates that the molecular hydrogen ion is formed
- D. Curve-2 represents the energy level of the antibonding region

Answer: B



Watch Video Solution

2. Molecule having non-polar as well as polar bonds but the molecule as a whole is polar:



Answer: A



[Watch Video Solution](#)

3. Choose the correct statement regarding $SeOCl_2$ molecule :

A. It does not contain plane of symmetry

B. Cl-Se-Cl' bond angle is greater than 'Cl-Se-O' bond angle

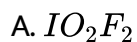
C. Lone pair has greater than 33.% s-character

D. Central atom used one d-orbital in bonding

Answer: D

 [Watch Video Solution](#)

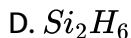
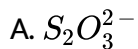
4. In which species $X - O$ bond order is 1.5 and contains $p\pi - d\pi$ bond (s)



Answer: A

 [Watch Video Solution](#)

5. Which of the following species has polar and non-polar bonds but molecule as a whole is non-planar?



Answer: D

 [Watch Video Solution](#)

6. The incorrect statement (s) regarding $\text{C}(\text{X})_3$

A. If electronegativity of surrounding element X is less than 2.5, then central carbon atom used almost 33% s-character in their hybrid bonding orbital

B. If electronegativity of surrounding element X is less than 2.5, then central carbon atom used almost 25% s-character in their hybrid bonding orbital

C. If X is F, then species should be polar and pyramidal

D. If X is H, then species should be polar and planar

Answer: D



Watch Video Solution

7. Consider following compounds,

(i) $H_3X - HCS$ (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



Watch Video Solution

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

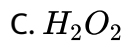
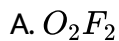
- A. In singlet carbene, carbon is sp^2 -hybridized whereas in triplet carbene, carbon is sp -hybridized
- B. Triplet carbene is less stable than singlet carbene
- C. Stability order of singlet halocarbene is $:CHF > CHCl > CHBr$
- D. None of the above

Answer: B



Watch Video Solution

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

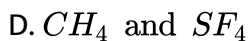
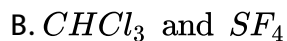


Answer: B



Watch Video Solution

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



Answer: B

 [Watch Video Solution](#)

11. When iodine is dissolved in aqueous potassium iodide, the shape of the species formed is :

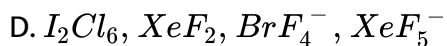
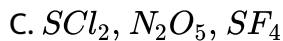
- A. linear
- B. angular
- C. triangular
- D. see-saw

Answer: A

 [Watch Video Solution](#)

12. Which of the following set of species have planar structure?

- A. I_3^- , CH_3 , Cl_3^- , SiF_6^{2-}
- B. I_3^+ , ICl_4^- , Al_2Cl_6 , $TeCl_4$



Answer: D

 [Watch Video Solution](#)

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) Triplet methylene

A. (IV) and (V)

B. (I) and (III)

C. (I) and (II)

D. II, IV and V

Answer: C

 [Watch Video Solution](#)

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) $(CH_3)_2P(CF_3)_3$ is non-palar and $(CH_3)_3P(CF_3)_2$ is polar molecule

(II) $\widehat{CH_3PCH_3}$ bond angle are equal in $(CH_3)_3P(CF_3)_2$ molecule

(III) PF_3 will be more soluble in polar solvent than SiF_4

A. TTF

B. FFT

C. FFF

D. FTT

Answer: D

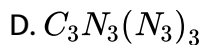
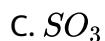
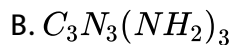
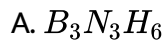


Watch Video Solution

15. The correct sequence of polarity of the following molecule

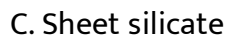
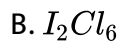
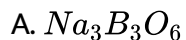
(1) Benzene (2) Inorganic Benzene (3) PCl_3F_2 (4) PCl_2F_3

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



Answer: D

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



D. Inorganic graphite layer

Answer: C

 [Watch Video Solution](#)

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. One in 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

 [Watch Video Solution](#)

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

A. +6, +5, 0

B. +6, +6, +6

C. +6, +4, +2

D. +6, +2, 0

Answer: A

 [Watch Video Solution](#)

21. 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

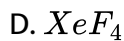
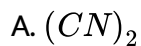
C. all tetrahedral units

D. all triangular units

Answer: A

 [Watch Video Solution](#)

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



Answer: D

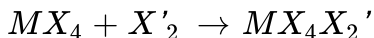
 Watch Video Solution

23. 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

24. Consider the following reactions:



If atomic number of M is 52 and X and X' are halogens and X' is more electronegative than X. Then choose the correct statement regarding the given information:





- A. Both X' atoms occupy axial positions which are formed by overlapping 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



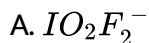
Watch Video Solution

25. Select the Incorrect statements:

	Statement	Shape	Example
(a)	Bond pair has > 75% p-character		HF
(b)	Reduction in axial bond angle is more than that of in equatorial bond angle		SF ₄
(c)	Two axial d-orbitals and one non-axial d-orbital are used in hybridization		XeF ₅ ⁻
(d)	Two p-orbitals are used in hybridization		SnCl ₂

 [Watch Video Solution](#)

26. In which of the following species, d-orbitals having xz and yz two nodal planes involved in hybridization of central atoms?

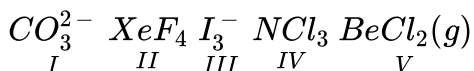


D. None of these

Answer: C

 Watch Video Solution

27. 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) :



A. $II < III < IV < I < V$

B. $II < IV < III < V < I$

C. $III < II < I < V < IV$

D. $II < IV < III < I < V$

Answer: A

 Watch Video Solution

28. 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

29. 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

 Watch Video Solution

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

Molecule	P—X(axial) bond length	P—X(Equatorial) bond length
PF ₅	<i>a</i>	<i>b</i>
PF ₄ CH ₃	<i>c</i>	<i>d</i>
PF ₃ (CH ₃) ₂	<i>e</i>	<i>f</i>
PCl ₅	<i>g</i>	<i>h</i>

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

A. $g > a > d > b$

B. $g > e > f > b$

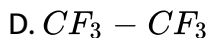
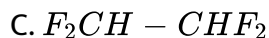
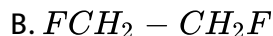
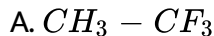
C. $f > d > a > b$

D. $c > f > d > b$

Answer: C

 Watch Video Solution

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



Answer: B



Watch Video Solution

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

(I) In N_2F_4 , d-orbitals are contracted by electronegative fluorine 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_2H_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](#)

33. The correct order of equatorial FSF bond angle in the following compound.

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

A. $III > II > I$

B. $I > III > II$

C. $I > II > III$

D. $II > III > I$

Answer: D

 Watch Video Solution

34. Incorrect orders of bond angle is :

A. $OCl_2 > SF_2 > AsH_3 > H_2Se$

B. $NH_3 > PF_3 > PH_3 > H_2S$

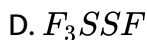
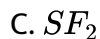
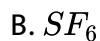
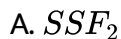
C. $XeO_4 > ClO_4^- > SO_4^{2-} > CF_4$

D. $N(SiH_3)_3 > O(SiH_3)_2 > OMe_2$

Answer: C::D

 Watch Video Solution

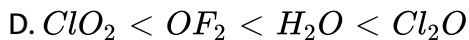
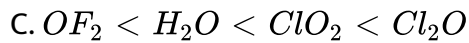
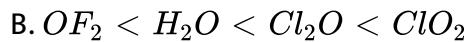
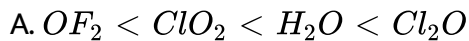
35. Minimum $F - S - F$ bond angle present in :



Answer: D

 [Watch Video Solution](#)

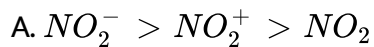
36. The correct order of increasing bond angle is



Answer: B

 [Watch Video Solution](#)

37. The correct order for bond angles is :

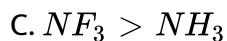
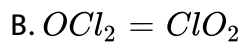
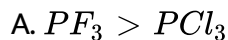


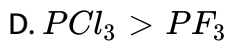
Answer: D



Watch Video Solution

38. Which one is correct for bond angle?





Answer: D

 [Watch Video Solution](#)

39. In molecules of the type AX_2I_n (where I 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 increases
- B. Always increase if n increases
- C. Will be maximum for $n=3$
- D. Generally decrease if n decreases

Answer: C

 [Watch Video Solution](#)

40. Which of the following solid has maximum melting points?

A. $NaCl$

B. Ice

C. Dry ice

D. SiO_2

Answer: D



Watch Video Solution

41. The melting point of AlF_3 is $104^\circ C$ and that of SiF_4 is $-77^\circ C$ (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 give a three dimensional structure but in SiF_4 no such

interaction is possible

C. the silicon ion in the tetrahedral SiF_4 is not shielded effectively from the fluoride 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](#)

42. The correct order of boiling point is:

A. $T_2 < D_2 > H_2$

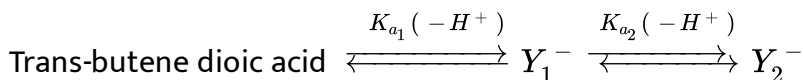
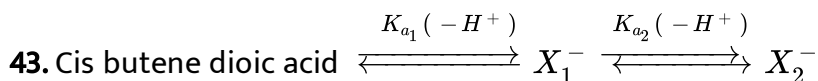
B. n-pentane < neo-pentane

C. $Xe < Ar < He$

D. m-nitrophenol > o-nitrophenol

Answer: D

 [Watch Video Solution](#)



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

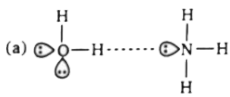
C. K_{a_1} is greater than K'_{a_1}

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

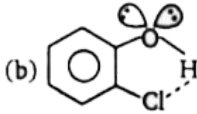
Answer: B

 [View Text Solution](#)

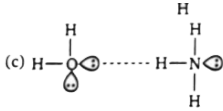
44. Which of the following is not a best representation of the H-bond?



A.



B.



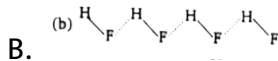
C.

D. None

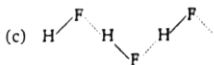
Answer: C

 Watch Video Solution

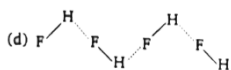
45. The H-Bonds in solid HF can be best represented as :



B.



C.

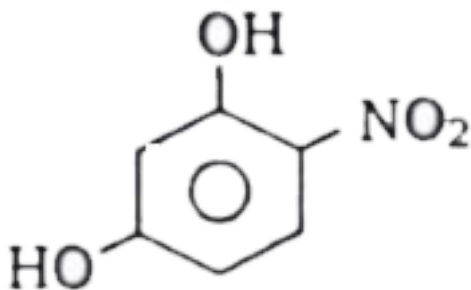


D.

Answer: C

 [Watch Video Solution](#)

46. 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

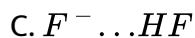
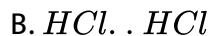
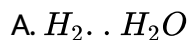
D. All of these

Answer: D



Watch Video Solution

47. Which of the following interaction lies in the range of 8-42kJ/mol?

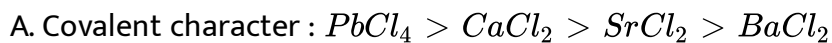


Answer: D



Watch Video Solution

48. The incorrect order is :



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

 [Watch Video Solution](#)

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

A. Yellow

B. Red

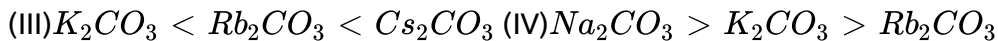
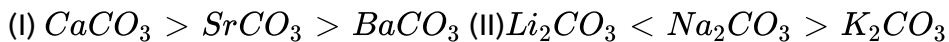
C. Blue

D. cannot be predicted

Answer: D

 [Watch Video Solution](#)

50. The correct solubility order is/are



A. II, IV

B. I, IV

C. II, III, IV

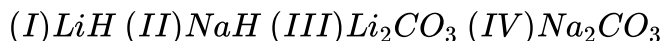
D. I, II, III

Answer: D



Watch Video Solution

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



A. II, III

B. I, II, III

C. I, III

D. III, IV

Answer: A

 Watch Video Solution

52. Both $N(\text{SiH}_3)_3$ and $NH(\text{SiH}_3)_2$ compounds have trigonal planar skeleton. Incorrect statement about both compounds is :

A. SiNSi bond angle in $NH(\text{SiH}_3)_2 > \text{SiNSi}$ bond angle in $N(\text{SiH}_3)_3$

B. $N - \text{Si}$ bond length in $NH(\text{SiH}_3)_2 > N - \text{Si}$ bond length in $N(\text{SiH}_3)_3$

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

 [Watch Video Solution](#)

53. 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 OCl_2 molecule

B. $Si - O - Si$ bond angle in $O(SiH_3)_2$ is greater than $Cl - O - Cl$ bond angle in OCl_2

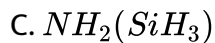
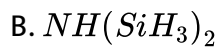
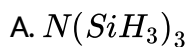
C. The nature of back in both molecules is $2p_x - 3d_\pi$

D. Hybridisation of central O-atom in both molecules is same

Answer: D

 [Watch Video Solution](#)

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

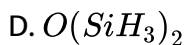
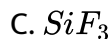
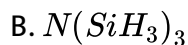


D. All have equal $N - Si$ bond length

Answer: C

 [Watch Video Solution](#)

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

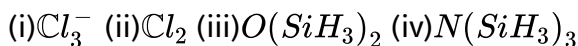


Answer: A



[Watch Video Solution](#)

56. "hybridization of central atom does not always change due to back bonding". This statement is valid for which of the following compounds?



A. (i) and (ii)

B. (i) and (iii)

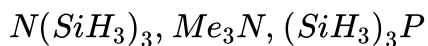
C. (ii) and (iii)

D. All

Answer: A

 [Watch Video Solution](#)

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



A. planar, pyramidal, planar

B. planar, pyramidal, pyramidal

C. pyramidal, pyramidal, pyramidal

D. pyramidal, planar, pyramidal

Answer: B

 [Watch Video Solution](#)

58. 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

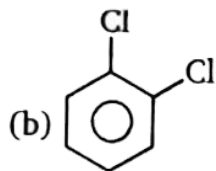


Watch Video Solution

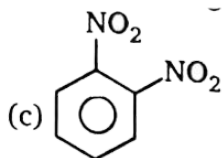
59. In which of the following molecules μ (observed) is found to be greater than μ (theoretical):

A. $CHCl_3$

B. 



C.



D.

Answer: D

 [Watch Video Solution](#)

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

:



Answer: A

 [Watch Video Solution](#)

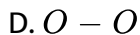
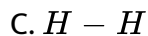
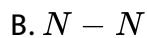
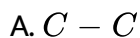
61. Which of the following compounds has dipole moment approximately equal to that of chlorobenzene?

- A. o-dichlorobenzene
- B. m-dichlorobenzene
- C. p-dichlorobenzene
- D. p-chloronitrobenzene

Answer: B

 [Watch Video Solution](#)

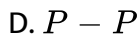
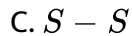
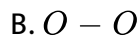
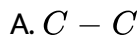
62. Which of the following bonds have lowest bond energy?



Answer: D

 [Watch Video Solution](#)

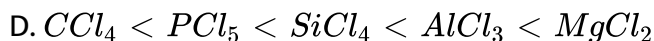
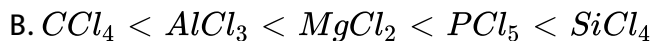
63. The bond having the minimum bond energy is :



Answer: B

 [Watch Video Solution](#)

64. Arrange in increasing order of extent of hydrolysis $[CCl_4, MgCl_2, AlCl_3, PCl_5, SiCl_4]$.



Answer: A



Watch Video Solution

65. 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](#)

66. Select the correct statements about hydrolysis of BCl_3 and NCl_3 :

A. NCl_3 is hydrolysed and gives HOCl but BCl_3 is not hydrolysed

B. Both NCl_3 and BCl_3 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](#)

67. The incorrect statement regarding molecular orbital (s) is :

- A. If there is a nodal plane perpendicular to the internuclear 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 corresponding orbitals is (π) 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



Watch Video Solution

68. Which of the following species absorb maximum energy in its *HOMO* – *LUMO* electronic transition?

A. O_2

B. N_2^-

C. C_2

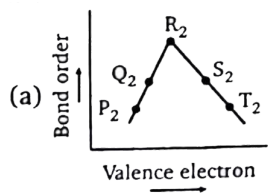
D. N_2

Answer: D

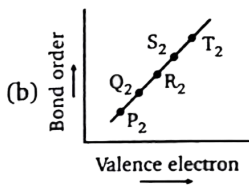
 Watch Video Solution

69. If P to T are second period p-block elements then which of the following graph show correct relation between valence electrons in

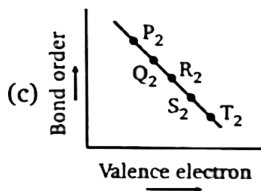
$P_2 \rightarrow T_2$



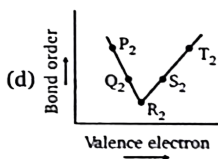
A.



B.



C.



D.

Answer: A

 [Watch Video Solution](#)

70. 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 $2\frac{1}{2}$

(III) 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



[Watch Video Solution](#)

71. 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

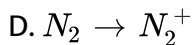
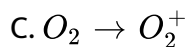
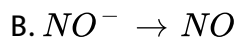
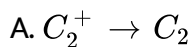
C. In O_2^+ , the paramagnetism decrease

D. N_2^+ becomes diamagnetic

Answer: D

 [Watch Video Solution](#)

72. In which of the following transformations, the bond order has increased and the magnetic behaviour has changed?



Answer: A

 [Watch Video Solution](#)

73. H.O.M.O (Highest Occupied Molecular Orbital) of CO molecular is :

A. Non-bonding M.O. with slight antibonding character

B. Non-bonding M.O. with slight bonding character

C. Pure non-bonding M.O.

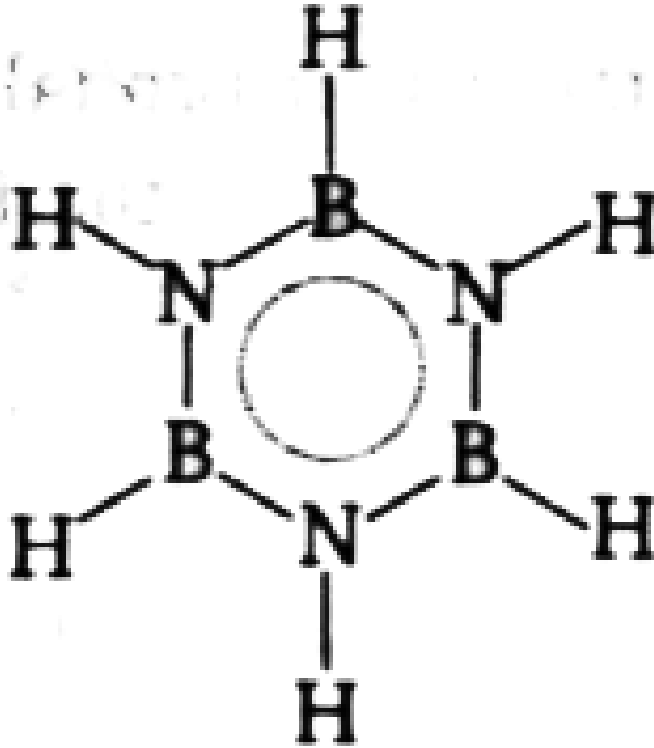
D. None of above

Answer: A



Watch Video Solution

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



How many 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

 [Watch Video Solution](#)

75. Correctly match is:

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

B. p_y atomic orbital -Two nodal planes

C. σ_{p_x} - ψ (gerade)

D. Π_{p_y} - ψ (ungerade)

Answer: C

 [Watch Video Solution](#)

76. 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_{a1} of fumaric acid is higher than maleic acid but reverse is true for their K_{a2}

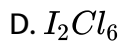
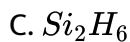
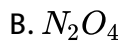
Answer: C



Watch Video Solution

77. Molecule having non-polar as well as polar bonds but the molecule as a whole is polar

A. S_2F_2



Answer: A

 [Watch Video Solution](#)

78. Choose the correct statement regarding $SeOCl_2$ molecule :

A. It does not contain plane of symmetry

B. Cl-S-Cl' bond angle is greater than 'Cl-Se-O' bond angle

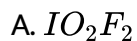
C. Lone pair has greater than 33.% s-character

D. Central atom used one d-orbital in bonding

Answer: D

 [Watch Video Solution](#)

79. In which species, X-O bond order is 1.5 and contains $p\pi - d\pi$ bond(s)

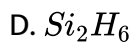
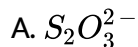


Answer: A



Watch Video Solution

80. Which of the following species has polar and non-polar bonds but molecule as a whole is non-polar?



Answer: D



Watch Video Solution

81. The incorrect statement (s) regarding $\text{C}(\text{X})_3$

- A. If electronegativity of surrounding element X is less than 2.5, then central carbon atom used almost 33% s-character in their hybrid bonding orbital
- B. If electronegativity of surrounding element X is less than 2.5, then central carbon atom used almost 25% s-character in their hybrid bonding orbital
- C. If X is F, then species should be polar and pyramidal
- D. If X is H, then species should be polar and planar

Answer: D



View Text Solution

82. Consider following compounds,



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



[Watch Video Solution](#)

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

A. In singlet 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 :

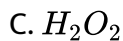
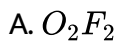


D. None of the above

Answer: B

 [Watch Video Solution](#)

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



Answer: B

 [Watch Video Solution](#)

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

- A. $CHCl_3$ only
- B. $CHCl_3$ and SF_4
- C. CH_4
- D. CH_4 and SF_4

Answer: B

 [Watch Video Solution](#)

86. 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](#)

87. Which of the following set of species have planar structure?

- A. I_3^- , CH_3 , Cl_3^- , SiF_6^{2-}
- B. I_3^+ , ICl_4^- , Al_2Cl_6 , $TeCl_4$
- C. SCl_2 , N_2O_5 , SF_4
- D. I_2Cl_6 , XeF_2 , BrF_4^- , XeF_5^-

Answer: D

 [Watch Video Solution](#)

88. 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

89. Given the correct order of initials T or F for following statements. Use

T if statements is true and F if it is false:

(I) $(CH_3)_2P(CF_3)_3$ is non-polar and $(CH_3)_3P(CF_3)_2$ is polar molecule

(II) $\widehat{CH_3PCH_3}$ bond angle are equal in $(CH_3)_3P(CF_3)_2$ molecule

(III) PF_3 will be more soluble in polar solvent than SiF_4

A. TTF

B. FFT

C. FFF

D. FTT

Answer: D



[Watch Video Solution](#)

90. The correct sequence of polarity of the following molecule

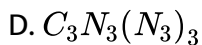
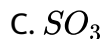
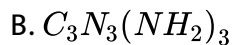
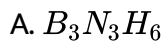
(1) Benzene (2) Inorganic Benzene

(3) PCl_3F_2 (4) PCl_2F_3



[Watch Video Solution](#)

91. Which among the following molecules is not perfect flat?

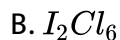
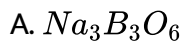


Answer: B



Watch Video Solution

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



C. Sheet silicate

D. Inorganic graphite layer

Answer: C

 [Watch Video Solution](#)

93. 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. One in 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

 [Watch Video Solution](#)

94. 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

95. 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](#)

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

A. +6, + 5, 0

B. +6, + 6, + 6

C. +6, + 4, + 2

D. +6, + 2, 0

Answer: A

 [Watch Video Solution](#)

97. 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



[Watch Video Solution](#)

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

- A. $(CN)_2$
- B. OCN^-
- C. XeF_2
- D. XeF_2

Answer: D

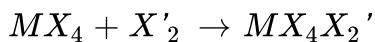
 [Watch Video Solution](#)

99. 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](#)

100. Consider the following reactions:



If atomic number of M is 52 and X and X' are halogens and X' is more electronegative than X. Then choose the correct statement regarding the given information:

- A. Both X' atoms occupy axial positions which are formed by overlapping 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 d-orbitals in hybridization of final product

D. Hybridization of central atom 'M' remains same in both reactant and final product

Answer: C

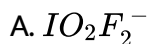
 [Watch Video Solution](#)

101. Select the correct statements:

	Statement	Shape	Example
(a)	Bond pair has > 75% p-character		HF
(b)	Reduction in axial bond angle is more than that of in equatorial bond angle		SF ₄
(c)	Two axial d-orbitals and one non-axial d-orbital are used in hybridization		XeF ₅ ⁻
(d)	Two p-orbitals are used in hybridization		SnCl ₂

 [View Text Solution](#)

102. In which of the following species, d-orbitals having xz and yz two nodal planes involved in hybridization of central atoms?



D. None of these

Answer: C

 [Watch Video Solution](#)

103. 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. $II < IV < III < V < I$

C. $III < II < I < V < IV$

D. $II < IV < III < I < V$

Answer: A

 [Watch Video Solution](#)

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

A. tetrahedral, sp^3

B. tetrahedral, d^3s

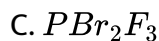
C. square planar, dsp^2

D. square planar, sp^3

Answer: B

 [Watch Video Solution](#)

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



Answer: A

 Watch Video Solution

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

Molecule	P—X(axial) bond length	P—X(Equatorial) bond length
PF_5	a	b
PF_4CH_3	c	d
$PF_3(CH_3)_2$	e	f
PCl_5	g	h

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

A. $g > a > d > b$

B. $g > e > f > b$

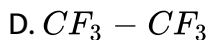
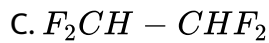
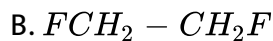
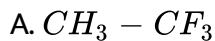
C. $f > d > a > b$

D. $c > f > d > b$

Answer: C

 [View Text Solution](#)

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



Answer: B

 [Watch Video Solution](#)

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

(I) In N_2F_4 , d-orbitals are contracted by electronegative fluorine 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_2H_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](#)

109. The correct order of equatorial FSF bond angle in the following compound.

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

A. $III > II > I$

B. $I > III > II$

C. $I > II > III$

D. $II > III > I$

Answer: D

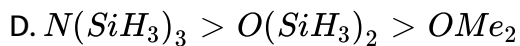
 [Watch Video Solution](#)

110. Incorrect orders of bond angle is :

A. $OCl_2 > SF_2 > AsH_3 > H_2Se$

B. $NH_3 > PF_3 > PH_3 > H_2S$

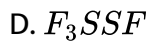
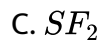
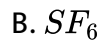
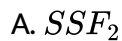
C. $XeO_4 > ClO_4^- > SO_4^{2-} > CF_4$



Answer: C::D

 [Watch Video Solution](#)

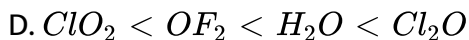
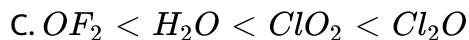
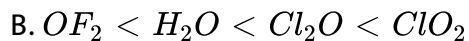
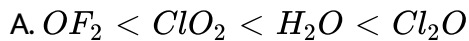
111. Minimum $F - S - F$ bond angle present in :



Answer: D

 [Watch Video Solution](#)

112. The correct order of increasing bond angle is



Answer: B

 [Watch Video Solution](#)

113. Bond energies can be obtained by using the following relation:

$$\Delta H(\text{reaction}) = \sum \text{Bond energy of bonds, broken in the reactants} \\ - \sum \text{Bond energy fo bonds, formed in the products}$$

Bond energy depends on three factors:

- Greater is the bond length, lesser is the bond energy.
- Bond energy increases with the bond multiplicity.
- Bond energy increases with electronegativity difference between the bonding atoms.

Arrange $N - H$, $O - H$, and $F - H$ bonds in the decreasing order of bond energy.

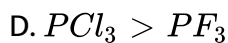
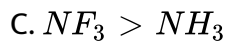
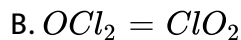
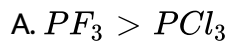


Answer: D



Watch Video Solution

114. Which one is correct for bond angle?



Answer: D



Watch Video Solution

115. In molecules of the type AX_2I_n (where I 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

116. Which of the following solid has maximum melting points?

A. $NaCl$

B. Ice

C. Dry ice

D. SiO_2

Answer: D

 [Watch Video Solution](#)

117. 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 give a three dimensional 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 fluoride 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](#)

118. The correct order of boiling point is:

A. $T_2 < D_2 > H_2$

B. n-pentane < neo-pentane

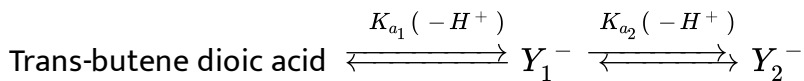
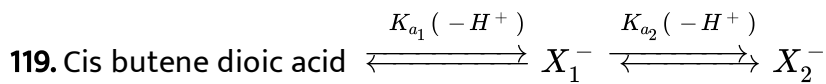
C. $Xe < Ar < He$

D. m-nitrophenol > o-nitrophenol

Answer: D



Watch Video Solution



The incorrect statement regarding above information is:

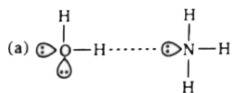
- A. X_2^{2-} species is more basic than Y_2^{2-} species
- B. X_1^- species is more basic than Y_1^- species
- C. K_{a_1} is greater than K'_{a_1}
- D. K_{a_2} is greater than K'_{a_2}

Answer: B

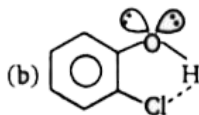


View Text Solution

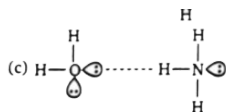
120. Which of the following is not a best representation of the H-bond?



A.



B.



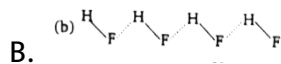
C.

D. None

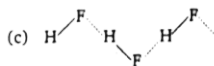
Answer: C

Watch Video Solution

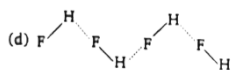
121. The H-bonds in solid HF can be best represented as :



B.



C.

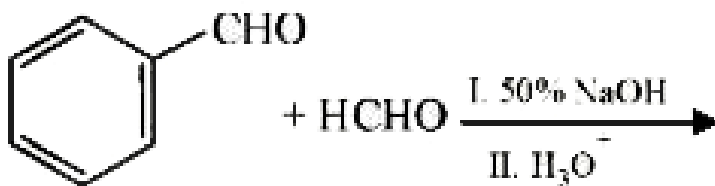


D.

Answer: C

 [Watch Video Solution](#)

122. Major product of the following reactions is

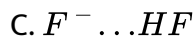
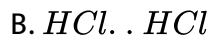
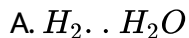


- A. Intermolecular H-bonding
- B. Intramolecular H-bonding
- C. van der waal's force
- D. All of these

Answer: D

 [Watch Video Solution](#)

123. Which of the following interaction lies in the range of 8-42kJ/mol?



Answer: D



Watch Video Solution

124. Assertion (*A*): The presence of CO_2 in the air accelerates corrosion.

Reason (*R*): CO_2 is a poisonous gas.

A. Yellow

B. Red

C. Blue

D. cannot be predicted

Answer: D

 [Watch Video Solution](#)

125. 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

 [Watch Video Solution](#)

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

(I) LiH (II) NaH (III) Li_2CO_3 (IV) Na_2CO_3

A. II, III

B. I, II, III

C. I, III

D. III, IV

Answer: A



Watch Video Solution

127. 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 $\text{NH}(\text{SiH}_3)_2 > \text{SiNSi}$ bond angle in $\text{N}(\text{SiH}_3)_3$

B. $\text{N} - \text{Si}$ bond length in $\text{NH}(\text{SiH}_3)_2 > \text{N} - \text{Si}$ bond length in $\text{N}(\text{SiH}_3)_3$

C. $\text{N} - \text{Si}$ bond length in $\text{NH}(\text{SiH}_3)_2 < \text{N} - \text{Si}$ bond length in $\text{N}(\text{SiH}_3)_3$

D. Back bonding strength in $\text{NH}(\text{SiH}_3)_2 > \text{Back bonding strength in } \text{N}(\text{SiH}_3)_3$

Answer: B



[Watch Video Solution](#)

128. The incorrect statement regarding $\text{O}(\text{SiH}_3)_2$ and OCl_2 molecule is/are

- A. The strength of back bonding is more in $O(SiH_3)_2$ molecule than OCl_2 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

 [Watch Video Solution](#)

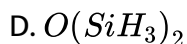
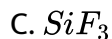
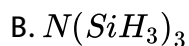
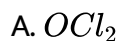
129. Among following molecule $N - Si$ bond length is shortest:

- 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](#)

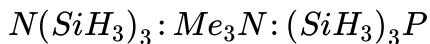
130. Which of the following molecule has weakest ($p\pi - d\pi$) back bonding?



Answer: A

 [Watch Video Solution](#)

131. The geometry with respect to the central atom of the following molecules are :



- A. planar, pyramidal, planar
- B. planar, pyramidal, pyramidal
- C. pyramidal, pyramidal, pyramidal
- D. pyramidal, planar, pyramidal

Answer: B

 [Watch Video Solution](#)

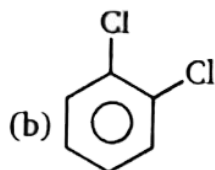
132. Incorrect statement regarding BF_3NH_3 molecule is :

- 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

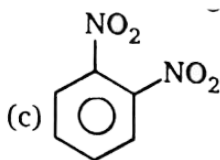
Answer: D

133. In which of the following molecules $\mu(\text{observed})$ is found to be greater than μ (theoretical):

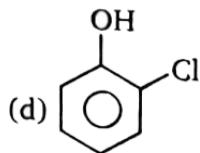
A. CHCl_3



B.



C.



D.

Answer: D

134. Among the following, the molecule with the highest dipole moment is :



Answer: A



Watch Video Solution

135. Which of the following is wheat fruit?

A. o-dichlorobenzene

B. m-dichlorobenzene

C. p-dichlorobenzene

D. p-chloronitrobenzene

Answer: B

 [Watch Video Solution](#)

136. Which of the following is wheat fruit?

A. $C - C$

B. $N - N$

C. $H - H$

D. $O - O$

Answer: D

 [Watch Video Solution](#)

137. The bond having the minimum bond energy is :

A. $C - C$

B. $O - O$

C. $S - S$

D. $P - P$

Answer: B

 [Watch Video Solution](#)

138. The correct increasing order of extent of hydrolysis is

A. $CCL_4 < MgCl_2 < AlCl_3 < SiCl_4 < PCl_5$

B. $CCL_4 < AlCl_3 < MgCl_2 < PCl_5 < SiCl_4$

C. $CCL_4 < SiCl_4 < PCl_5 < AlCl_3 < MgCl_2$

D. $CCL_4 < PCl_5 < SiCl_4 < AlCl_3 < MgCl_2$

Answer: A

 [Watch Video Solution](#)

139. Inorganic benzene reacts with HCl to form a compound $B_3N_3H_9Cl_3$

. The protonation occurs at:

- A. B-atom
- B. N-atom
- C. First at B-atom then rearranges into N-atom
- D. first at N-atom then rearranges into B-atom

Answer: B

 [Watch Video Solution](#)

140. Select the correct statements about hydrolysis of BCl_3 and NCl_3 :

- A. NCl_3 is hydrolysed and gives HOCl but BCl_3 is not hydrolysed
- B. Both NCl_3 and BCl_3 on hydrolysis give HCl
- C. NCl_3 on hydrolysis give HOCl but BCl_3 gives HCl
- D. Both NCl_3 and BCl_3 on hydrolysis give HOCl

Answer: C



Watch Video Solution

141. The incorrect statement regarding molecular orbital (s) is :

- A. If there is a nodal plane perpendicular to the internuclear 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 corresponding orbitals is (π) 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

 [Watch Video Solution](#)

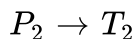
142. Which of the following species absorb maximum energy in its *HOMO* – *LUMO* electronic transition?

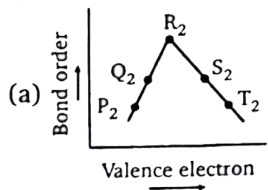


Answer: D

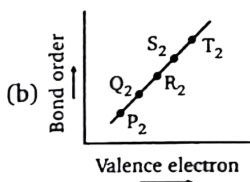
 [Watch Video Solution](#)

143. If P to T are second period p-block elements then which of the following graph show correct relation between valence electrons in

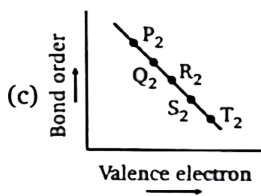




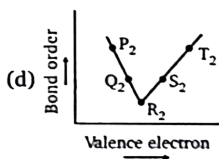
A.



B.



C.



D.

Answer: A

 Watch Video Solution

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

(l) 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



[Watch Video Solution](#)

145. 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

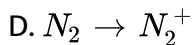
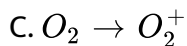
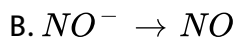
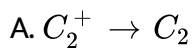
C. In O_2^+ , the paramagnetism decrease

D. N_2^+ becomes diamagnetic

Answer: D

 [Watch Video Solution](#)

146. In which of the following transformations, the bond order has increased and the magnetic behaviour has changed?



Answer: A

 [Watch Video Solution](#)

147. H.O.M.O (Highest Occupied Molecular Orbital) of CO molecular is :

A. Non-bonding M.O. with slight antibonding character

B. Non-bonding M.O. with slight bonding character

C. Pure non-bonding M.O.

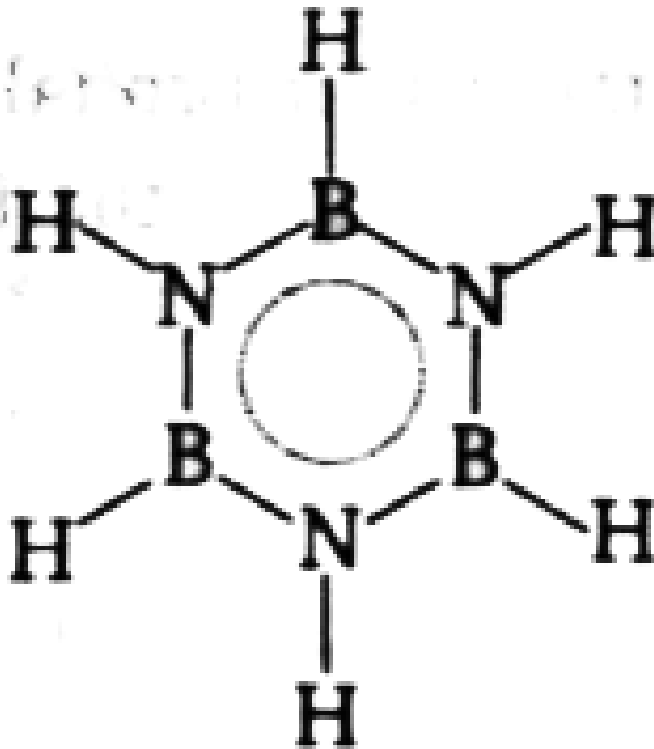
D. None of above

Answer: A



Watch Video Solution

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



How many 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

 [Watch Video Solution](#)

149. Correctly match is:

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

B. p_y atomic orbital -Two nodal planes

C. σ_{p_x} - ψ (gerade)

D. P_{p_y} - ψ (ungerade)

Answer: C

 [Watch Video Solution](#)

150. 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 \widehat{HCH} bond angle

D. K_{a1} of fumaric acid is higher than maleic acid but reverse is true for their K_{a2}

Answer: C



[Watch Video 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 $KFe^{II} \left[Fe(CN_6) \right]_{III}$ and $KFe^{III} \left[Fe(CN_6) \right]_{II}$ 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 because (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.

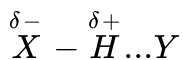
- A. Coloured
- B. White
- C. May be or coloured
- D. Black

Answer: C

 [Watch Video Solution](#)

3. Hydrogen bond is the given to the relatively weak secondary 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 act as a base. We can give the following generalized representation of hydrogen bond.



Bond dissociation energy of H-bond ranges from 8 and 42 kJ/mol, and the most commonly encountered hydrogen bonds are $O - H \dots O$, $N - H \dots O$ and $F - H \dots E$.

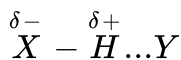
Q. Among molecules of HCl, which of the following forces are present.

- A. Interaction between two HCl molecules is found to be greater than 8 kJ/mol
- B. Weak dipole-dipole interaction
- C. Weak ion-dipole interactions
- D. All of above

Answer: B

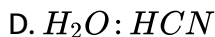
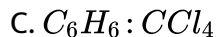
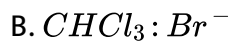
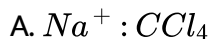
 [Watch Video Solution](#)

4. Hydrogen bond is the given to the relatively weak secondary 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 act as a base. We can give the following generalized representation of hydrogen bond.



Bond dissociation energy of H-bond ranges from 8 and 42 kJ/mol, and the most commonly encountered hydrogen bonds are $O - H \dots O$, $N - H \dots O$ and $F - H \dots E$.

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



Answer: D



[Watch Video Solution](#)

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

Q. Melting and boling points of halogen increase down the group due to

A. Increase in London dispersion forces

B. Increase in extent of polarity

C. Increase in Molecular mass

D. Both (a) and (b)

Answer: D

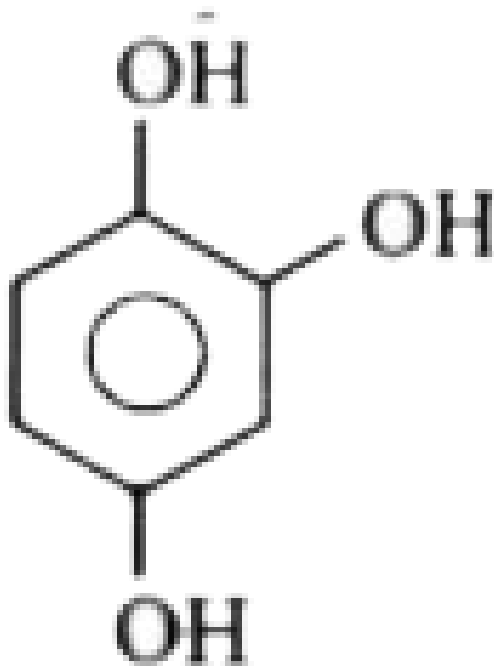


[Watch Video Solution](#)

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.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

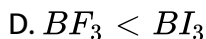
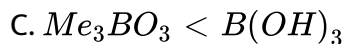
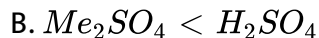
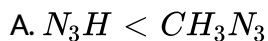
Answer: D



Watch Video Solution

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

Q. Select the incorrect order of boiling point between the following compounds:



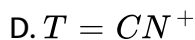
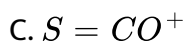
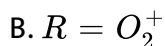
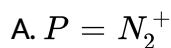
Answer: A



Watch Video Solution

8. 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 monovalent positive ion and Q is monovalent negative ion:

Q. According to given information the incorrect match is :



Answer: C



Watch Video Solution

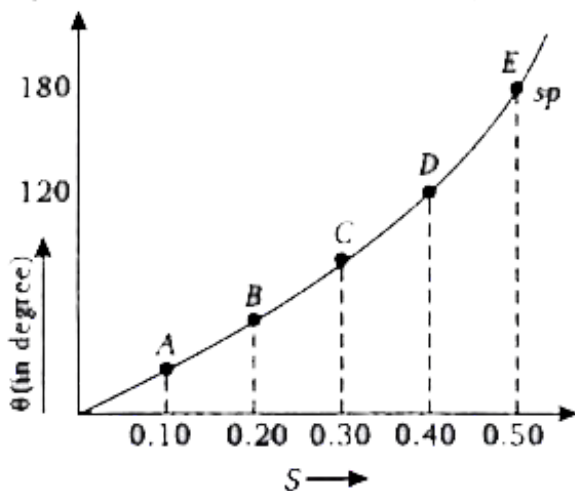
Compound, MX_n type ($n = 2$ or 3 or 4)	Value of $\cos \theta$ ($\theta =$ bond angle between equivalent hybrid orbitals)
P	-0.241
Q	-0.292
R	-0.5
S	-0.325
T	-0.469

9.

In all expected compounds each central atom only uses its s and p-orbitals 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



[View Text Solution](#)

10. The concept of redistribution of energy in different orbitals of an atom associated with different energies to give new orbitals of equal (or sometimes 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 $POCl_3$ ($X - P - X$ 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



[Watch Video Solution](#)

11. The concept of redistribution of energy in different orbitals of an atom associated with different energies to give new orbitals of equal (or

sometimes 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 equatorial plane
- C. In $OSCl_4$, $Cl - S - Cl$ equatorial 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

12. The concept of redistribution of energy in different orbitals of an atom associated with different energies to give new orbitals of equal (or sometimes 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 molecule $XeO_{n_1}F_{n_2}$, 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

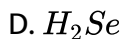
Answer: D



Watch Video Solution

13. Drago suggested an empirical 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:



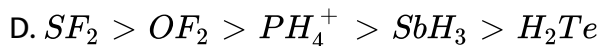
Answer: B



[Watch Video Solution](#)

14. Drago suggested an empirical 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 :



Answer: A



Watch Video Solution

15. 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 :



Answer: C



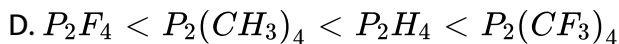
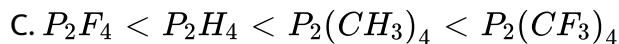
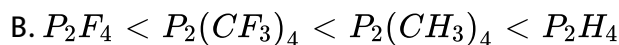
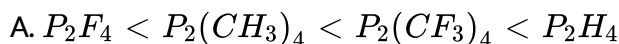
Watch Video Solution

16. 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 :

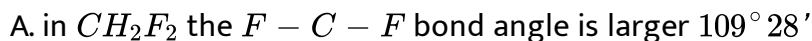


Answer: B



Watch Video Solution

17. The correct statement is :



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 $109^\circ 28'$

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

Answer: C,D

 [Watch Video Solution](#)

18. 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 substituents 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](#)

19. 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 substituents 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

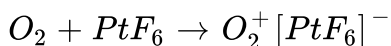
D.

Answer: A

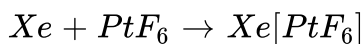


Watch Video Solution

20. The first compound of the noble gases was made in 1962. Barlett and Lohman had previously used the highly oxidizing compound platinum hexafluoride to oxidize dioxygen.



The first ionization energy for $O_2 \rightarrow O_2^+$ is $1165 kJ \cdot mol^{-1}$, which is almost as the value of $1170 kJ \cdot mol^{-1}$ for $Xe \rightarrow Xe^+$. It was predicted 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.



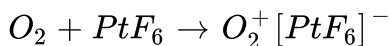
Q. IUPAC name of first xenon-compounds synthesized by scientist Barlett is :

- A. xenonhexaflouroplatinatate(IV)
- B. xenonhexaflouroplatinatate(V)
- C. hexafluoroplatinum(V) xenon
- D. xenoniumhexafluoroplatinum(V)

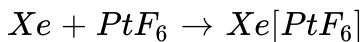
Answer: B

 [Watch Video Solution](#)

21. The first compound of the noble gasees was made in 1962. Barlett and Lohman had previously used the highly oxidizing compound platinum hexafluoride to oxidize dioxygen.



The first ionization energy for $O_2 \rightarrow O_2^+$ is $1165 kJ \cdot mol^{-1}$, which is almost as the value of $1170 kJ \cdot mol^{-1}$ 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.



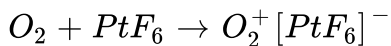
Q. Noble gases are water insoluble, however decrease their insolubility in water decrease down the group due to increase in :

- A. dipole-dipole attraction
- B. dipole-induced dipoles
- C. instantaneous dipole-induced dipole attraction
- D. None of these

Answer: B

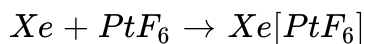
 [Watch Video Solution](#)

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

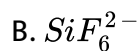


The first ionization energy for $O_2 \rightarrow O_2^+$ is $1165kJ \cdot mol^{-1}$, which is almost as the value of $1170kJ \cdot mol^{-1}$ for $Xe \rightarrow Xe^+$. It was predicated

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.



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



Answer: A

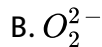


Watch Video Solution

23. 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 is increased by Δ' (destabilisation energy).

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



D. None

Answer: C



Watch Video Solution

24. 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 is 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



25. 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 is 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

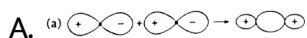
D. 3

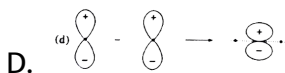
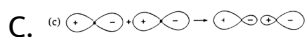
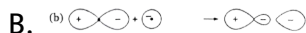
Answer: A

 Watch Video Solution

26. 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 is increased by Δ' (destabilisation energy).

Q. which of the following combination of orbitals is corrects?





Answer: C::D

 [Watch Video Solution](#)

27. According to MOT, two atomic orbitals overlap resulting in the formation of molecular orbital formed. Number of atomic orbitals overlapping together is equal to the molecule orbital formed. The two atomic orbital thus formed by LCAO (linear combination of atomic orbital) in the phase or in the different phase are known as bonding and antibonding molecular orbitals respectively. The energy of bonding molecular orbital is lower than that of the pure atomic orbitals by an amount Δ . This known as the stabilization energy. The energy of antibonding molecular orbital is 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 nuclei
- C. Electron in bonding molecular contributes to the attraction between atoms.
- D. They are formed when the lobes of the combining atomic orbitals have the same sign.

Answer: B



[Watch Video Solution](#)

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 energy of antibonding molecular orbital is increased by Δ' (destabilisation energy).

Q. If x-axis is the molecular axis, then π -molecular orbitals are formed by the overlap of :

A. $S + p_x$

B. $p_x + p_y$

C. $p_z + p_z$

D. $p_x + p_x$

Answer: C

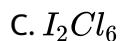
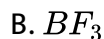


Watch Video Solution

29. 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 moment 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 molecule. Dipole moment values can be distinguished between cis- and trans- isomers, ortho, meta and para-forms of a substance, etc.

Q. Which is a polar molecule?



Answer: D



Watch Video Solution

30. 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 moment 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 molecule. Dipole moment values can be distinguished between cis- and trans- isomers, ortho, meta and para- forms 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

31. 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 moment 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 molecule. Dipole moment values can be distinguished between cis- and trans- isomers, ortho, meta and para-

forms 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. $IV < I < II < III$

B. $I < IV < II < III$

C. $IV < I < III < II$

D. $IV < II < I < III$

Answer: C



Watch Video Solution

32. 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 para-forms 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](#)

33. 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 para-forms 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

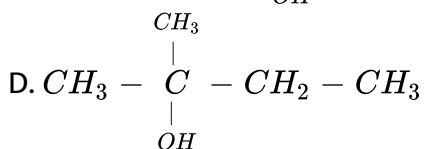
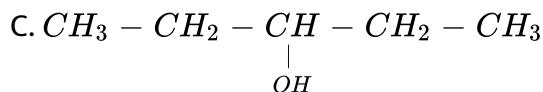
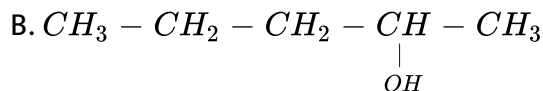
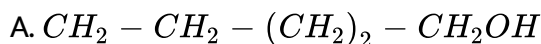
Answer: B



[Watch Video Solution](#)

34. In general boiling point of covalent compounds is affected due to increasing molecular weight and hydrogen bonding. Thus it is observed that the boiling point of octanol is greater than that of 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, anomalous behaviour of water below $4^{\circ}C$. It is therefore concluded that hydrogen bonding plays a vital role in explaining many observable facts.

Q. Which among the following has maximum boiling point?



Answer: A



35. In general boiling point of covalent compounds is affected due to increasing molecular weight and hydrogen bonding. Thus it is observed that the boiling point of octanol is greater than 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, anomalous behaviour of water below $4^{\circ}C$. It is therefore concluded that hydrogen bonding plays a vital role in explaining 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

36. In general boiling point of covalent compounds is affected due to increasing molecular weight and hydrogen bonding. Thus it is observed that the boiling point of octanol is greater than 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, anomalous behaviour of water below $4^{\circ}C$. It is therefore concluded that hydrogen bonding plays a vital role in explaining many observable facts.

Q. K_{a2} of maleic acid is lesser than K_{a2} of fumaric acid due to:

- A. Intramolecular hydrogen bonding is formed after one proton removal in fumaric acid
- B. Intermolecular hydrogen bonding in the ion formed after one proton removal in maleic acid

C. Intramolecular hydrogen bonding in the ion formed after one proton removal in maleic acid

D. Intermolecular hydrogen bonding in the ion formed after one proton removal in fumaric acid

Answer: C

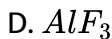
 [Watch Video Solution](#)

37. 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 bonding 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. $AlCl_3$



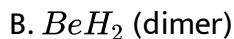
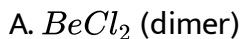
Answer: D



Watch Video Solution

38. 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 need not to have always $p\pi - d\pi$ bonding.

Q. Which of the following is having complete octet:

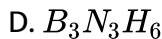
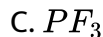
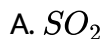


Answer: D

 [Watch Video Solution](#)

39. 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 need not to have always $p\pi - d\pi$ bonding.

Q. Which of the following molecule is not having $p\pi - d\pi$ bonding:



Answer: D

 [Watch Video Solution](#)

40. 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.

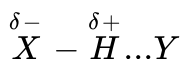
- A. Coloured
- B. White
- C. May be or coloured
- D. Black

Answer: C



Watch Video Solution

41. Hydrogen bond is the given to the relatively weak secondary 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 act as a base. We can give the following generalized representation of hydrogen bond.



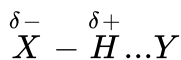
Bond dissociation energy of H-bond ranges from 8 and 42 kJ/mol, and the most commonly encountered hydrogen bonds are $O - H \dots O$, $N - H \dots O$ and $F - H \dots E$.

Q. Among molecules of HCl, which of the following forces are present.

- A. Interaction between two HCl molecules is found to be greater than 8 kJ/mol
- B. Weak dipole-dipole interaction
- C. Weak ion-dipole interactions
- D. All of above

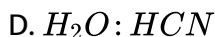
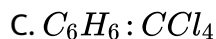
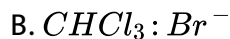
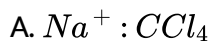
Answer: B

42. Hydrogen bond is the given to the relatively weak secondary 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 act as a base. We can give the following generalized representation of hydrogen bond.



Bond dissociation energy of H-bond ranges from 8 and 42 kJ/mol, and the most commonly encountered hydrogen bonds are $O - H \dots O$, $N - H \dots O$ and $F - H \dots E$.

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



Answer: D

 [Watch Video Solution](#)

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

Q. Melting and boling points of halogen increase down the group due to

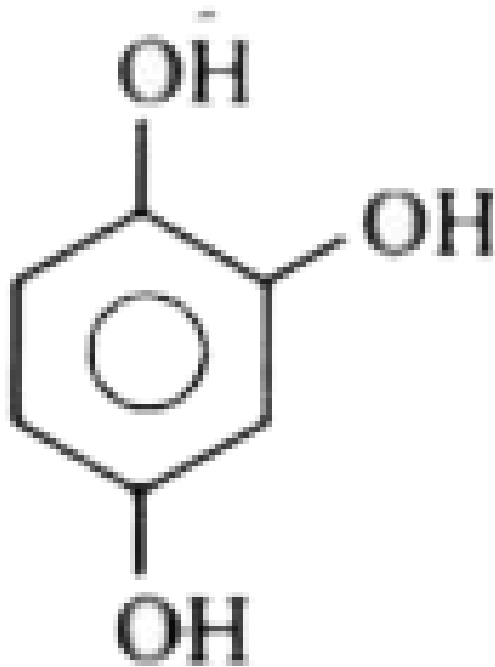
- A. Increase in London dispersion forces
- B. Increase in extent of polarity
- C. Increase in Molecular mass
- D. Both (a) and (b)

Answer: D

 [Watch Video Solution](#)

44. 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

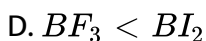
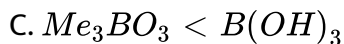
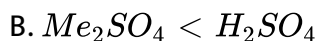
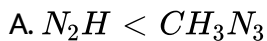
D. All of these

Answer: D

 [Watch Video Solution](#)

45. 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:



Answer: A

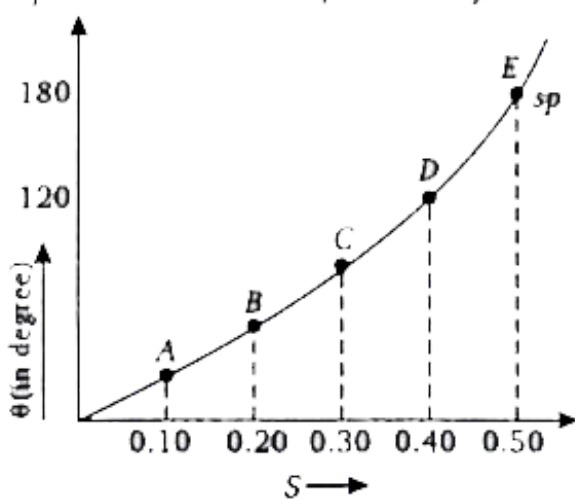
 Watch Video Solution

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

46.

In all expected compounds each central atom only uses its s and p-orbitals 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

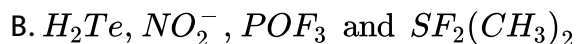
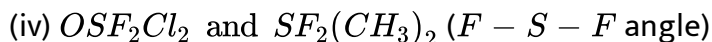
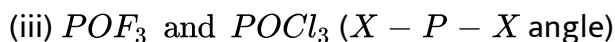
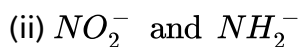
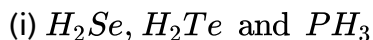
Answer: B



[View Text Solution](#)

47. The concept of redistribution of energy in different orbitals of an atom associated with different energies to give new orbitals of equal (or sometimes 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 :



D. H_2Te , NH_2^- , POF_3 and $SF_2(CH_3)_2$

Answer: D



View Text Solution

48. The concept of redistribution of energy in different orbitals of an atom associated with different energies to give new orbitals of equal (or sometimes 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 equatorial plane

C. In $OSCl_4$, $Cl - S - Cl$ equatorial 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](#)

49. The concept of redistribution of energy in different orbitals of an atom associated with different energies to give new orbitals of equal (or sometimes 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 molecule $XeO_{n_1}F_{n_2}$, 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

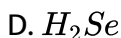
Answer: D



Watch Video Solution

50. Drago suggested an empirical 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:

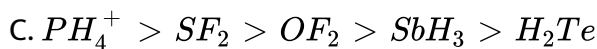


Answer: B

 [Watch Video Solution](#)

51. Drago suggested an empirical 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 :





Answer: A

 [Watch Video Solution](#)

52. 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 :



C. sp^4

D. sp^5

Answer: C



Watch Video Solution

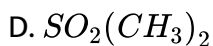
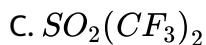
53. According to hybridisation theory, the % s-character in sp , sp^2 and sp^3 hybrid orbitals is 50, 33.3 and 25 respectively, but this is not true for all the species. When θ is the bond angle between equivalent hybrid orbitals then % s and p-character in hybrid orbitals (when only s and p-orbitals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



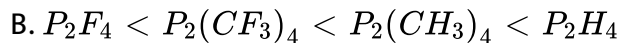
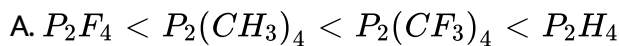
Answer: D

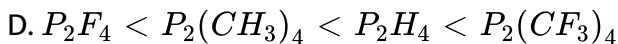
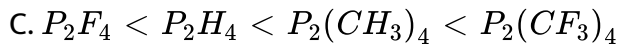
 [Watch Video Solution](#)

54. 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 :





Answer: B



Watch Video Solution

55. 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 substituents 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](#)

56. 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 substituents 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 :

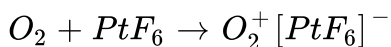


D.

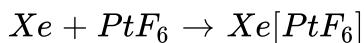
Answer: A

 [Watch Video Solution](#)

57. The first compound of the noble gases was made in 1962. Barlett and Lohman had previously used the highly oxidizing compound platinum hexafluoride to oxidize dioxygen.



The first ionization energy for $O_2 \rightarrow O_2^+$ is $1165 kJ \cdot mol^{-1}$, which is almost as the value of $1170 kJ \cdot mol^{-1}$ for $Xe \rightarrow Xe^+$. It was predicted 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.



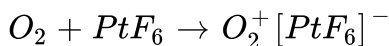
Q. IUPAC name of first xenon-compounds synthesized by scientist Barlett is :

- A. xenonhexaflouroplatinatate(IV)
- B. xenonhexaflouroplatinatate(V)
- C. hexafluoroplatinum(V) xenon
- D. xenoniumhexafluoroplatinum(V)

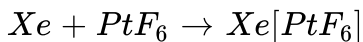
Answer: B

 [Watch Video Solution](#)

58. The first compound of the noble gases was made in 1962. Barlett and Lohman had previously used the highly oxidizing compound platinum hexafluoride to oxidize dioxygen.



The first ionization energy for $O_2 \rightarrow O_2^+$ is $1165 kJ \cdot mol^{-1}$, which is almost as the value of $1170 kJ \cdot mol^{-1}$ for $Xe \rightarrow Xe^+$. It was predicted 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.



Q. Noble gases are water insoluble, however their insolubility in water decreases down the group due to increase in :

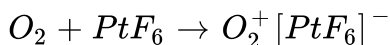
- A. dipole-dipole attraction
- B. dipole-induced dipoles
- C. instantaneous dipole-induced dipole attraction
- D. None of these

Answer: B



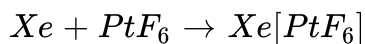
[Watch Video Solution](#)

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



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.



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

is :



Answer: A

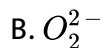


Watch Video Solution

60. 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 is increased by Δ' (destabilisation energy).

Q. Which of the following statements is not correct regarding bonding molecular orbitals?



D. None

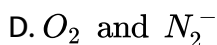
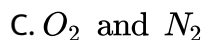
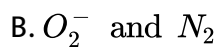
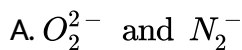
Answer: C



Watch Video Solution

61. 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 is increased by Δ' (destabilisation energy).

Q. Which among the following pairs contains both paramagnetic species.



Answer: D



62. 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 is 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](#)

63. 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 is increased by Δ' (destabilisation energy).

Q. How many nodal plane is present in σ_s and p bonding molecular orbital ?

A. zero

B. 1

C. 2

D. 3

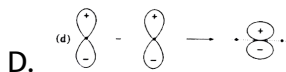
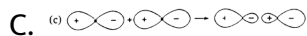
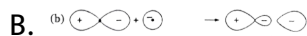
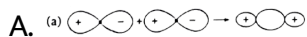
Answer: A



Watch Video Solution

64. 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 is increased by Δ' (destabilisation energy).

Q. which of the following combination of orbitals is corrects?



Answer: C

 [Watch Video Solution](#)

65. 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 is 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 combining atomic orbitals have the same sign.

Answer: B



[Watch Video Solution](#)

66. 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 is increased by Δ' (destabilisation energy).

Q. If x-axis is the molecular axis, then π -molecular orbitals are formed by the overlap of :

A. $S + p_x$

B. $p_x + p_y$

C. $P_z + p_x$

D. $p_x + p_x$

Answer: C

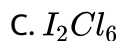
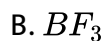


Watch Video Solution

67. 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 moment 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 molecule. Dipole moment values can be distinguished between cis- and trans- isomers, ortho, meta and para-forms of a substance, etc.

Q. Which is a polar molecule?



Answer: D



Watch Video Solution

68. 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 moment 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 molecule. Dipole moment values can be distinguished between cis- and trans- isomers, ortho, meta and para- forms 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

69. 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 moment 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 molecule. Dipole moment values can be distinguished between cis- and trans- isomers, ortho, meta and para-

forms 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. $IV < I < II < III$

B. $I < IV < II < III$

C. $IV < I < III < II$

D. $IV < II < I < III$

Answer: C



Watch Video Solution

70. 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 para-forms 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](#)

71. 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 para-forms 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

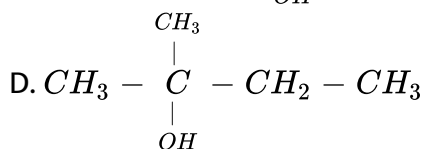
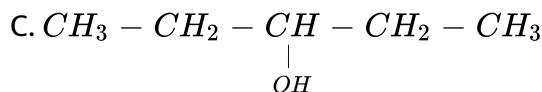
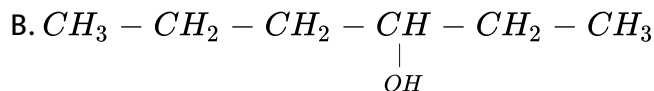
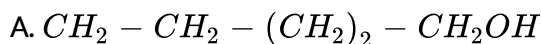
Answer: B



[Watch Video Solution](#)

72. In general boiling point of covalent compounds is affected due to increasing molecular weight and hydrogen bonding. Thus it is observed that the boiling point of octanol is greater than that of 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, anomalous behaviour of water below $4^{\circ}C$. It is therefore concluded that hydrogen bonding plays a vital role in explaining many observable facts.

Q. Which among the following has maximum boiling point?



Answer: A



73. In general boiling point of covalent compounds is affected due to increasing molecular weight and hydrogen bonding. Thus it is observed that the boiling point of octanol is greater than 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, anomalous behaviour of water below $4^{\circ}C$. It is therefore concluded that hydrogen bonding plays a vital role in explaining 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](#)

74. In general boiling point of covalent compounds is affected due to increasing molecular weight and hydrogen bonding. Thus it is observed that the boiling point of octanol is greater than 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, anomalous behaviour of water below $4^{\circ}C$. It is therefore concluded that hydrogen bonding plays a vital role in explaining many observable facts.

Q. K_{a1} of maleic acid is lesser than K_{a1} of fumaric acid due to:

- A. Intramolecular hydrogen bonding is formed after one proton removal in fumaric acid
- B. Intermolecular hydrogen bonding in the ion formed after one proton removal in maleic acid

C. Intramolecular hydrogen bonding in the ion formed after one proton removal in maleic acid

D. Intermolecular hydrogen bonding in the ion formed after one proton removal in fumaric acid

Answer: C

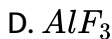
 [Watch Video Solution](#)

75. 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 bonding 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. $AlCl_3$



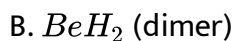
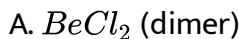
Answer: C



[View Text Solution](#)

76. 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 need not to have always $p\pi - d\pi$ bonding.

Q. Which of the following is having complete octet:

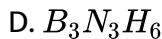
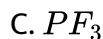
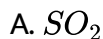


Answer: D

 [Watch Video Solution](#)

77. 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 need not to have always $p\pi - d\pi$ bonding.

Q. Which of the following molecule is not having $p\pi - d\pi$ bonding:



Answer: D

 [Watch Video Solution](#)

ONE OR MORE ANSWER IS/ARE CORRECT

1. Which is correct statement ?

A. $LiCl$ is more soluble in polar solvent (water) than $NaCl$

B. K_{a_2} of fumaric acid is more than K_{a_2} of maleic acid

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

D. In $CF_2 = C = CF_2$ molecule all the four fluorine atoms are in the same plane

Answer: A::B::C



Watch Video Solution

2. 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 primary effect in direction of bond.

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

 [Watch Video Solution](#)

3. Which of the following species is/are having π_{2p} as HOMO (highest occupied molecular orbital) ?

A. N_2^-

B. O_2^{2+}

C. NO^+

D. B_2^+

Answer: B::C::D

 Watch Video Solution

4. Select correct order between given compounds .

A. $\text{COCl}_2 > \text{COF}_2$: XCX bond angle

B. $\text{NO}_2\text{F} > \text{NO}_2\text{Cl}$: ONO bond angle

C. $\text{SO}_2\text{F}_2 < \text{SOF}_2$: FSF bond angle

D. $\text{N}_2\text{F}_2 < \text{N}_2(\text{CH}_3)_2$: $\text{N} - \text{N}$ bond length

Answer: A::B::D

 Watch Video Solution

5. 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

 [Watch Video Solution](#)

6. 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

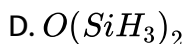
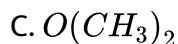
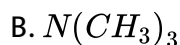
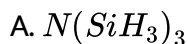
D. Experimental dipole moment of $R_3NO <$ Experimental dipole moment of R_3PO

Answer: A::D



View Text Solution

7. In which of the following compounds observed bond angle is found to be greater than expected, but not due to back bonding.



Answer: B::C



Watch Video Solution

8. 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

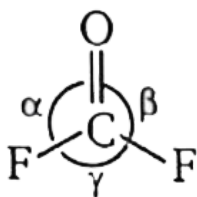
electronegativity order is $X > Y > Z$. Then incorrect statement (s) is/are:

- 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

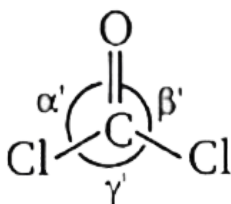
Answer: A:C

 [Watch Video Solution](#)

9. Correct order of bond angle in the given compounds is/are:



and



A. $\gamma < \gamma'$

B. $\gamma < \beta = \alpha$

C. $\alpha > \alpha'$

D. $\beta > \beta'$

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

 [Watch Video Solution](#)

10. 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 CCl_4

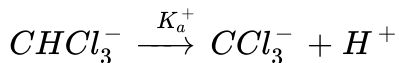
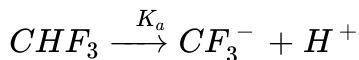
C. Melting point of $BeCl_2$ is higher than BeF_2

D. Boiling point of HF is greater than CH_3F

Answer: A::B::D

 [Watch Video Solution](#)

11. Consider of following reactions



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

A. $K_a > K'_a$

B. CHF_3 act as a stronger bronsted acid than $CHCl_3$

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

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

A. $POCl_3$

B.  width="30%">

C. HNC

D.  width="30%">

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

 [Watch Video Solution](#)

13. 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

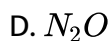
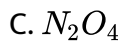
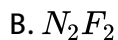
C. $As - Cl$ bond length is longer than $As - F$ bond length .

D. Maximum five atoms can lie in equatorial plane.

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

 [Watch Video Solution](#)

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



Answer: A::B



Watch Video Solution

15. Which of the following statements is correct?

A. ClF_3 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 $[Cl_4]^-$ molecular ion, $Cl - I - Cl$ bond angle is 90°

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

Answer: A::B::C

 [Watch Video Solution](#)

16. 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](#)

17. 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

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

A. S_3^{2-}

B. I_3^-

C. N_3^-

D. I_3^+

Answer: A::D

 [Watch Video Solution](#)

19. Select correct order between given compounds .

A. $COCl_2 > COF_2$: $\widehat{X\hat{C}X}$ bond angle

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

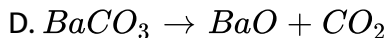
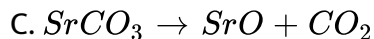
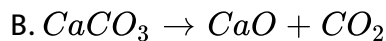
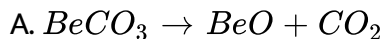
C. $SO_2F_2 < SOF_2$: $\widehat{F\hat{S}F}$ bond angle

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

Answer: A::B::D

 [Watch Video Solution](#)

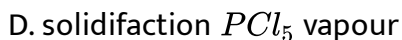
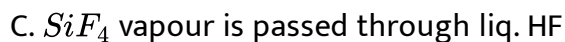
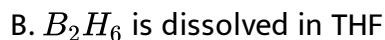
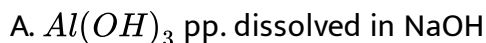
20. Which of the following equilibria would have highest and lowest value of K_p at a common temperature?



Answer: A::D

 [Watch Video Solution](#)

21. Which of the following process is/are associated with change of hybridisation of the underlined compounds?



Answer: A::C::D

 [Watch Video Solution](#)

22. Which of the following are true?

- A. van der waals forces are responsible for the formation of molecular crystals
- B. Branching lower the boiling points of isomeric organic due to decrease in van der waals forces
- C. In graphite, van der waal forces act between the carbon layers
- D. In diamond, van der waal forces act between the carbon layers

Answer: A::B::C

 [Watch Video Solution](#)

23. 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 observation is found in their bond length when



Answer: C

 [Watch Video Solution](#)

24. 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

 Watch Video Solution

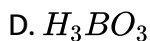
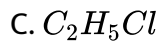
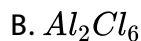
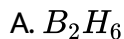
25. In the structure of H_2CSF_4 , which of the following statement is/are correct?

- 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 equatorial $S - F$ bonds
- C. Total six atoms are in the plane
- D. Equatorial $S - F$ plane is perpendicular to the nodal plane of $\pi -$ bonds

Answer: A::C::D

 Watch Video Solution

26. In which compound compounds vacant hybrid orbitals take part in bonding:



Answer: A::B



Watch Video Solution

27. 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

 [Watch Video Solution](#)

28. 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](#)

29. Which of the following statement(s) is/are not correct for following compounds?



- A. – OCH_3 groups in both cases occupy the same position
- B. Cl-atoms occupy equatorial position in case of (I) and F-atoms occupy equatorial position in case of (II)
- C. Cl-atoms occupy axial position in case of (II) & F-atoms occupy equatorial position in case of (II)
- D. Cl and F-atoms occupy either axial or equatorial position in case of (I) and (II) respectively

Answer: A::B::C



Watch Video Solution

30. 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

31. 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](#)

32. 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)

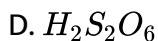
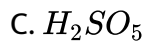
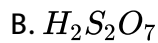
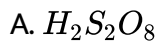
C. It is a diamagnetic species

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

Answer: A::C

 [Watch Video Solution](#)

33. Which of the following molecule has as $O-O$ bonds?

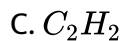
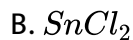
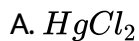


Answer: A, C



Watch Video Solution

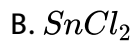
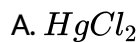
34. CO_2 molecule is not isostructural with :



Answer: B::D

 [Watch Video Solution](#)

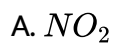
35. Which of the following have a linear structure?

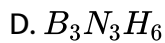
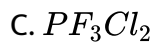
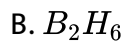


Answer: A::C::D

 [Watch Video Solution](#)

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

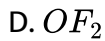
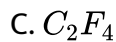
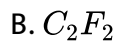




Answer: B::D

 [Watch Video Solution](#)

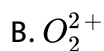
37. Non-polar molecule are:



Answer: A::B::C

 [Watch Video Solution](#)

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

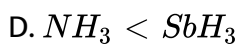
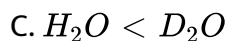
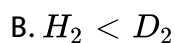
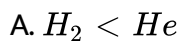


Answer: B::C::D



Watch Video Solution

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



Answer: B::C::D

 [Watch Video Solution](#)

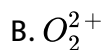
40. Select correct statement(s) regarding σ and π bonds :

- 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 primary effect in direction of bond.

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

 [Watch Video Solution](#)

41. Which of the following species is/are having π_{2p} as HOMO (highest occupied molecular orbital) ?

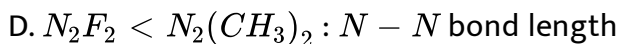
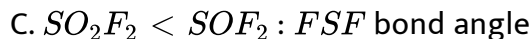
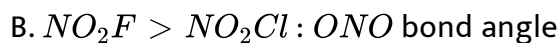
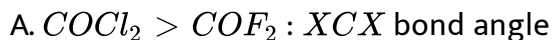


Answer: B::C::D



Watch Video Solution

42. Select correct order between given compounds .



Answer: A::B::D

 [Watch Video Solution](#)

43. 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

 [Watch Video Solution](#)

44. 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 $<$ Experimental dipole moment of R_3PO

Answer: A::D

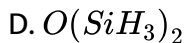
 [Watch Video Solution](#)

45. 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. $O(CH_3)_2$



Answer: B::C

 [Watch Video Solution](#)

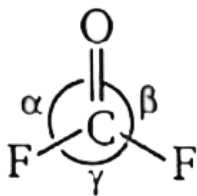
46. Two compounds PX_2Y_3 and PX_3Y_2 (Where P=phosphorous atom and X, Y= monovalent atoms). If all 'X' atoms are replaced by 'Z' atoms and electronegativity order is $X > Y > Z$. Then incorrect statement (s) is/are:

- 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

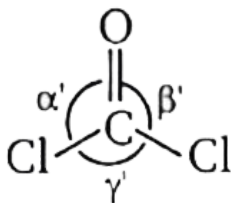
Answer: B::D

 [Watch Video Solution](#)

47. Correct order of bond angle in the given compounds is/are:



and



A. $\gamma < \gamma'$

B. $\gamma < \beta = \alpha$

C. $\alpha > \alpha'$

D. $\beta > \beta'$

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

 [Watch Video Solution](#)

48. 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 Cl_4

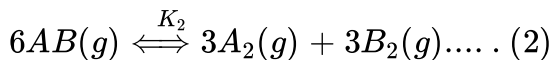
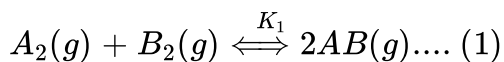
C. Melting point $BeCl_2$ is higher than BeF_2

D. Boiling point HF is greater than CH_3F

Answer: A::B::D

 Watch Video Solution

49. Consider the following reversible chemical reactions :



The relation between K_1 and K_2 is :

A. $K_a > K'_a$

B. CHF_3 act as a stronger bronsted acid than $CHCl_3$

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

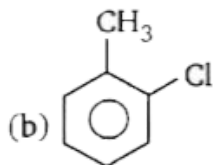
D. CCl_3^- is weaker lewis base than CF_3^-

Answer: C::D

 Watch Video Solution

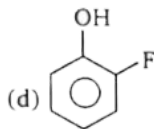
50. In which of the following molecules μ_{exp} (observed dipole moment) is found to be greater than μ_{μ} (expected dipole moment)?

A. POCl_3



B.

C. HNC



D.

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

 Watch Video Solution

51. 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



Watch Video Solution

52. Which of the following species are involved

- A. N_3^-
- B. N_2F_2
- C. N_2O_4
- D. N_2O

Answer: A::B

 Watch Video Solution

53. Which of the following statements is correct?

A. ClF_3 molecule is bent 'T' shape

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

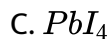
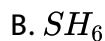
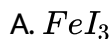
C. In $[Cl_4]^-$ molecular ion, $Cl - I - Cl$ bond angle is 90°

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

Answer: A::C

 Watch Video Solution

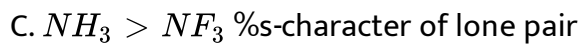
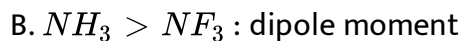
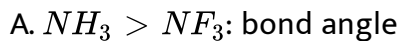
54. Which of the following species is/are not know?



Answer: A::B::C

 [Watch Video Solution](#)

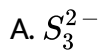
55. Select correct order between following compounds:



Answer: A::B::D

 [Watch Video Solution](#)

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

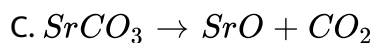
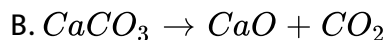
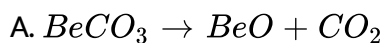


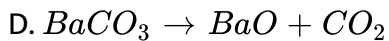
Answer: A::D



Watch Video Solution

57. Which of the following equilibria would have highest and lowest value of K_p at a common temperature?





Answer: A::D

 [Watch Video Solution](#)

58. Which of the following process is/are associated 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. SiF_4 vapour is passed through liq. HF

D. solidification PCl_5 vapour

Answer: A::C::D

 [Watch Video Solution](#)

59. Which of the following are true?

- A. van der waals forces are responsible for the formation of molecular crystals
- B. Branching lower the boiling points of isomeric organic due to decrease in van der waals forces
- C. In graphite, van der waal forces act between the carbon layers
- D. In diamond, van der waal forces act between the carbon layers

Answer: A::B::C

 [Watch Video Solution](#)

60. 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 observation is found in their bond length when



Answer: A::B::D

 [Watch Video Solution](#)

61. 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



Watch Video Solution

62. In the structure of H_2CSF_4 , which of the following statement is/are correct?

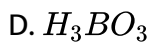
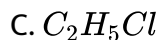
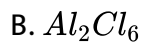
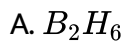
- A. Two $C - H$ bonds are in the same plane of axial $S - F$ bonds
- B. Two $C - H$ bonds are in the same plane of equatorial $S - F$ bonds
- C. Total six atoms are in the plane
- D. Equatorial $S - F$ plane is perpendicular to the nodal plane of $\pi -$ bonds

Answer: A::C::D



Watch Video Solution

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



Answer: A::B

 [Watch Video Solution](#)

64. 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



Watch Video Solution

65. 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

66. Which of the following statement(s) is/are not correct for following compounds?

(I) $S\text{Cl}_2(\text{OCH}_3)_2$ and (II) $\text{SF}_2(\text{OCH}_3)_2$

- A. – OCH_3 groups in both cases occupy the same position
- B. Cl-atoms occupy equatorial position in case of (I) and F-atoms occupy equatorial position in case of (II)
- C. Cl-atoms occupy axial position in case of (II) & F-atoms occupy equatorial position in case of (II)
- D. Cl and F- atoms occupy either axial or equatorial position in case of (I) and (II) respectively

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

 [Watch Video Solution](#)

67. 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, fractional or zero value of bond order
- C. Molecule is only paramagnetic species
- D. Molecule does not exist

Answer: B::C::D

 [Watch Video Solution](#)

68. 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

69. 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

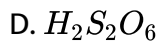
Answer: A:C



Watch Video Solution

70. Which of the following molecule has as $O - O$ bonds?

- A. $H_2S_2O_8$
- B. $H_2S_2O_7$
- C. H_2SO_5

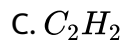
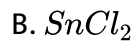


Answer: A::C



Watch Video Solution

71. Which of the following species is paramagnetic:

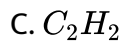
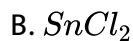
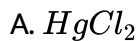


Answer: B::D



Watch Video Solution

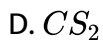
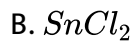
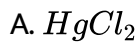
72. CO_2 molecule is not isostructural with :



Answer: B::D

 [Watch Video Solution](#)

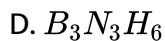
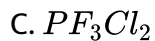
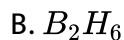
73. Which of the following have a linear structure?



Answer: A::C::D

 [Watch Video Solution](#)

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

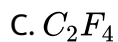
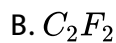


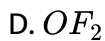
Answer: B::D



Watch Video Solution

75. Non-polar molecule are:

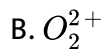




Answer: A::B::C

 Watch Video Solution

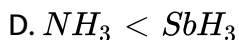
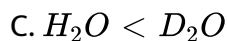
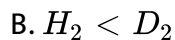
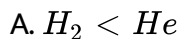
76. Which of the following molecule species is/are having π_{2p} as H.O.M.O (highest occupied molecular orbital) :



Answer: B::C::D

 Watch Video Solution

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

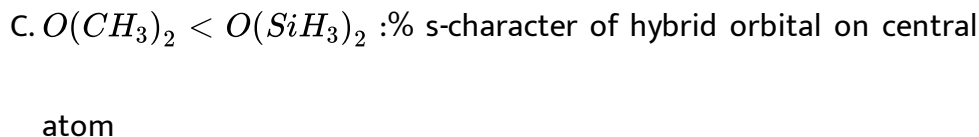
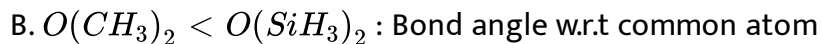
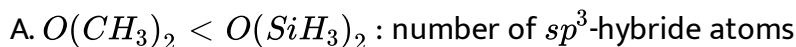


Answer: B::C::D



Watch Video Solution

78. Incorrect order between following compounds is/are:



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

 [View Text Solution](#)

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.

Column-I	Column-II
(A) CO , CN^- , NO^+ , O_2^{2+}	(P) All are paramagnetic
(B) N_2^- , O_2^+ , O_2^- , NO	(Q) All are diamagnetic
(C) NO^- , N_2^{2+} , C_2 , B_2^-	(R) All have intermixing of s and p -orbitals
(D) CN , C_2^+ , B_2^+ , N_2^-	(S) All have same bond order
	(T) All have fractional bond order

 [View Text Solution](#)

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

Column-II.

Column-I (Reactions)

- (A) Formation of cation and anion by self ionization of iodine
(B) Attack of hydroxide ion on boric acid
(C) $\text{Ba}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) \longrightarrow \text{BaSO}_4 \downarrow$ (white ppt.)
(D) $\text{MgSO}_4 \xrightarrow{T > 800^\circ\text{C}} \text{MgO} + \text{SO}_2 + \frac{1}{2}\text{O}_2$

Column-II (Characteristics of final products)

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



Watch Video Solution

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

Column-I (Compounds)

- (A) H_4SiO_4
(B) H_2SeO_4
(C) H_3BO_3
(D) H_2NBF_2

Column-II (Characteristics)

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



Watch Video 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)

- (A) The distribution of s -character in hybrid orbitals of central atom is not equal and all bond lengths (CA—X) are equivalent
- (B) The distribution of s -character in hybrid orbitals of central atom is equal and all bond lengths (CA—X) are equivalent

Column-II (Species)

- (P) $(\text{CH}_3)_2\text{O}$
- (Q) NH_3

 [View Text Solution](#)

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

**Column-I
(Oxyacids)**

- (A) $\text{H}_2\text{S}_4\text{O}_6$
- (B) $\text{H}_2\text{S}_2\text{O}_3$
- (C) H_2SO_5
- (D) $\text{H}_2\text{S}_2\text{O}_5$

**Column-II
(Oxidation state of S-atom)**

- (P) +6
- (Q) +5
- (R) 0
- (S) -2
- (T) +3

 [Watch Video Solution](#)

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

Column-I	Column-II
(A) NH_4Cl	(P) Hydrogen bond
(B) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	(Q) Co-ordinate bond
(C) HNC	(R) Ionic bond
(D) Liquid H_2O_2	(S) Covalent bond

 [View Text Solution](#)

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

Column-I	Column-II
(A) $\text{B}_3\text{N}_3\text{H}_6$	(P) Planar geometry
(B) S_2Cl_2	(Q) Non-planar geometry
(C) B_2H_6	(R) No lone pair
(D) I_2Cl_6	(S) Non-polar molecule

 [Watch Video Solution](#)

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.

Column-I
(Decreasing order)

- (A) $\text{NH}_3, \text{SbH}_3, \text{AsH}_3, \text{PH}_3$
- (B) $\text{HI}, \text{HBr}, \text{HCl}, \text{HF}$
- (C) $\text{SnH}_4, \text{GeH}_4, \text{SiH}_4, \text{CH}_4$
- (D) $\text{H}_2\text{O}, \text{H}_2\text{Te}, \text{H}_2\text{Se}, \text{H}_2\text{S}$

Column-II
(Physical properties)

- (P) Bond dipole moment
- (Q) Reducing property
- (R) Enthalpy of fusion
- (S) Boiling point



[View Text Solution](#)

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

Column-I (Species)

- (A) NO_2^+
- (B) NO_2^-
- (C) NO_2
- (D) NO_3^-

Column-II (Bond angle)

- (P) 180°
- (Q) 120°
- (R) 134°
- (S) 115°
- (T) 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) $\text{O}(\text{SiH}_3)_2$	(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) $\text{B}(\text{NMe}_2)_3$	(S) Electron density on central atom decreases due to back bonding
	(T) Electron density on central atom increases due to back bonding



View Text Solution

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

Column-II.

Column-I

- (A) CO, CN^- , NO^+ , O_2^{2+}
- (B) N_2^+ , O_2^+ , O_2^- , NO
- (C) NO^- , N_2^{2+} , C_2 , B_2^+
- (D) CN, C_2 , B_2^+ , N_2^-

Column-II

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



[View Text Solution](#)

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

Column-I (Reactions)

- (A) Formation of cation and anion by self ionization of iodine
- (B) Attack of hydroxide ion on boric acid
- (C) $\text{Ba}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) \longrightarrow \text{BaSO}_4 \downarrow$ (white ppt.)
- (D) $\text{MgSO}_4 \xrightarrow{T > 800^\circ\text{C}} \text{MgO} + \text{SO}_2 + \frac{1}{2}\text{O}_2$

Column-II (Characteristics of final products)

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



[Watch Video Solution](#)

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.

i. **Column-I (Compounds)**

- (A) H_4SiO_4
- (B) H_2SeO_4
- (C) H_3BO_3
- (D) H_2NBF_2

Column-II (Characteristics)

- (P) Back bond
- (Q) Intermolecular hydrogen bond
- (R) Hypovalent compound
- (S) 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.

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) $(\text{CH}_3)_2\text{O}$ |
| (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 ($X\text{—CA—X}$) 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 ($X\text{—CA—X}$) is either equal or less than $109^\circ 28'$ | (S) H_2O |
| | (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-I

- (A) $\text{Re}_2\text{Cl}_8^{2-}$
 (B) NO_3^-
 (C) SO_4^{2-}
 (D) SO_3

Column-II

- (P) $p\pi - p\pi$ bonding
 (Q) $p\pi - d\pi$ bonding
 (R) $d\pi - d\pi$ bonding
 (S) δ -bonding

 [Watch Video 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.

Column-I (Oxyacids)	Column-II (Oxidation state of S-atom)
(A) $\text{H}_2\text{S}_4\text{O}_6$	(P) +6
(B) $\text{H}_2\text{S}_2\text{O}_3$	(Q) +5
(C) H_2SO_5	(R) 0
(D) $\text{H}_2\text{S}_2\text{O}_5$	(S) -2
	(T) +3



Watch Video Solution

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

Column-I	Column-II
(A) NH_4Cl	(P) Hydrogen bond
(B) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	(Q) Co-ordinate bond
(C) HNC	(R) Ionic bond
(D) Liquid H_2O_2	(S) Covalent bond



Watch Video 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.

Column-I	Column-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) I_2Cl_6	(S) Non-polar molecule

 [View Text Solution](#)

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

Column-I (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_2^{2-}	(R) μ (dipole moment)
(D) C_6H_6 and $B_3N_3H_6$	(S) Total number of electrons

 [View Text Solution](#)

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

Column-I (Decreasing order)	Column-II (Physical properties)
(A) $\text{NH}_3, \text{SbH}_3, \text{AsH}_3, \text{PH}_3$	(P) Bond dipole moment
(B) $\text{HI}, \text{HBr}, \text{HCl}, \text{HF}$	(Q) Reducing property
(C) $\text{SnH}_4, \text{GeH}_4, \text{SiH}_4, \text{CH}_4$	(R) Enthalpy of fusion
(D) $\text{H}_2\text{O}, \text{H}_2\text{Te}, \text{H}_2\text{Se}, \text{H}_2\text{S}$	(S) Boiling point



[View Text Solution](#)

ASSERTION-REASON TYPE QUESTIONS

1. Assertion : C_3O_2 is non-polar molecule.

Reason : Terminal π -bonds of the molecule are lying in different planes.

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and the reason is the correct explanation of assertion

D. If both assertion and reason are true and the reason is not the correct explanation of assertion

Answer: B

 [Watch Video Solution](#)

2. Assertion:- If $d_{x^2-y^2}$ and p_y 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 fluoride groups have come out on nucleophilic 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

 [Watch Video Solution](#)

4. Assertion : The central carbon atom in $F_2C = C = CF_2$ and both carbon atoms in $F_2B - C \equiv C - BF_2$ are sp -hybridized.

Reason 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](#)

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



Watch Video Solution

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

 [Watch Video 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

 [Watch Video Solution](#)

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

Reason: Dimerr 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

 [Watch Video 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

 [Watch Video Solution](#)

11. 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



[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



[Watch Video Solution](#)

13. Assertion : NaCl is more ionic than NaI.

Reason : Chlorine is more electronegative than iodine.

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

Answer: D



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 heat 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

 [Watch Video Solution](#)

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

Reason : The hydrophobic nature of alkyl chain increase.

A. If assertion is true but the reason is false

B. If assertion is false but reason is true

C. If both assertion and reason are true and the reason is the correct 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](#)

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

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



Watch Video Solution

19. Assertion : The p-isomer of dichlorobenzene has higher melting point than o- and 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): Lattice 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 is sp -hybridized.

- 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](#)

24. Assertion In case of $(CH_3)_3N$ geometry is pyramidal but in case of $(SiH_3)_3N$ 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](#)

25. Assertion: Superoxides of alkali metals are paramagnetic.

Reason: Superoxides contain O_2^- ion which has one unpaired electron.

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

Answer: C

 [Watch Video Solution](#)

26. Assertion : The HF_2^- ion exists in the solid state & also in liquid state but not in aqueous state.

Reason : The magnitude 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

 [Watch Video Solution](#)

27. 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

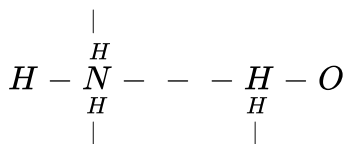
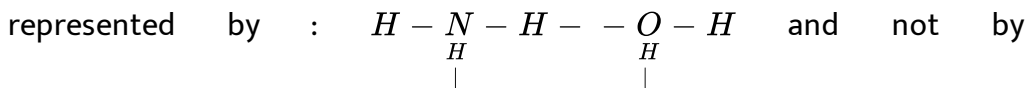
C. If both assertion and reason are true and the reason is the correct explanation of assertion

D. If both assertion and reason are true and the reason is not the correct explanation of assertion

Answer: B

 [Watch Video Solution](#)

28. Assertion : The H-bond present in NH_3 dissolved in water is best represented by :



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

 [Watch Video Solution](#)

29. Assertion : C_3O_2 is non-polar molecule.

Reason : Terminal π -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](#)

30. 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 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](#)

31. Assertion : BF_3 undergoes in partial hydrolysis

Reason : Due to strong back bonding in BF_3 only two fluoride groups have come out on nucleophilic 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



[Watch Video Solution](#)

32. Assertion : The central carbon atom in $F_2C = C = CF_2$ and both carbon atoms in $F_2B - C \equiv C - BF_2$ are sp -hybridized.

Reason 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

33. 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

 [Watch Video Solution](#)

34. 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](#)

35. 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



[Watch Video Solution](#)

36. 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

 [Watch Video Solution](#)

37. 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

 [Watch Video Solution](#)

38. 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



[Watch Video Solution](#)

39. 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



[Watch Video Solution](#)

40. Assertion : H_2S is stronger acid than PH_3 .

Reason : S is more electronegative than P, conjugate base HS^- is

more stable than H_2P^- .

- 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](#)

41. Assertion : $NaCl$ is more ionic than NaI .

Reason : Chlorine is more electronegative than iodine.

- A. If assertion is true but the reason is false
- B. If assertion is false but reason is true

C. If both assertion and reason are true and the reason is the correct explanation of assertion

D. If both assertion and reason are true and the reason is not the correct explanation of assertion

Answer: D

 [Watch Video Solution](#)

42. Assertion : PbI_4 doesn't exist and converts into PbI_2 and I_2 spontaneously at room temperature but $PbCl_4$ needs heating 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](#)

43. 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

 [Watch Video Solution](#)

44. Assertion : Solubility of n-alkanes 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

 [Watch Video Solution](#)

45. Assertion : The unpaired electron of CH_3^\bullet free radical occupies p-orbital.

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](#)

46. Assertion : Nitrogen is 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



[Watch Video Solution](#)

47. Assertion The p - isomer of dichlorobenzene has higher m.p than o- and 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

48. Assertion (A): Na_2SO_4 is soluble in water while $BaSO_4$ is insoluble.

Reason (R): Lattice 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](#)

49. 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



Watch Video Solution

50. 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](#)

51. Assertion: C_3O_2 has linear structure.

Reason: Each carbon atom in C_3O_2 is sp -hybridized.

- 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](#)

52. 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

 [Watch Video Solution](#)

53. Assertion : $(CH_3)_3N$ geometry is pyramidal but in case $(SiH_3)_3N$ 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

 [Watch Video Solution](#)

54. Assertion : Superoxides of alkali metals are paramagnetic.

Reason : Superoxides contain the ion O_2^- which has one unpaired electron in its anti-bonding molecular 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

 [Watch Video Solution](#)

55. Assertion : The HF_2^- ion exists in the solid state & also in liquid state but not in aqueous state.

Reason : The magnitude 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



[Watch Video Solution](#)

56. 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 orbitals do not have electron density along z-axis.

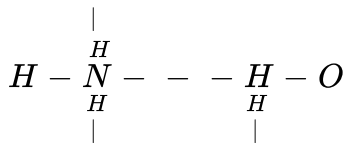
- A. If assertion is true but the reason is false
- B. If assertion is false but reason is true
- C. If both assertion and reason are true and the reason is the correct explanation of assertion
- D. If both assertion and reason are true and the reason is not the correct explanation of assertion

Answer: B



[Watch Video Solution](#)

57. Assertion : The H-bond present in NH_3 dissolved in water is best represented by : $H - \underset{\substack{| \\ H}}{N} - H - - \underset{\substack{| \\ H}}{O} - H$ and not by



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

 [Watch Video Solution](#)

1. There are two groups of compounds A and B. Group A contains three compounds Px_4, Qy_3, Rz_2 . Group 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 (iii) 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](#)

3. 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](#)

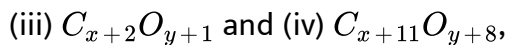
4. Consider the following elements A, B, C and D and their outer electronic configurations are ns^2np^1 , ns^2np^3 , ns^2np^4 and ns^2np^5 respectively. Element E also has same outer electronic configuration like D but shows only single oxidation state(-1). If element A, B, C and D belong to same period 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](#)

5. Consider following four compounds:



if " $x=y=1$ ", then calculate the value of $|p-q|$, where p and q are total number of sp^2 and hybridized carbon atoms respectively in given four compounds.

 [Watch Video Solution](#)

6. 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](#)

7. If Hund rule violate, then find the total number of species among following which will be diamagnetic:



 [Watch Video Solution](#)

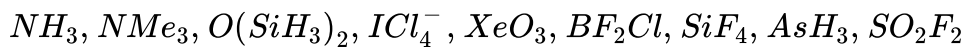
8. Consider the following table

	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_n	16	Planar and polar	m_1
(ii)	BX_n	15	Trigonal pyramidal	m_2
(iii)	CX_n	14	Zero dipole moment	m_3
(iv)	DX_n	13	All $X - D - X$ bond angle are 120°	m_4

Then calculate value of expression $\left| \frac{n_1 + n_2 + n_3 + n_4}{m_1 + m_2 + m_3 + m_4} \right|^2$.

 [View Text Solution](#)

9. 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 :

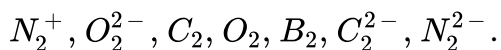


 [View Text Solution](#)

10. Total number of unpaired electrons(s) present in both cationic and anionic part of compound $O_2[PtF_6]$.

 [Watch Video Solution](#)

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



 [View Text Solution](#)

12. Total number of molecules, in which each covalent bond is comprised of effective back bond.

BF_3 , $N(SiH_3)_3$, PF_3 , POF_3 , $B(OH)_3$, $O(SiH_3)_2$, BFH_2 , $BF_2(NH_2)$, N

 [View Text Solution](#)

13. Total number of angle in $SeCl_4$ which are less than 90° .

 [Watch Video Solution](#)

14. Consider the following species

$O(Me)_2$, $N(SiH_3)_3$, CO , $O(SiH_3)_2$, Cl_2 (singlet), Cl_3^- , H_4SiO_4 , OCl_2 , Me

. Then calculate the number of species which have $(p_\pi - p_x)$ back bond or $(p_\pi - d_\pi)$ back bond.

 [View Text Solution](#)

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

SiH_3OH , HCN , $B(OMe)_3$, $NHMe_2$, CH_2CONH_2 , $HCHO$, $HCOOH$, N

 [Watch Video Solution](#)

16. 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 expression $(n_1 - n_2)^2$.

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

 [Watch Video Solution](#)

17. Calculate the $I - I$ distance in (\AA) for given compound $H_2C_2I_2$ if $C - I$ bond length is 2.35\AA . ($\sin 60^\circ = 0.866$)

 [Watch Video Solution](#)

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



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

 [View Text Solution](#)

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

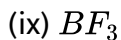
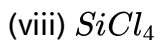
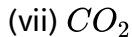
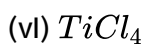
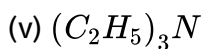
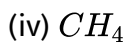
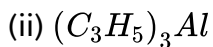
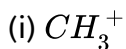
 [Watch Video Solution](#)

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



Watch Video Solution

21. Consider the following species:



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



Watch Video Solution

22. 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](#)

23. Consider the following compounds:

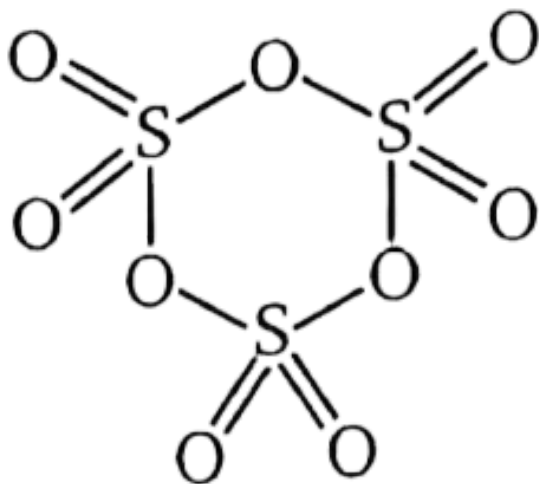
(i) IF_5 (ii) ClI_4^- (iii) XeO_2F_2 (iv) NH_2^- (v) BCl_3 (vi) $BeCl_2$ (vii) $AsCl_4^+$ (viii)

$B(OH)_3$ (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](#)

24. Consider the following



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

 [Watch Video Solution](#)

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

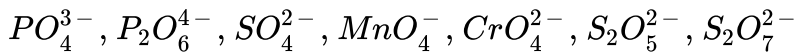
Then, calculate value of " $x + y - z$ " here x is total number of gerade orbital and y is total number of ungerade orbitals and z is total number of axial orbitals in given above orbitals.

 [Watch Video Solution](#)



Watch Video Solution

26. Consider the following oxyanions:



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

27. 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

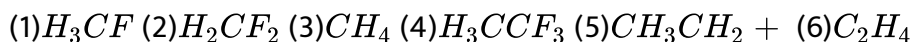
covalency is $3n$. If total number of proton in surrounding atom X is n and

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](#)

28. Consider the following compounds



and calculate value of $Y+X$, (where X is the total number of compounds which have $H - C - H$ bond angles equal to $109^\circ 28'$ and Y is the total number of compounds which have $H - C - H$ bond angles greater than $109^\circ 28'$ and less than 120°)

 [Watch Video Solution](#)

29. 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+} (viii) CN^- (ix) N_2^-

total number of species which have fractional bond order.

 [Watch Video Solution](#)

30. 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.

 [Watch Video Solution](#)

31. The hybridization of central atoms of compounds A, B, C and D are sp^3d , 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](#)

32. 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).

 [Watch Video Solution](#)

33. There are two groups of compounds A and B. Group A contains three compounds Px_4, Qy_3, Rz_2 . Group 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.

 [View Text Solution](#)

34. Consider the following three compounds (i) AX_{2n}^{n-} , (ii) AX_{3n} and (iii) 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](#)

35. 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](#)

36. Consider the following elements A, B, C and D and their outer electronic configurations 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](#)

37. Consider following four compounds:

(i) C_xO_y

(ii) C_xO_{y+1}

(iii) $C_{x+2}O_{y+1}$ and (iv) $C_{x+11}O_{y+8}$,

if " $x=y=1$ ", then calculate the value of $|p-q|$, where p and q are total number of sp^2 and hybridized carbon atoms respectively in given four compounds.

 [Watch Video Solution](#)

38. 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](#)

39. If Hund rule violate, then find the total number of species among following which will be diamagnetic:

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

 [Watch Video Solution](#)

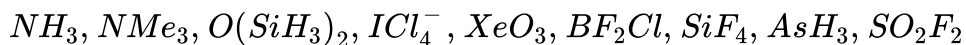
40. Consider the following table

	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_n	16	Planar and polar	m_1
(ii)	BX_{n_2}	15	Trigonal pyramidal	m_2
(iii)	CX_{n_3}	14	Zero dipole moment	m_3
(iv)	DX_{n_4}	13	All $X - D - X$ bond angle are 120°	m_4

Then calculate value of expression $\left| \frac{n_1 + n_2 + n_3 + n_4}{m_1 + m_2 + m_3 + m_4} \right|^2$.

 [View Text Solution](#)

41. 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 :

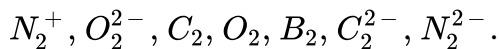


 [View Text Solution](#)

42. Total number of unpaired electrons(s) present in both cationic and anionic part of compound $O_2[PtF_6]$.

 [Watch Video Solution](#)

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



 [Watch Video Solution](#)

44. Total number of molecules, in which each covalent bond is comprised of _____ effective _____ back _____ bond.

BF_3 , $N(SiH_3)_3$, PF_3 , , POF_3 , $B(OH)_3$, $O(SiH_3)_2$, BFH_2 , $BF_2(NH_2)$, N .

 [View Text Solution](#)

45. Total number of angle in $SeCl_4$ which are less than 90° .

 [Watch Video Solution](#)

46. Consider the following species

$O(Me)_2$, $N(SiH_3)_3$, CO , $O(SiH_3)_2$, Cl_2 (singlet), Cl_3^- , H_4SiO_4 , OCl_2 , Me

. Then calculate the number of species which have $(p_\pi - p_x)$ back bond or $(p_\pi - d_\pi)$ back bond.

 [View Text Solution](#)

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

SiH_3OH , HCN , $\text{B}(\text{OMe})_3$, NHMe_2 , CH_2CONH_2 , HCHO , HCOOH , N

 [Watch Video Solution](#)

48. 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 expression $(n_1 - n_2)^2$.

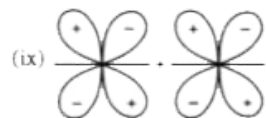
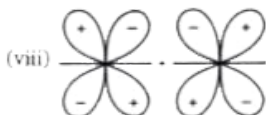
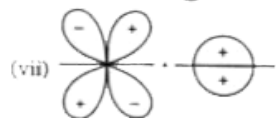
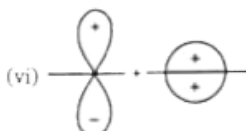
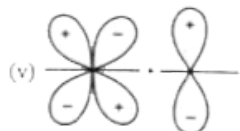
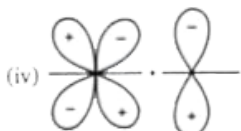
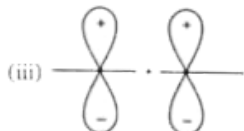
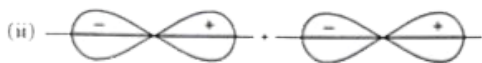
[Where n_1 and n_2 are number of monovalent surrounding atom (L)]

 [Watch Video Solution](#)

49. Calculate the $\text{I} - \text{I}$ distance in (\AA) for given compound $\text{H}_2\text{C}_2\text{I}_2$ if $\text{C} - \text{I}$ bond length is 2.35\AA . ($\sin 60^\circ = 0.866$)

 [Watch Video Solution](#)

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



Then

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



[View Text Solution](#)

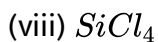
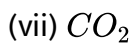
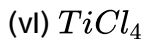
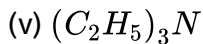
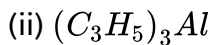
51. Number of hybrid orbital C atoms which have 33% p-character in $C(CN)_4$.

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

53. Consider the following species:



(ix) BF_3

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

 [Watch Video Solution](#)

54. 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](#)

55. Consider the following compounds :

(i) IF_5 (ii) ClI_4^- (iii) XeO_2F_2 (iv) NH_2^-

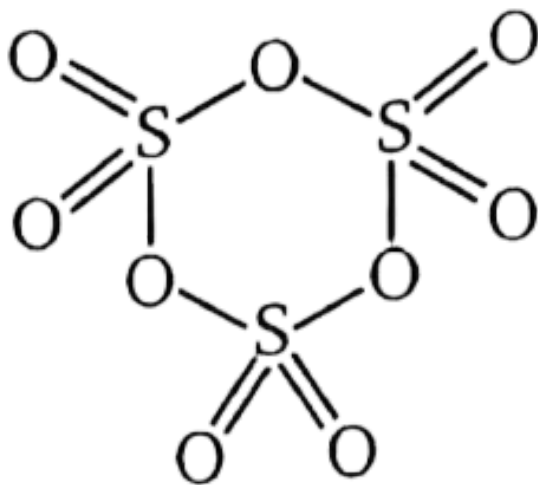
(v) BCl_3 (vi) $BeCl_2$ (vii) $AsCl_4^+$ (viii) $B(OH)_3$

(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

56. Consider the following



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

 Watch Video Solution

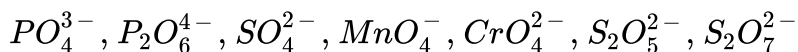
57. Consider the following orbitals (i) $3p_x$ (ii) $4d_{z^2}$ (iii) $3d_{x^2 - y^2}$ (iv) $3d_{yz}$

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](#)

58. Consider the following oxyanions:



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](#)

59. 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](#)

60. 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 $109^\circ 28'$ and Y is the total number of compounds which have $H - C - H$ bond angles greater than $109^\circ 28'$ and less than 120°)

 [Watch Video Solution](#)

61. 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+} (viii) CN^- (ix) N_2^-
total number of species which have fractional bond order.



Watch Video Solution

62. 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.



Watch Video Solution

63. The hybridization of central atoms of compounds A, B, C and D are sp^3d , 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

64. 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 $x_3 \dots$ are possible values of x , with zero dipole moment for given compound).



[Watch Video Solution](#)