CHEMISTRY

BOOKS - TARGET CHEMISTRY (HINGLISH)

NATURE OF CHEMICAL BOND

Classical Thinking

1. Most stable electronic configuration is of _____.

A. noble gases

B. alkali metals

C. alkaline earth metals

D. halogens

Answer: A

2. A chemical bond may be _____ in nature.

A. ionic

B. covalent

C. metallic

D. all of these

Answer: D

Watch Video Solution

3. According to the electronic theory of chemical bonding, developed independently by K ë $ssel$ and Lewis, the atoms of representative elements can combine either

by the transfer of valence electrons from one atom to another (gaining or losing) or by the sharing of valence electrons in order to have an octet in their _____. This is known as octet rule.

A. 4

B. 2

C. 6

D. 8

Answer: D

Watch Video Solution

4. Which of the following Lewis symbols is INCORRECT ?

A. $\dot{L}i$

B. $\cdot \dot{\underset{\cdot}{C}} \cdot$

C. $: \ddot{\underset{\cdot\cdot}{O}} :$

D. $: \ddot{\underset{\cdot\cdot}{F}} \cdot$

Answer: C

Watch Video Solution

5. Electropositive element forms an ion by _____.

A. gaining electron(s) readily

B. losing electron(s) readily

C. sharing the electron(s) readily

D. accepting a proton

Answer: B

Watch Video Solution

6. Ionic bonds are formed between _____.

A. negatively charged ions

B. oppositely charged ions

C. neutral atoms

D. positively charged ions

Answer: B

Watch Video Solution

7. Which of the following is an ionic compound ?

A. $NaCl$

B. NH_3

C. C_2H_6

D. CH_4

Answer: A

Watch Video Solution

8. Element 'X' , whose atoms have an outer - shell electronic configuration ns^2np^4, is most likely to react chemically to form ions, which have a charge of _____.

A. $2+$

B. $1+$

C. $1-$

D. $2-$

Answer: D

Watch Video Solution

9. The charge on a cation M is +2 and on an anion A is -3. The compound formed by them has teh formula _____.

A. MA_2

B. M_2A

C. M_3A_2

D. M_2A_3

Answer: C

Watch Video Solution

10. Bond formed between two unlike atoms with little electronegativily difference is generally _____.

A. ionic

B. covalent

C. metallic

D. co-ordinate

Answer: B

Watch Video Solution

11. Which of the following statements concerning a covalent bond is FALSE ?

A. The electrons are shared between atoms.

B. The bond is non-directional

C. The strength of the bond depends upon the extent of overlapping.

D. The bond formed may be polar on non-polar.

Answer: B

Watch Video Solution

12. Bond between Cl-Cl is _____.

A. co-ordinate

B. ionic

C. covalent

D. metallic

Answer: C

 Watch Video Solution

13. In a double bond connecting two atoms there is a sharing of

A. one

B. two

C. four

D. five

Answer: C

Watch Video Solution

14. The electron not representation of covalent molecules is also known as _____ structures.

A. Rutherford's

B. Bohr's

C. Lewis

D. Millikan's

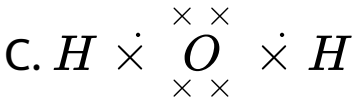
Answer: C

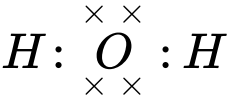
 Watch Video Solution

15. The correct electron dot structure of a water molecule is

A. $H \times \dot{O} \times H$

B. $H \times \underset{\times\times}{\dot{O}} \times \underset{\cdot}{H}$

C. 

D. 

Answer: C

Watch Video Solution

16. Beryllium has 2 electrons in its outer shell. so according to octet rule it will form bonds with _____.

A. 6 Cl atoms

B. 2 Cl atoms

C. 4 Cl atoms

D. 1 Cl atom

Answer: B

Watch Video Solution

17. Which of the following compounds is having an expanded octet?

A. $AlCl_3$

B. CCl_4

C. PCl_5

D. BF_3

Answer: C

Watch Video Solution

18. How many electrons will be around S in SF_6?

A. 8

B. 10

C. 6

D. 12

Answer: D

Watch Video Solution

19. The electron dot structure of NO is _____.

A. $\cdot \ddot{N} = \ddot{O}$

B. $\ddot{\underset{\cdot\cdot}{N}} = \ddot{\underset{\cdot\cdot}{O}}$

C. $\ddot{N} = O:$

D. $:\ddot{N} = \ddot{O}\cdot$

Answer: A

Watch Video Solution

20. Bond energy is defined as _____.

A. amount of energy required to break one mole of bonds between two atoms in a

gaseous state

B. average of the bond energies of the constituent molecules

C. energy required for an electron jump from lower to higher orbital

D. energy released during electron jump from higher to lower orbitals

Answer: A

Watch Video Solution

21. Bond length is defined as _____.

A. twice the distance between the nuclei of two covalently bonded atoms.

B. the average distance between the centres of nuclei of the two covalently bonded atoms

C. the sum of the radius of the two covalently bonded atoms i.e., $r_1 + r_2$

D. the difference between the radius of the two covalently bonded atoms i.e., $r_1 - r_2$

Answer: B

Watch Video Solution

22. The bond energy of H_2 is greater than that of I_2 because of _____.

A. smaller bond length

B. larger bond length

C. larger difference in the electronegativity in I_2 molecule

D. large value of electronegativity of iodine

Answer: A

Watch Video Solution

23. Which type of bonds are present in $CH_3COO^-Na^+$

A. Ionic

B. Metallic

C. covalent

D. Both A and C

Answer:

Watch Video Solution

24. Resonating structures have different _____.

A. atomic arrangements

B. electronic arrangements

C. functional groups

D. alkyl groups

Answer: B

Watch Video Solution

25. Which of the following exhibits resonance?

A. O_3

B. NH_3

C. CH_4

D. H_2O

Answer: A

 Watch Video Solution

26. Which of the following is INCORRECT about resonance?

A. Canonical forms have higher energies than resonating hybrid structure.

B. Resonace energy =Energy of resonanace hybrid-most stable canonical form.

C. Hybrid structure is least stable.

D. Hybrid structure is least energetic.

Answer: C

Watch Video Solution

27. A bond is said to be 50% ionic, when the difference in the electronegativity value of the participating atoms is _____.

A. equal to 1.7

B. less than 1.7

C. more than 1.7

D. less than 1.17

Answer: B

 Watch Video Solution

28. Which of the following molecule has a net dipole moment?

A. CCl_4

B. BF_3

C. CH_4

D. NH_3

Answer: D

Watch Video Solution

29. LiI is more covalent than LiCi because _____.

A. I is less electronegative than CI

B. I^- is larger than Cl^-

C. I is more electronegative than Cl

D. I^- is smaller anion than Cl^-

Answer: B

Watch Video Solution

30. When a molecule is formed by the combinaiton of two atoms having small difference in the electronegativeties, _____.

A. only forces of attraction between them operate

B. only forces of repulsion between them operate

C. forces of attraction or repulsion play no part

D. force of both attraction and repulsion operate

Answer: D

 Watch Video Solution

31. When total attractive forces between two atoms approaching each other is greater than total repulsive force then, potential energy of the system _____.

A. increases

B. remains constant

C. decreases

D. is zero

Answer: C

Watch Video Solution

32. In a hydrogen molecules, the attractive and repulsive force between the atoms are balanced at _____.

A. 77.4 pm

B. 74.0 pm

C. 74.7 pm

D. 70.4 pm

Answer: B

Watch Video Solution

33. Covalent bond formation in H_2 involves _____ overlap.

A. s-s

B. s-p

C. p-p

D. s-d

Answer: A

Watch Video Solution

34. Fluorine molecule is formed by

A. the co-axial p-p orbital overlap

B. the lateral p-p orbital overlap

C. s-s orbital overlap

D. s-p orbital overlap

Answer: A

Watch Video Solution

35. s-p overlap is defined as the overlapping between _____.

A. half filled s-orbital of one atom and completely electrons with opposite spins

B. half filled s-orbital of another atom containing electron with parallel spins

C. half filled s-orbital of one atom and half filled p-orbital of another atom containing electron with opposite spins

D. half filled s-orbital of one atom and half filled p-orbital of another atom containing electron with parallel spins

Answer: C

Watch Video Solution

36. $H - X$ (X = halogen) bond is formed due to _____.

A. s-s overlap

B. s-d overlap

C. s-p overlap

D. p-p overlap

Answer: C

Watch Video Solution

37. A sigma bond is formed by overlapping of _____.

A. p orbitals when they are perpendicular to each other

B. s-s, s-p or p-p orbitals along their axis

C. only s-s orbitals

D. s-p orbitals

Answer: B

 Watch Video Solution

38. Hybridisation involves

A. addition of an electron pair

B. mixing up of atomic orbitals

C. removal of an electron pair

D. separation of orbitals

Answer: B

Watch Video Solution

39. How many sigma bonds are there in oxalic acid ?

Watch Video Solution

40. The oxygen molecule contains _____.

A. two σ-bonds

B. two π-bonds

C. one σ- bond and one π-bond

D. ionic bond

Answer: C

Watch Video Solution

41. Which of the following statement is INCORRECT for PCl_5?

A. All the P-Cl bond lengths are equal.

B. It involves sp^3 hybridisation

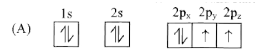
C. The two axial bonds make an angle of 90° with the equatorial plane.

D. Its shape is trigonal bipyramidal .

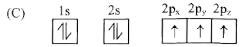
Answer: A

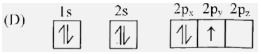
Watch Video Solution

42. Which of the following is the electronic configuration of nitrogen atom in ground state?

A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

43. The bond angle in ammonia is _____.

A. $107^\circ 18'$

B. $109^\circ 28'$

C. 90°

D. 120°

Answer: A

Watch Video Solution

44. The hybridisation in BF_3 is _____.

A. sp

B. sp^3d

C. sp^2

D. sp^3

Answer: C

45. In C_2H_4 molecule, formation of pi bond is due to the overlapping of _____.

A. unhybridised p orbitals of the same carbon atom

B. unhybridised p orbitals of two carbon atoms

C. hybrid orbitals of the carbon atom

D. unhybridised s orbitals of hydrogen atoms

Answer: B

 Watch Video Solution

46. Type of hybridisation in which 33.3% s-character and 66.6% p-character is observed is _____.

A. sp^3

B. sp^2

C. Sp

D. Sp^3d^2

Answer: B

Watch Video Solution

47. Which of the following hybridised state CANNOT be shown by carbon?

A. sp^3d

B. sp^2

C. sp^3

D. Sp

Answer: A

Watch Video Solution

48. Which of the following is INCORRECT regarding VSEPR theory?

A. The number of valence shell electron pairs around the central atom determines the shape of the molecule

B. the valence shell of the central atom is considered as spherical surface with electron pairs localising on it.

C. The valence shell electron pairs repel one another.

D. The valence shell electron pair include only the lone pair of electrons on the central atom.

Answer: D

Watch Video Solution

49. Which of the following molecules does NOT contain a lone pair of electron ?

A. NH_3

B. H_2O

C. PF_5

D. ClF_3

Answer: C

 Watch Video Solution

50. The BCl_3 is a planar molecule whereas NCI_3 is pyramidal because

A. BCl_3 has no lone pair of electrons but NCl_3 has a lone pair of electorns

B. $B - Cl$ bond is more polar than $N - Cl$ bond

C. nitrogen atom is smaller than boron atom

D. $N - Cl$ bond is more covalent than $B - Cl$ bond

Answer: A

Watch Video Solution

51. According to VSEPR theory, the shape of OF_2 molecule is _____.

A. linear

B. octahedral

C. bent

D. sea saw

Answer: C

Watch Video Solution

52. Formation of an excited state is NOT observed for the formation of _____.

A. CH_4

B. C_2H_4

C. NH_3

D. BeF_2

Answer: C

Watch Video Solution

53. Which of the following molecules have a T-shape?

A. ClF_3

B. H_2O

C. PCl_5

D. CO_2

Answer: A

Watch Video Solution

54. SF_4 has _____ shape.

A. see saw

B. square planar

C. angular

D. T shape

Answer: A

Watch Video Solution

55. F-S-F bond angles in SF_6 molecule are _____.

A. 180° and 90°

B. 60° and 90°

C. 180° and 60°

D. 120° and 90°

Answer: A

Watch Video Solution

56. What is sigma bond ? How many sigma bonds are present in C_2H_2 ?

Watch Video Solution

57. The structure of $Cr_2O_7^{2-}$

Watch Video Solution

58. Which of the following statements is not regarding bonding molecular orbitals

A. Bonding molecular orbitals possess less energy than the atomic orbitals from which they are formed

B. Bonding molecular orbitals have low electron densities between the two nuclei.

C. every bonding between molecular orbital 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

59. Antibonding molecular orbital is formed by _____.

A. addition of wave functions of atomic orbitals

B. subtraction of wave function of atomic orbitals

C. multiplication of wave function of atomic orbitals

D. divison of wave function of atomic orbitals

Answer: B

Watch Video Solution

60. Delta molecular orbitals are formed by _____ a

A. d_{xy} and d_{yz}

B. d_{xy} and $d_{x^2-y^2}$

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

D. d_{xy} and d_{xz}

Answer: B

 Watch Video Solution

61. A diatomic molecule is NOT formed by _____.

A. H

B. O

C. He

D. C

Answer: C

Watch Video Solution

62. Hydrogne bonding is formed in compounds containing hydrogen and _____.

A. highly electronegative atoms

B. highly electropositive atoms

C. metal atoms with d-orbitals occupied

D. metalloids

Answer: A

Watch Video Solution

63. strongest hydrogen bonding is shown by

A. water

B. hydrogen fluoride

C. ammonia

D. hydrogen sulphide

Answer: B

Watch Video Solution

64. Total number of π bonds in

$CH_3 - CH = CH - CH_2 - C \equiv CH$ is

_____.

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

Critical Thinking

1. According to octet rule, during bond formation _____.

A. the combining atoms tend to acquire a noble gas configuration

B. the combining atoms have no tendency to acquire stable configuration

C. the combining atoms merely change their configuration

D. combining atoms try to attain maximum potential energy

Answer: A

 Watch Video Solution

2. Write the chemical equation when borax dissolve in water ?

 Watch Video Solution

3. The force, which holds atoms together in an electrovalent bond, is _____.

A. van der Waal's force

B. dipole attraction force

C. electrostatic force of attraction

D. hydrogen bonding

Answer: C

 Watch Video Solution

4. An element 'X' (Z=12) combines with element 'Y' (Z=17) to form an electrovalently bonded compound. Which of the following is FALSE for the formed compound?

A. The electrovalence of X and Y in the compound will be 2 and 1 respectively.

B. The cation of X attains the stable inert gas configuration of neon

C. The anion of Y attains the stable inert gas configuration of krypton.

D. The empirical formula of the compound formed will be XY_2

Answer: C

Watch Video Solution

5. From the following which group of elements easily forms cation

A. F, Cl, Br

B. Li, Na, K

C. O, S, Se

D. n, p, As

Answer: B

Watch Video Solution

6. What happen when diborane is heated with ammonia ?

Watch Video Solution

7. During the formation of CCl_4 molecule, each chlorine atom contributes _____ electron(s) to the shared pair.

A. one

B. two

C. three

D. four

Answer: A

Watch Video Solution

8. If the structural formula of HCN is $H - C \equiv N$, its Lewis dot formula is _____.

A. $H \dot{\times} C \vdots \overset{\times}{\underset{\times}{\times}} N \overset{\times}{\times}$

B. $H \dot{\times} C \vdots \overset{\times}{\underset{\times}{\times}} N$

C. $H \dot{\times} C : \overset{\times}{\times} N :$

D. $H \dot{\times} C : \overset{\times}{\times} \dot{N} :$

Answer: A

Watch Video Solution

9. Describe structure of BuckminsterFullerence ?

Watch Video Solution

10. Which of the following molecule does NOT obey octet rule?

A. BF_3

B. CO_2

C. H_2O

D. N_2

Answer: A

Watch Video Solution

11. What is producer gas ?

Watch Video Solution

12. Which of the following carbon-carbon bonds has the highest energy?

A. C_2H_6

B. C_2H_4

C. C_2H_2

D. C_3H_8

Answer: C

Watch Video Solution

13. Total energy required to break all the bonds in the gaseous state molecule of AB_2 is $xkJmol^{-1}$. Then the bond energy of the bond A-B in the molecule will be _____.

A. $\frac{x}{2} kJmol^{-1}$

B. $\frac{x}{3} kJmol^{-1}$

C. $2x kJmol^{-1}$

D. $2\frac{x}{2} kJmol^{-1}$

Answer: A

Watch Video Solution

14. Which among the following pairs have same bond order?

A. N_2, O_2^{2-}

B. N_2, CO

C. F_2, CO

D. O_2^-, CO

Answer: B

Watch Video Solution

15. Which of the following bonds will be most polar?

A. C-F

B. C-N

C. N-F

D. N-O

Answer: A

Watch Video Solution

16. The bonds between P atoms and Cl atoms in PCl_5 are likely to be

A. ionic with no covalent character

B. covalent with some ionic character

C. covalent with no ionic character

D. ionic with some metallic character

Answer: B

Watch Video Solution

17. NH_3 is more polar than NF_3 because _____.

A. F is more electornegative than H

B. NF_3 has three lone pairs on each F atom

C. the orbital dipole due to lone pair on N is in same direction as the resultant dipole moment of N-H bonds in NH_3

D. the orbital dipole due to lone pair on N is in opposite direction as the resultant dipole moment of N-H bonds in NH_3

Answer: C

Watch Video Solution

18. Maximum covalent character is associated with which of the following compound ?

A. NaI

B. MgI_2

C. $AlCI_3$

D. AlI_3

Answer: D

Watch Video Solution

19. Write product of the following reaction :-

$Fe_2O_3 + CO \rightarrow$

Watch Video Solution

20. Which of the following will provide the most efficient overlap?

A. $s - s$

B. $p_x - p_x$

C. $p_z - p_z$

D. $p_y - p_y$

Answer: A

 Watch Video Solution

21. In hybridisation, mixing of _____ takes place.

A. orbitals of different principal quantum number

B. orbitals of same principal quantum number

C. orbitals of different azimuthal quantum number

D. both (B) and (C)

Answer: D

View Text Solution

22. Write product of the following reaction :-

$CaCO_3 + HCl \rightarrow$

Watch Video Solution

23. Methane molecule contains _____ lone pairs and _____bond pairs respectively.

A. four,zero

B. three, one

C. one, three

D. zero, four

Answer: D

Watch Video Solution

24. A hybrid orbital formed from s and p-orbital can contribute to

A. σ bond only

B. either σ or π bond

C. π bond only

D. none of these

Answer: A

Watch Video Solution

25. Which of the following molecule has a linear shape?

A. $BeCl_2$

B. BF_3

C. CH_4

D. C_2H_4

Answer: A

Watch Video Solution

26. Which of the following statement is not correct for sigma and pi- bonds formed between two carbon atoms ?

A. Sigma bond is stronger than pi-bond

B. pi bonds are formed between hybrid orbitals between unhybridised orbitals

C. Free rotation of atoms around a sigma bond is allowed but not in case of a pi bond.

D. Sigma bond is directional but a pi bond has no primary effect in this regard.

Answer: B

 Watch Video Solution

27. Which of the following is TRUE regarding hybridisation in PCl_5?

A. All the bond angles in PCl_5 are equivalent.

B. Axial and equatorial bonds have same bond length

C. On orbital overlap between phosphorus and chlorine atom, five $sp^3d - p$ sigma covalent bond are formed.

D. Axia and equatorial bonds have equivalent bond energies.

Answer: C

Watch Video Solution

28. Which of the following does NOT have lone pair over the central atom?

A. NH_3

B. PH_3

C. BF_3

D. PCl_3

Answer: C

Watch Video Solution

29. The bond angle in H_2O molecule is less than that of NH_3 molecule because_____.

A. the hybridisation of H_2O and NH_3 is different

B. the atomic radii of N and O are different

C. there is one lone pair of electorns on O and two lone pair of electrons on N

D. there are two lone pairs of electrons on O and one lone pair of electrons of N

Answer: D

 Watch Video Solution

30. As the electronegative increases from iodine to fluorine, the bond angle _____, from PI_3 to PF_3.

A. increases

B. remains same

C. decreases

D. doubled

Answer: C

Watch Video Solution

31. What happens when HCOOH is heated at 373K with conc. H_2SO_4 ?

Watch Video Solution

32. Write the resonance structure of CO_2 .

Watch Video Solution

33. $2p_z$ orbital of one atom do not combine with $2p_x$ orbital of another atom because of

their _____.

A. same energy

B. same symmetries

C. different symmetries

D. different shell

Answer: C

Watch Video Solution

34. What happens when CH_3Cl is heated at 570K in presence of Cu powder and Si ?

Watch Video Solution

35. For a stable molecule the value of bond order should be

A. negative

B. positive

C. zero

D. either (A) or (C)

Answer: B

Watch Video Solution

36. The molecular orbital configuration of a diatomic molecule is

$\sigma 1s^2 \sigma^* 1s^2 \sigma 2s^2 \sigma^* 2s^2 \sigma 2p_x^2 \pi 2p_y^2 \pi 2p_z^2$

Its bond order is _____.

A. 3

B. 2.5

C. 2

D. 1

Answer: A

Watch Video Solution

37. Which of the following molecule has highest bond energy?

A. F_2

B. C_2

C. N_2

D. O_2

Answer: C

Watch Video Solution

38. Which of the following does NOT exist on the basis of molecular orbital theory?

A. C_2

B. B_2

C. He_2

D. Li_2

Answer: C

Watch Video Solution

39. Which of the following is CORRECT with respect to decreasing order of their bond orders?

A. $N_2 > C_2 > B_2 > Be_2$

B. $N_2 > C_2 > Be_2 > B_2$

C. $N_2 = C_2 > B_2 > Be_2$

D. $N_2 = C_2 > Be_2 > B_2$

Answer: A

Watch Video Solution

40. The bond order of O_2 and O_2^+ are _____ respectively.

A. $2 \text{ and } 1\frac{1}{2}$

B. $2 \text{ and } 2\frac{1}{2}$

C. 1 and 2

D. 2 and 1

Answer: B

Watch Video Solution

41. What are the uses of zeolites ?

Watch Video Solution

42. Which of the following molecules shows intramolecular hydrogen bonding?

A. Benzoic acid

B. Salicylaldehyde

C. Benzaldehyde

D. Phenol

Answer: B

Watch Video Solution

43. What do you mean by silicones ?

Watch Video Solution

44. H_2O is dipolar, whereas BeF_2 is not. It is because

A. H_2O is linear and BeF_2 is angular

B. H_2O is angurlar and BeF_2 in linear

C. the electronegativity of F is greater than that of O

D. H_2O involves hydrogen bonding whereas BeF_2 is a discrete molecule

Answer: B

Watch Video Solution

Competitive Thinking

1. If the atomic number of element X is 7, the best electron dot symbol for the element is _____.

A. X

B. . . X .

C. $\cdot \dot{\underset{\cdot}{X}} :$

D. $: \ddot{\underset{\cdot\cdot}{X}} :$

Answer: C

Watch Video Solution

2. Ionic bonds are usually formed by combination of elements with _____.

A. high ionisation potiential and low electron affinity

B. low ionisation potiential and high electron affinity

C. high ionisation potiential and high electron affinity

D. low ionisation potiential and low electron affinity

Answer: B

Watch Video Solution

3. Bond formed in crystal by anion and cation is _____.

A. ionic

B. metallic

C. convalent

D. dipole

Answer: A

 Watch Video Solution

4. What is the effect of more electronegative atoms on the strength of an ionic bond ?

A. Decreases

B. Increases

C. Decreases slowly

D. Remain the same

Answer: B

 Watch Video Solution

5. An element X with the electronic configuration $1s^2 2s^2 2p^6 3s^2$ would be expected to form the chloride with the formula _____.

A. XCl_3

B. XCl_2

C. XCL

D. X_2Cl

Answer: B

Watch Video Solution

6. Which of the following compounds is covalent?

A. H_2

B. CaO

C. KCl

D. $MgCl_2$

Answer: A

Watch Video Solution

7. The number of electrons involved in the bond formation of N_2 molecule are _____.

A. 2

B. 4

C. 6

D. 10

Answer: C

Watch Video Solution

8. Number of electrons in the valence orbit of nitrogen in an ammonia molecule are

A. 8

B. 5

C. 6

D. 7

Answer: A

 Watch Video Solution

9. Write the product obtained on action of oxygen on diborane ?

Watch Video Solution

10. The molecule having one unpaired electron is

A. NO

B. CO

C. CN^-

D. O_2

Answer: A

Watch Video Solution

11. Which of the following bonds require the largest amount of bond energy to dissociate the atoms concerned ?

A. H-H bond in H_2

B. C-H bond CH_4

C. $N \equiv N$ bond in N_2

D. O=O bond in O_2

Answer: C

Watch Video Solution

12. The bond order in NO is 2.5 while that in NO^+ is 3. Which of the following statements is true for these two species ?

A. Bond length in NO^+ is equal to that in NO.

B. Bond length in NO is greater than in NO^+

C. Bond length in NO^+ is greater than in NO.

D. Bond length is unpredictable.

Answer: B

Watch Video Solution

13. Resonance occurs due to the :

A. delocalization of sigma electrons

B. delocalization of pi electrons

C. migration of H atoms

D. migration of proton

Answer: B

Watch Video Solution

14. The unequal sharing of bonded pair of electrons between two atoms in a molecule causes _____.

A. dipole

B. redical formation

C. covalent

D. decomposition of molecule

Answer: A

Watch Video Solution

15. Pauling's electronegativity values for elements are useful in predicting

A. polarity of bonds in molecules

B. position of elements in electrochemical series

C. co-ordination number

D. dipole moment of various molecules

Answer: A

 Watch Video Solution

16. Bond polarity of diatomic molecule is because of _____.

A. difference in electron affinities of the two atoms

B. difference in electronegativities of the two atoms

C. difference in ionisation potential

D. difference in atomic radii

Answer: B

Watch Video Solution

17. In a polar molecule , the ionic charge is 4.8×10^{-10} esu. If the interatomic distance is 1Å unit, then the dipole moment is

A. 41.8 Debye

B. 4.18 Debye

C. 4.8 Debye

D. 0.48 Debye

Answer: C

Watch Video Solution

18. The dipole moment of BF_3 is zero because _____.

A. it is covalent molecule

B. it is a tetraatomic molecule

C. it is having trigonal planar geometry

D. the electronegativeity difference between boron and fluorine is more

Answer: C

Watch Video Solution

19. Carbon tetrachloride has no net dipole moment because of

A. its planar structure

B. its regular tetrahedral structure

C. similar sizes of carbon and chlorine atoms

D. similar electrons affinities of carbon and chlorine

Answer: B

20. Identify the non-polar molecule in the set of compounds given HCl, HF, H_2 , HBr.

A. H_2

B. HCl

C. HF

D. HBr

Answer: A

 Watch Video Solution

21. Which molecule has the largest dipole moment?

A. HCl

B. HI

C. HBr

D. HF

Answer: D

Watch Video Solution

22. Which molecules has zero dipole moment ?

A. H_2O

B. CO_2

C. HF

D. HBr

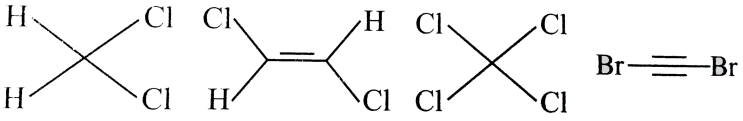
Answer: B

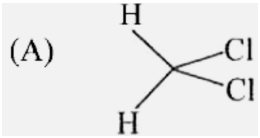
Watch Video Solution

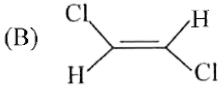
23. Write the structure of inorganic benzene ?

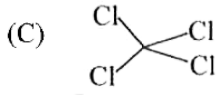
Watch Video Solution

24. The compound that will have a permanent dipole moment among the following is:



A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

25. polarisibility of halide ions increasing in the order

A. F^-, I^-, Br^-, Cl^-

B. Cl^-, Br^-, I^-, F^-

C. I^-, Br^-, CI^-, F^-

D. F^-, Cl^-, Br^-, I^-

Answer: D

Watch Video Solution

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

A. LiCi and RbCl`

B. $RbCl$ and $BeCl_2$

C. $RbCl$ and $MgCl_2$

D. $MgCl_2$ and $BeCl_2$

Answer: B

Watch Video Solution

27. The correct sequence of increasing covalent character is represented by

A. $LiCi < NaCl < BeCl_2$

B. $BeCl_2 < NaCl < LiCi$

C. $NaCl < LiCi < BeCl_2$

D. $BeCl_2 < LiCi < NaCl$

Answer: C

Watch Video Solution

28. Which of the following hybridisation is known as trigonal hybridisation?

A. sp^3

B. Sp

C. sp^2

D. dsp^2

Answer: C

Watch Video Solution

29. In which molecule are all atoms co-planar?

A. CH_4

B. BF_3

C. PF_3

D. NH_3

Answer: B

Watch Video Solution

30. The species, having bonds angle of 120° is

A. PH_3

B. CIF_3

C. NCl_3

D. BCl_3

Answer: D

Watch Video Solution

31. Formation of PCl_3 is explained on the basis of what hybridisation of phosphorus atom?

A. sp^2

B. Sp

C. sp^3d

D. sp^3d^2

Answer: B

Watch Video Solution

32. The main axis of diatomic molecule is z. The orbitals p_x and p_y overlap to form

A. π- molecular orbital

B. σ- molecular orbital

C. δ- molecular orbital

D. no bond

Answer: D

Watch Video Solution

33. Which type of overlapping reusults in the formation of a π bond?

A. Axial overlapping of s-s orbitals

B. Lateral overlapping of p-p orbitals

C. Axial overlapping of p-p orbitals

D. Axial overlapping of s-p orbitals

Answer: B

Watch Video Solution

34. The structure of PF_5 molecule is _____.

A. tetrahedral

B. trigonal bipyramidal

C. square planar

D. pentagonal bipyramidal

Answer: B

Watch Video Solution

35. The trigonal bipyramidal geometry results from the hybridisation

A. dsp^3 or sp^3d

B. dsp^2 or sp^2d

C. d^2sp^3 or sp^3d^2

D. d^3sp^3 or d^2sp^3

Answer: A

Watch Video Solution

36. Octahedral molecular shape exists in _____ hybridisation.

A. sp^3d

B. sp^3d^2

C. sp^3d^3

D. none of these

Answer: B

Watch Video Solution

37. The structure of IF_7 is

A. octahedral

B. pentanonal bipyramidal

C. trigonal bipyramidal

D. tetrahedral

Answer: B

 Watch Video Solution

38. In a regular octahedral molecule MX_6 the number of $X - M - X$ bonds at 180° is

A. six

B. four

C. three

D. two

Answer: C

Watch Video Solution

39. The maximum number of 90° angles between bond pair-bond pair of electrons is observed in

A. dsp^2 hybridisation

B. sp^3 hybridisation

C. dsp^3 hybridisation

D. sp^3d^2 hybridisation

Answer: D

Watch Video Solution

40. Predicted the correct order among the following

A. bond pair - bond pair gt lone pair - bond pair gt lone pair - lone pair

B. lone pair - bond pair gt bond pair - bond pair gt lone pair - lone pair

C. lone pair - lone pair gt lone pair -bond pair gt bond pair - bond pair

D. lone pair - lone pair gt bond pair - bond pair gt lone pair - bond

Answer: C

Watch Video Solution

41. In the compound 'X', all the bond angles are exactly $109^\circ 28$. 'X' may be_____.

A. chloromethane

B. iodoform

C. carbon tetrachloride

D. chloroform

Answer: C

Watch Video Solution

42. In NH_3, bond angle is less than tetrahedral bond angle due to _____.

A. bond pair repulsion

B. lone pair repulsion

C. bond pair-lone pair repulsion

D. none of these

Answer: C

Watch Video Solution

43. The bond angle of water is 104.5° due to _____.

A. repulsion between lone pair and bond pair

B. sp^3 hybridisation of O

C. higher electronegativity of O

D. none of these

Answer: A

Watch Video Solution

44. Consider the molecules CH_4, NH_3 and H_2O which of the given statement is false ?

A. The H-O-H bond angle in H_2O is smaller than the H-N-H bond angle in NH_3

B. The H-O-H bond angle in CH_4 is larger than the H-N-H bond angle in NH_3

C. The H-C-H bond angle in CH_4, the H -N-H bond angle in NH_3, and the H-O-H bond angle in H_2O are all greater than 90°

D. The H-O-H bond angle in H_2O is larger than the H-C-H bond angle in CH_4.

Answer: D

Watch Video Solution

45. In Which of the following is the angle between the two covalent bonds is the greatest?

A. CO_2

B. CH_4

C. NH_3

D. H_2O

Answer: A

Watch Video Solution

46. Which of the following species contains three bond pairs and one lone pair around the central atom?

A. H_2O

B. BF_3

C. NH_2^-

D. PCl_3

Answer: D

Watch Video Solution

47. The shape of XeF_4 molecule is

A. linear

B. pyramidal

C. tetrahedral

D. square planar

Answer: D

 Watch Video Solution

48. Which is false statement about LCAO

A. addition of atomic orbitals results in molecular orbitals.

B. Atomic orbitals of nearby same energy combine to form molecular orbitals.

C. Bonding molecular orbitals occupy higher energy than atomic orbitals.

D. Each molecular orbital accommodates maximum number of two electrons.

Answer: C

Watch Video Solution

49. The bond order of a molecule is given by _____.

A. the total number of electrons in bonding and antibonding orbitals

B. the difference between the number of electrons in bonding and antibonding

orbitals

C. twice the difference between the number of electrons in bonding and antibonding orbitals

D. half the difference between the number of electrons in bonding and antibonding orbitals

Answer: D

Watch Video Solution

50. If bond order increase than _____.

A. energy and bond length increase

B. energy increases, bond length decreases

C. energy increases, bond length increases

D. both decreases

Answer: B

Watch Video Solution

51. Which one of the following sepcies is diamagnetic in nature ?

A. He_2^+

B. H_2

C. H_2^+

D. H_2^-

Answer: B

Watch Video Solution

52. The bond order in N_2 molecule is _____.

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

53. The bond order in N_2^+ ion is _____.

A. 1

B. 2

C. 2.5

D. 3

Answer: C

Watch Video Solution

54. Which of the following is paramagnetic?

A. B_2

B. C_2

C. N_2

D. F_2

Answer: A

 Watch Video Solution

55. The paramagnetic property of the oxygen molecule is due to the presence of unpiared electrons present in .

A. $(\sigma 2p_x)^1$ and $(\sigma^* 2p_x)^1$

B. $(\sigma 2p_x)^1$ and $(\pi 2p_y)^1$

C. $(\pi^* 2p_x)^1$ and $(\pi^* 2p_y)^1$

D. $(\pi^* 2p_y)^1$ and $(\pi 2p_y)^1$

Answer: C

Watch Video Solution

56. The increassing order of bond order of O_2, O_2^+, O_2^- and O_(2)^(--)` is :

A. $O_2^+, O_2, O_2^-, O_2^{2-}$

B. $O_2^{2-}, O_2^-, O_2^+, O_2$

C. $O_2, O_2^+, O_2^-, O_2^{2-}$

D. $O_2^{2-}, O_2^-, O_2, O_2^+$

Answer: D

Watch Video Solution

57. The boiling point of a compound is raised by _____.

A. intramolecular hydrogen bonding

B. intermolecular hydrogen bonding

C. covalent bonding

D. ionic covalent

Answer: B

Watch Video Solution

58. The hydrides of the first elements in groups 15-17, namely NH_3, H_2O and HF respectively show abnormally high value for

melting and boiling points. This is due to _____.

A. small size o N, O and F

B. the abitity to form extensive intermolecular H-bonding

C. the ability to form extensive intramolecular H-bonding

D. effective van der Waals interaction

Answer: B

Watch Video Solution

59. Indicate the nature of bonding in diamond

A. Covalent

B. ionic

C. coordinate

D. hydrogen

Answer: A

 Watch Video Solution

60. Which of the following is a correct set with respect to molecule, hybridization, and shape?

A. $BeCl_2$, sp^2, linear

B. $BeCl_2$, sp^2, triangular planar

C. $BeCl_3$, sp^2, triangular planar

D. $BeCl_3$, sp^3, triangular planar

Answer: C

Watch Video Solution

61. The bond angle and dipole moment of water respectively are :

A. $109.5^\circ, 1.84D$

B. $107.5^\circ, 10.56D$

C. $104.5^\circ, 1.84D$

D. $102.5^\circ, 1.56D$

Answer: C

Watch Video Solution

62. Which one of the following pairs of species have the same bond order ?

A. CO, NO

B. O_2NO^+

C. CN^-, CO

D. N_2, O_2^-

Answer: C

Watch Video Solution

Evaluation Test

1. In a homologous series, the percentage of 's' character _____.

A. increases gradually

B. decreases gradually

C. remains the same

D. increases to a cirtain molecules and then decreases

Answer: C

Watch Video Solution

2. Which of the following molecule has two p-orbitals unused?

A. BF_3

B. BeF_2

C. NH_3

D. C_2H_2

Answer: B

Watch Video Solution

3. Energy required to dissociate $4g$ of gaseous hydrogen into free gaseous atoms is $208Kcal$ at $25^{\circ}C$

The bond energy of $H-H$ bond will be

A. 104 kcal

B. 52 kcal

C. 520 kcal

D. 5.2 kcal

Answer: A

Watch Video Solution

4. What happens when aluminium reacts with NaOH in presence of water molecules ?

Watch Video Solution

5. What is the geometrical shape of $\left[Pt(Cl)_4\right]^{2-}$?

A. Planar triangular

B. Square pyramidal

C. square planar

D. tetrahedral

Answer: B

Watch Video Solution

6. Stability of the species Li_2, Li_2^- and Li_2^+ increases in the order of

A. $Li_2^- < Li_2 < Li_2^+$

B. $Li_2 < Li_2^+ < Li_2^-$

C. $Li_2^- < Li_2^+ < Li_2$

D. $Li_2 < Li_2^- < Li_2^+$

Answer: C

Watch Video Solution

7. Which of the following is NOT used to represent bond angles ?

A. Degrees

B. Minutes

C. Seconds

D. Milliseconds

Answer: D

Watch Video Solution

8. The number of sigma bonds in

$CH_2 = CH - CH = CH - C \equiv CH$ is

_____.

A. 5

B. 9

C. 11

D. 10

Answer: C

9. 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 species

D. low heat of sublimation of cation forming solid

Answer: B

Watch Video Solution

10. An example for an electron deficient molecule is _____.

A. NH_3

B. PCl_3

C. $BeCl_2$

D. IF_7

Answer: C

Watch Video Solution

11. Octahedral molecular shape exists in _____ hybridisation.

A. sp^3d

B. sp^3d^2

C. sp^2d

D. sp^2d^2

Answer: B

Watch Video Solution

12. The species having bond angles of $109^\circ 28$ is _____.

A. CH_4

B. BCl_3

C. PCl_5

D. H_2O

Answer: A

Watch Video Solution

13. The bond angle in ammonia is $107^\circ 18$ due to _____.

A. sp^3 hybridisation of N

B. repulsion between bonding electros and lone pair

C. higher electronegativity of N

D. tetrahedral geometry

Answer: B

 Watch Video Solution

14. A molecule is stable when the number of bonding orbitals is _____.

A. greater than the number of antibonding orbitals

B. greater than or equal to the number of antibonding orbitals

C. equal to the number of antibonding orbitals

D. less than the number of antibonding orbitals

Answer: A

Watch Video Solution

15. Which of the following molecules CANNOT exist under normal conditions?

A. Be_2

B. He^+

C. H_2^+

D. Be_2^+

Answer: A

 Watch Video Solution

16. The electronegativity values of C,H,O,N and S are 2.5, 2.1, 3.5, 3.0 and 2.5 respectively. Which of the following is the most polar?

A. O-H

B. S-H

C. N-C

D. C-H

Answer: A

Watch Video Solution

17. Find the CORRECT set with respect to molecule, hybridisation and shape.

A. CO_2, sp^2 linear

B. CO_2, sp, linear

C. BF_3, sp, bent

D. BF_3, sp^3 tetrahedral

Answer: B

 Watch Video Solution

18. If in a polar molecule, the ionic charge is 2.6×10^{-10} e.s.u. and the inter ionic distance is 0.8 Å , then the dipole moment is _____.

A. 3.25 Debye

B. 3.08 Debye

C. 1.28 Debye

D. 2.08 Debye

Answer: D

 Watch Video Solution

19. Which of the following does NOT show hydrogen bonding?

A. NH_3

B. HF

C. H_2O

D. HCl

Answer: D

Watch Video Solution

20. Which of the following theory provides good explanation about the paramagnetic behaviour of oxygen ?

A. Resonance

B. VSEPR theory

C. Molecular orbital theory

D. Valence bond theory.

Answer: C

Watch Video Solution