CHEMISTRY

BOOKS - ARIHANT CHEMISTRY (HINGLISH)

CHEMICAL BONDING

Practice Exercise

1. Which of the following is not correct?

A. $Na^+ + Cl^- \rightarrow NaCl$

B. $Ca^+ + 2F^- \rightarrow CaF_2$

C. $Na^+ + F^- \rightarrow NaF$

D. $Ca^+ + 2Na^+ \rightarrow CaNa_2$

Answer: D

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2. Which postulation provide the basic for the modern concepts regarding ion formation by

electron transfer and the formation opf ionic crystalline compounds?

A. Kossel's postulations

B. Langmulr's postulations

C. Newton's postulations

D. Lewis postulations

Answer:

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3. In chlorine atom, how many electrons are short of the argon configuration?

A. One

B. Two

C. Three

D. Four

Answer:

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4. Which is not paramagnetic?

A. O_2

B. O_2^+

C. O_2^-

D. O_2^{2-}

Answer: D

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5. Which of the following is the weakest bond?

A. Hydrogen bond

B. Covalent bond

C. Ionic bond

D. Metallic bond

Answer: A

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6. Which of the following compounds has the smallest bond angle?

A. H_2O

B. H_2S

C. NH_3

D. CO_2

Answer:

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7. The molecule which contains ionic as well as covalent bond, is

A. NH_4Cl

B. H_2O

C. $CaCl_2$

D. $\mathbb{C}l_4$

Answer:

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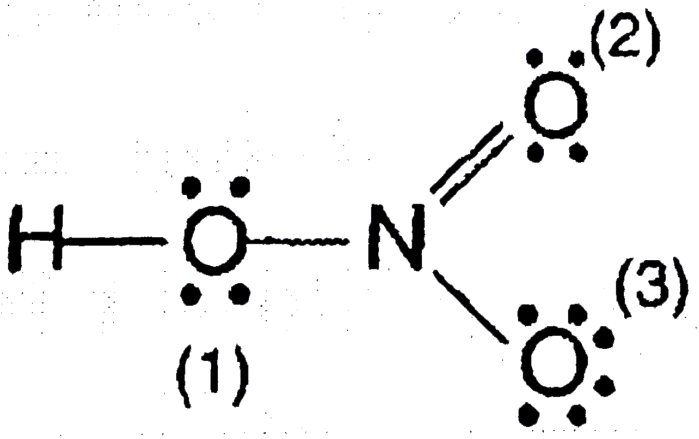
8. Consider the following Lewis structure of HNO_3,



The formal charge on $O_{(1)}$, $O_{(2)}$ and $O_{(3)}$ are given in colmun II. Match the following and choose the correct option from the codes given below.

Column I		Column II	
A.	O_1	1.	Zero
B.	O_2	2.	−1
C.	O_3	3.	+3

A. $\begin{matrix} A & B & C \\ 1 & 2 & 3 \end{matrix}$

B. $\begin{matrix} A & B & C \\ 2 & 1 & 2 \end{matrix}$

C. $\begin{matrix} A & B & C \\ 1 & 1 & 2 \end{matrix}$

D. $\begin{matrix} A & B & C \\ 3 & 2 & 1 \end{matrix}$

Answer:

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9. Which one has covalent as well as ionic valency?

A. NaCl

B. HCl

C. H_2O

D. NaOH

Answer:

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10. In NO_3^- ion, the number of bond pairs and lone pairs of electrons on nitrogen atom respectively are

A. 2 and 2

B. 3 and 1

C. 1 and 3

D. 4 and 0

Answer:

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11. Which one of the following contains both ionic and covalent bonds?

A. C_6H_5Cl

B. H_2O

C. NaOH

D. CO_2

Answer:

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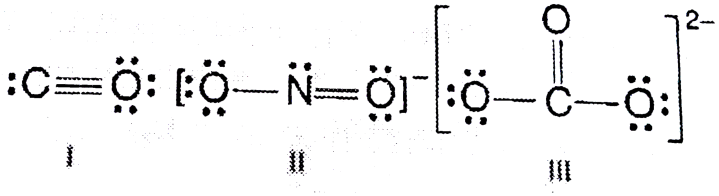
12. Lewis dot structures of CO, NO_2^- and CO_3^{2-} are I, II and III respectivley given below.



Which of these structure(s) is/are wrong?

A. Only I

B. Only II

C. Only III

D. I, II and III

Answer:

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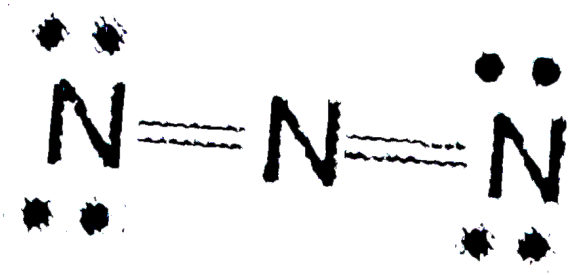
13. In the following electron dot structure, calculate the formal charge from left to right nitrogen atom respectively:



A. $-1,\ -1$ and $+1$

B. $-1,\ +1$ and -1

C. $+1,\ -1$ and -1

D. $+1,\ -1$ and $+1$

Answer:

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14. The magnitude of lattice energy of a solid increases if

A. size of ions is small

B. charges of ions are small

C. ions are neutral

D. None of the above

Answer:

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15. If the electronic configuration of an element is $1s^2 2s^2 2p^2 3s^2 3p^6 3d^2 4s^2$, four electrons involved in chemical bond formation will be ..... .

A. $3p^6$

B. $3p^6, 4s^2$

C. $3p^6, 3d^2$

D. $3d^2, 4s^2$

Answer:

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16. The electronic configuration of the outemost shell of the most electronegative element is

A. $2s^2 2p^5$

B. $3s^2 3p^5$

C. $4s^2 4p^5$

D. $5s^2 5p^5$

Answer:

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17. An electronic arrangement is said to be stable if its outer shell consists

A. doublet of electrons

B. triplet of electrons

C. octet of electrons

D. singlet of electron

Answer:

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18. Which is the most covalent?

A. C-F

B. C-O

C. C-S

D. C-Br

Answer:

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19. Which of the following molecules is correct regarding $BeCl_2$?

A. It violates octet rule and has sp^2-hybridisation

B. It has sp-hybridisation and follow octet rule

C. It violates octet rule and has linear structure

D. All of the above are true

Answer:

20. The correct order of increasing covalent character of the following is

A. $SiCl_4 < AlCl_3 < CaCl_3 < KCl$

B. $KCl < CaCl_2 < AlCl_3 < SiCl_4$

C. $AlCl_3 < CaCl_2 < KCl < SiCl_4$

D. None of the above

Answer:

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21. The metallic luster exhibited by sodium is explained by

A. diffusion of sodium ions

B. excitation of free protons

C. oscillation of loose electrons

D. existence of body centred cubic lattice

Answer:

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22. Arrange the following ionic compunds in order of increasing ionic character :

KF	KCL	KBr	Kl
A	B	C	D

A. $A < B < C < D$

B. $D < C < B < A$

C. $B < A < C < D$

D. $C < A < B < D$

Answer:

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23. Consider the Born-Haber cycle for the formation of an ionic compound given below.

$$M(s) \xrightarrow{\triangle H_1} M(g) \xrightarrow{\triangle H_2} M^+(g)$$

$$\frac{1}{2}X_2(g) \xrightarrow{\triangle H_3} X(g) \xrightarrow{\triangle H_4} X^-(g) \xrightarrow{\triangle H_5} Z$$

Here, Z refers to

A. $M^+X^-(I)$

B. $M^+X^-(s)$

C. MX_2

D. $M^+X^-(g)$

Answer:

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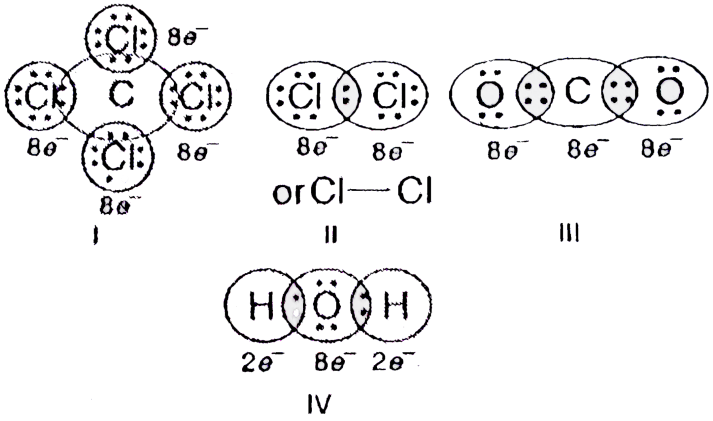
24. Which of the following structures is/are correct?



A. I, II and IV

B. II, III and IV

C. II and III

D. I, II, III and IV

Answer:

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25. In which of the following molecule/ion, all the bonds are not equal?

A. XeF_4

B. BF_4^-

C. C_2H_4

D. SiF_4

Answer:

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26. The electronegativity difference between two atoms A and B is 2, then percentage of covalent character in the molecule is

A. $54\ \%$

B. $46\ \%$

C. $23\ \%$

D. $72\ \%$

Answer:

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27. Which of the following is a favorable factor for cation formation?

A. Low ionisation potential

B. High electron affinity

C. High electron negativity

D. Small atomic size

Answer:

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28. Match the reaction give in Column I with enthalpy in Column II and choose the correct

option from the codes given below.

	Column I		Column II
A.	$Mg \longrightarrow Mg^{2+} + 2e^-$	1.	Electron gain enthalpy
B.	$O \longrightarrow O^{2-} - 2e^-$	2.	Ionisation enthalpy
C.	$M(g) \longrightarrow M^+(g) + e^-$		
D.	$X(g) \longrightarrow X^-(g) - e^-$		

A. $\begin{matrix} A & B & C & D \\ 1 & 2 & 1 & 2 \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ 2 & 1 & 2 & 1 \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ 1 & 1 & 2 & 2 \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ 2 & 2 & 1 & 1 \end{matrix}$

Answer:

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29. In the formation of a molecule, only the outer shell electrons take part in chemical combination and are known as

A. Valence electrons

B. inner electrons

C. inert electrons

D. reactive electrons

Answer:

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30. How many double bonds are present in carbon dioxide molecule?

A. One

B. Two

C. Three

D. Four

Answer:

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31. Which of the following hybridisations is not possible?

A. sp^3

B. sp^3d^3

C. sd^3

D. None of the above

Answer:

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32. The hybridization of atomic orbitals of nitrogen is NO_2^+, NO_3^-, and NH_4^+ respectively are

A. sp^2, sp^3 and sp^2

B. sp, sp^2 and sp^3

C. sp^2, sp and sp^3

D. sp^2, sp^3 and sp

Answer:

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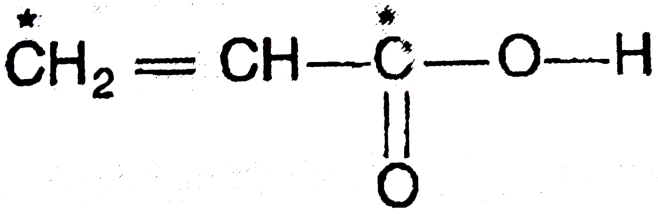
33. What is the type of hybridisation of carbon atoms marked with star?



A. sp^2 and sp

B. sp^2 and sp^2

C. sp and sp^2

D. None of these

Answer:

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34. Among the three molecules $XeF_4, SF_4, SiF_4,$ which has/have tetrahedral structure?

A. All three

B. SiF_4 and SF_4

C. Only SiF_4

D. Only SF_4

Answer:

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35. What is the structure ox XeF_6?

A. Tetrahedral

B. Distorted octahedral

C. Octahedral

D. None of these

Answer:

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36. Which of the molecules has trigonal bipyramidal geometry with bond angles 120° and 90°?

A. SF_6

B. PCl_5

C. CH_4

D. BF_3

Answer:

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37. Which of the following species has tetrahedral geometry?

A. BH_4^-

B. NH_2^-

C. CO_3^{2-}

D. H_3O^+

Answer:

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38. The species having pyramidal shape is

A. SO_3

B. BrF_3

C. SiO_3^{2-}

D. OSF_2

Answer:

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39. Which species having molecules have same molecular geometry?

I. CH_4 II. BF_3 III. NH_4^+ IV. SF_4

A. I and II

B. III and IV

C. I and III

D. I, III and IV

Answer:

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40. The structure of IF_7 is

A. square pyramidal

B. trigonal bipyramidal

C. octahedral

D. pentagonal bipyramidal

Answer:

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41. Based on VSEPR theory, the number of 90 degree F-Br-F angles in BrF_5, is

A. 0

B. 1

C. 2

D. 3

Answer:

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42. A sigma-bonded molecule MX_3 is T-shaped. The number of non-bonding pairs of electrons is

A. 0

B. 2

C. 1

D. Can be predicted only If atomic number of M is known

Answer:

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43. Element A has three electrons in the outermost orbit and B has six electrons in the outermost orbit The formula of the compound will be .

A. X_2Y_6

B. XY_2

C. X_2Y_3

D. X_3Y_2

Answer:

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44. The number of oxygen atoms bonded to one phosphorus atom in P_4O_6 is

A. 4

B. 3

C. 6

D. 5

Answer:

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45. In PO_4^{3-} the formal charge on each O-atom and $P-O$ bond order respectively are .

A. $+1$

B. -1

C. -0.75

D. $+0.75$

Answer:

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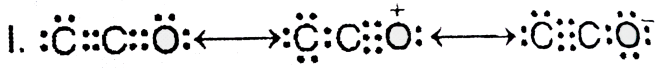
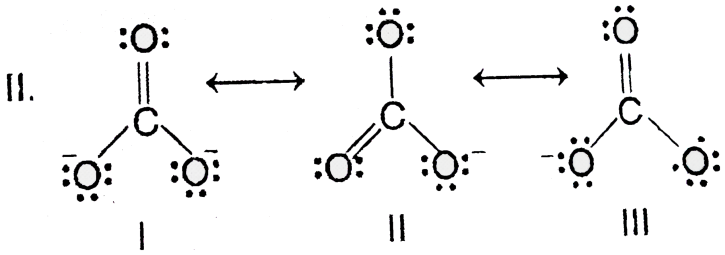
46. Which of the following is not the correct representation of resonance?

I. 

II. 

A. Only I

B. Only II

C. Both I and II

D. None of these

Answer:

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47. Which of the following molecules represent the resonance?

A. O_3

B. CO_3^{2-}

C. CO_2

D. All of these

Answer:

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48. The structure represents the molecules more accurately, is called

A. resonance hybrid

B. canonical structure

C. resonating structure

D. None of these

Answer:

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49. Match the following columns and choose the correct option from the codes given below.

Column I		Column II	
A.	$BeCl_2$	1.	Linear
B.	BF_3	2.	Trigonal planar
C.	CO_2		

A. $\begin{matrix} A & B & C \\ 1 & 1 & 2 \end{matrix}$

B. $\begin{matrix} A & B & C \\ 2 & 2 & 1 \end{matrix}$

C. $\begin{matrix} A & B & C \\ 1 & 2 & 1 \end{matrix}$

D.

A	B	C
2	1	2

Answer:

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50. The compound MX_4 is tetrahedral. The number of $\angle XMX$ angles formed in the compound is

A. three

B. four

C. five

D. six

Answer:

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51. In accordance to molecular theory,

A. O_2^+ is diamagnetic and bond order is more than O_2

B. O_2^+ is diamagnetic and bond order is less than O_2

C. O_2^+ is paramagnetic and bond order is less than O_2

D. O_2^+ is paramagnetic and bond order is more than O_2

Answer:

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52. Which bond angle θ would result in the maximum dipole moment for the triatomic YXY?

A. $\theta = 90^\circ$

B. $\theta = 120^\circ$

C. $\theta = 150^\circ$

D. $\theta = 180^\circ$

Answer:

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53. The bond angles of NH_3, $NH_4^{\oplus}$ and $\overset{\Theta}{N}H_2$ are in the order .

A. $NH_2^- > NH_3 > NH_4^+$

B. $NH_4^+ > NH_3 > NH_2^-$

C. $NH_3 > NH_2^- > NH_4^+$

D. $NH_3 > NH_4^+ > NH_2^-$

Answer:

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54. The molecule having zero dipole moment is

A. CIF_3

B. CH_4

C. PH_3

D. CH_2Cl_2

Answer:

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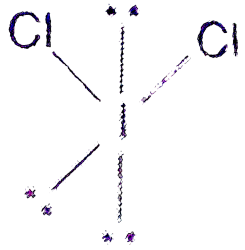
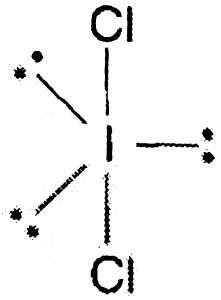
55. Which of the following show correct structure of lCl_2?

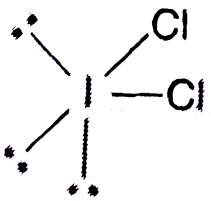
A.



B.



C.



D. None of these

Answer:

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56. The net dipole moment of H_2O molecule is

A. zero

B. 1.85 D

C. 4.90×10^{-30}cm

D. 0.80×10^{-30} cm

Answer:

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57. Deviation of O-O bond length in ozone molecule from the normal bond length seems as

A. single bond length increases while double bond length decreases

B. single bond length decreases while double bond length increases

C. single bond length increases while double bond length remains same

D. single bond length remains same while double bond length increases

Answer:

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58. The decreasing order of dipole moments of the molecules HF, H_2O, BeF_2, NF_3 is

A. $HF > H_2O > BeF_2 > NF_3$

B. $H_2O > HF > NF_3 > BeF_2$

C. $BeF_2 > NF_3 > HF > H_2O$

D. $NF_3 > BeF_2 > H_2O > HF$

Answer:

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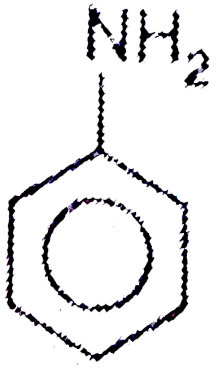
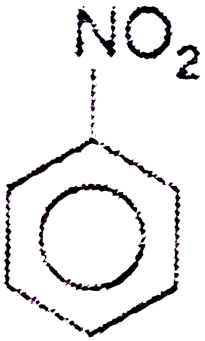
59. Which of the following will have largest dipole moment?

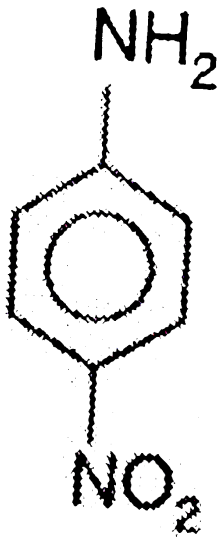
A.

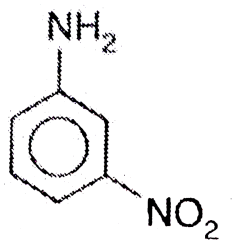


B.



C.



D. 

Answer:

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60. Which pair of moecules will have permanent dipole moment for both members ?

A. SiF_4 and NO_2

B. NO_2 and CO_2

C. NO_2 and O_3

D. SiF_4 and CO_2

Answer:

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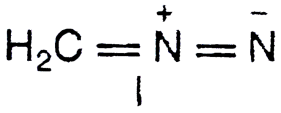
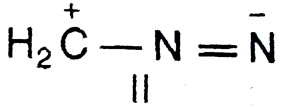
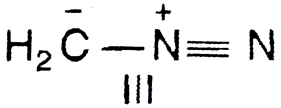
61. The correct stability order of the following resonance structure is



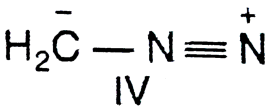
I



II



III



IV

A. $I > II > IV > III$

B. $I > III > II > IV$

C. $II > I > III > IV$

D. $III > I > IV > II$

Answer:

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62. The correct order of bond angles in $NH_3, PCl_3 \text{and} BCl_3$ is

A. $PCl_3 > NH_3 > BCl_3$

B. $NH_3 > BCl_3 > PCl_3$

C. $NH_3 > PCl_3 > BCl_3$

D. $BCl_3 > NH_3 > PCl_3$

Answer:

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63. The correct order of decreasing polarity is

A. $HF > SO_2 > H_2O > NH_3$

B. $HF > H_2O > SO_2 > NH_3$

C. $HF > NH_3 > SO_2 > H_2O$

D. $H_2O > NH_3 > SO_2 > HF$

Answer:

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64. In case of sodium and chlorine, the electron transfer takes place from

A. sodium to chlorine

B. chlorine to sodium

C. Both (a) and (b)

D. None to these

Answer:

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65. Bond order of O_2, O_2^- and O_2^{2-} is in order

A. 2.5

B. 1.5

C. 1.0

D. 2

Answer:

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66. $AICI_3$ is covalent while AIF_3 is ionic This can be justified on the basic of .

A. valence bond theory

B. crystal structure

C. lattice energy

D. Fajan's rule

Answer:

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67. VSEPR theory was proposed by

A. Pauling

B. Sidgwick and Powell

C. Hund and Mulliken

D. GN Lewis

Answer: B

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68. The bond order of O_2^- is

A. 2

B. 1.5

C. 1

D. 2.5

Answer: B

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69. In the case of Cl_2, the bond is formed by

A. transfer of electrons

B. sharing of electrons

C. Both (a) and (b)

D. None of the above

Answer:

70. Match the following species with chemical formula and choose the correct option from

the codes given below.

	Column I		Column II
A.	Compounds	1.	NH_4^+
B.	Atoms	2.	H_2O
C.	Ions	3.	Li_2O
		4.	Ne
		5.	Li^+

A. $\begin{matrix} A & B & C \\ 2,3 & 4 & 1,5 \end{matrix}$

B. $\begin{matrix} A & B & C \\ 3 & 1,2 & 4,5 \end{matrix}$

C. $\begin{matrix} A & B & C \\ 2 & 3,1 & 4,5 \end{matrix}$

D. $\begin{matrix} A & B & C \\ 1 & 2,1 & 4,5 \end{matrix}$

Answer:

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71. Sodium chloride is soluble in water but not in benzene because

A. a. $\Delta H_{hydration} < \Delta H_{lattice}$ (in water)
$\Delta H_{hydration} > \Delta H_{lattice}$ (in benzene)

B. b. $\Delta H_{hydration} < \Delta H_{lattice}$ (in benzene)
$\Delta H_{hydration} > \Delta H_{lattice}$ (in water)

C. c. $\Delta H_{hydration} = \Delta H_{lattice}$ (in water)
$\Delta H_{hydration} < \Delta H_{lattice}$ (in benzene)

D. d. $\Delta H_{hydration} < \Delta H_{lattice}$ (in water)
$\Delta H_{hydration} = \Delta H_{lattice}$ (in benzene)

Answer:

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72. Which of the following bonds is present in BF_4^- ?

A. Electrovalent

B. Metallic

C. Dative

D. Hydrogen

Answer:

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73. KF combines with HF to form KHF_2. The compound contains the species

A. K^+, F^- and H^+

B. K^+, F^- and HF

C. K^+ and $[HF_2]^-$

D. $[KHF]^+$ and F_2

Answer:

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74. Which of the following pairs of ions are isoelectronic and isostructural?

A. NO_3^-, CO_3^{2-}

B. SO_3, NO_3^-

C. ClO_3^-, CO_3^{2-}

D. CO_3^{2-}, ClO_3^-

Answer:

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75. When two atoms share two electron pairs, they are said to be joined by a

A. single bond

B. double bond

C. triple bond

D. None of these

Answer:

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76. Which of the following molecules have same bond order?

H_2	Cl_2	CO	Br_2	N_2
I	II	III	IV	V

A. I, II and IV have same bond order

B. III and V have same bond order

C. Both (a) and (b)

D. None of the above

Answer:

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77. An ionic solid is poor conductor of electricity because

A. ions do not conduct electricity

B. charge on the ions is uniformly distributed

C. ions have uniform field of influence around it

D. ion occupy fixed position in solids

Answer:

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78. The molecule having one unpaired electron is

A. NO

B. CO

C. CN^-

D. CO_2

Answer:

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79. How many corners of a cube would be occupied in the case of noble gas?

A. 1

B. 2

C. 4

D. 8

Answer:

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80. The noble gases have a particularly stable outer shell electronic configuration represented as

A. ns^2np^6

B. ns^2np^5

C. ns^2np^4

D. ns^2np^8

Answer:

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81. Which of the following has a linear structure?

A. CCl_4

B. SO_4

C. C_2H_2

D. C_2H_4

Answer:

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82. In XeF_2, XeF_4 and XeF_6, the number of the lone pairs of Xe respectively are

A. 2, 3 and 1

B. 1, 2 and 3

C. 4, 1 and 2

D. 3, 2 and 1

Answer:

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83. The largest bond angle in

A. AsH_3

B. NH_3

C. H_2O

D. PH_3

Answer:

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84. If the bond enthalpy of O_2, N_2 and H_2 are 498, 946 and 435.8 kJ mol^{-1} respectively. Choose the correct order of decreasing bond strength.

A. $H_2 > N_2 > O_2$

B. $N_2 > O_2 > H_2$

C. $O_2 > H_2 > N_2$

D. $H_2 > O_2 > N_2$

Answer:

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85. The one which has no coordinate bond, is

A. HNO_3

B. CO

C. CO_3^{2-}

D. $CH_3 - NC$

Answer:

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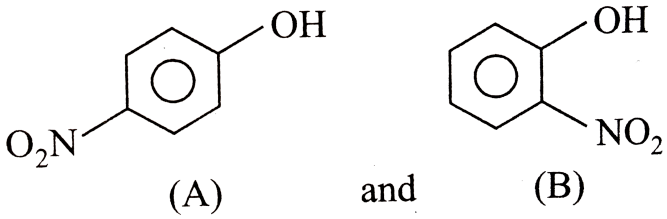
86. Of the two compounds shown below , the vapour pressure of B at a particular temperature is



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 vassel

Answer:

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Bitsat Archives

1. Which of the following pairs has identical shape?

A. CH_4 and SF_4

B. BCl_3 and CIF_3

C. XeF_2 and $ZnCl_2$

D. SO_2 and CO_3

Answer:

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2. Using MOT, which of the following pairs denote paramagnetic species?

A. B_2 and C_2

B. B_2 and O_2

C. N_2 and O_2

D. O_2 and O_2^{2-}

Answer:

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3. Which of the following is isoelectronic with carbon?

A. Na^+

B. Al^{3+}

C. O^{2-}

D. N^+

Answer:

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

A. H_3O^+

B. BF_4^-

C. HF_2^-

D. NH_4^+

Answer:

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5. The number of unpaired electrons in nickel carbonyl, is

A. zero

B. one

C. four

D. five

Answer:

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6. The highest bond strength is shown by

A. O-O bond

B. S-S bond

C. Se-Se bond

D. Te-Te bond

Answer:

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7. Which of the following has maximum dipole moment?

A. NCl_3

B. NBr_3

C. NH_3

D. NI_3

Answer:

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8. Which one of the following species has the largest internuclear distance for its ion pair ?

A. NaCl

B. NaBr

C. LiCi

D. KI

Answer:

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9. The pair of species with similar shape is

A. PCl_3, NH_3

B. CF_4, SF_4

C. $PbCl_2, CO_2$

D. PF_5, IF_5

Answer:

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10. The bond length of HCl molecule is 1.275 Å and its dipole moment is 1.03 D. The ionic character of the molecule (in per cent) is

(Charge of the electron $= 4.8 \times 10^{-10}$ esu)

A. 100

B. 67.3

C. 33.66

D. 16.83

Answer:

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11. Which of the following is a correct set ?

A. H_2O, sp^3 angular

B. BCl_3, sp^3, angular

C. NH_4^+ ,dsp^(2),square planar

D. CH_4, dsp^2, tetrahedral

Answer:

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12. The isoelectronic pair is

A. Cl_2O, ICl_2^-

B. Cl_2^-, ClO_2

C. IF_2^+, I_3^-

D. ClO_3^-, CIF_2^+

Answer:

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13. Which of the following species has a bond order other than 3?

A. CO

B. CN^-

C. NO^+

D. O_2^+

Answer:

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14. The molecular electronic configuration of Be_2 is

A. $\sigma 1s^2 \overset{*}{\sigma} 1s^2 \sigma 2s^2 \overset{*}{\sigma} 2p^2$

B. $KK\sigma 2s^2$

C. $\sigma 1s^2 \overset{*}{\sigma} 1s^2 \sigma 2s^2 \overset{*}{\sigma} 2s^2$

D. None of these

Answer:

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