CHEMISTRY

BOOKS - FULL MARKS CHEMISTRY (TAMIL ENGLISH)

CHEMICAL BONDING

Textual Evaluation Solved Multiple Choice Questions

1. In which of the following compounds does the central atom obey the octet rule ?

A. XeF_4

B. $AlCl_3$

C. SF_6

D. SCl_2

Answer: D

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2. In the molecule $O_A = C = O_B$, the formal charge on $O_A C$ and O_B are respectively.

A. $-1, 0, +1$

B. $+1, 0, -1$

C. $-2, 0, +2$

D. $0, 0, 0$

Answer: D

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3. Which of the following is electron deficient ?

A. PH_3

B. $(CH_3)_2$

C. BH_3

D. NH_3

Answer: C

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4. Which of the following molecule contains no π bond ?

A. SO_2

B. NO_2

C. CO_2

D. H_2O

Answer: D

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5. The ratio of number of sigma (σ) and pi (π) bonds in 2-butynal is

A. $8/3$

B. $5/3$

C. $8/2$

D. $9/2$

Answer: D

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6. Which one of the following is true?

A. $120^\circ, 80^\circ$

B. $109^\circ.28$

C. 90°

D. $89^\circ, 117^\circ$

Answer: D

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7. Assertion: Oxygen molecule is paramagnetic.

Reason: It has two unpaired electron in its bonding molecular orbital

A. 1) both assertion and reason are true and reason is the correct explanation of assertion

B. 2) both assertion and reason are true but reason is not the correct explanation of assertion

C. 3) assertion is true but reason is false

D. 4) Both assertion and reason are false

Answer: C

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8. According to Valence bond theory, a bond between two atoms is formed when

A. fully filled atomic orbitals overlap

B. half filled atomic orbitals overlap

C. non-bonding atomic orbitals overlap

D. empty atomic orbitals overlap

Answer: B

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9. In ClF_3, NF_3 and BF_3 molecules the chlorine, nitrogen and boron atoms are

A. sp^3 hybridised

B. sp^3, sp^3 and sp^2 respectively

C. sp^2 hybridised

D. sp^3d, sp^3 and sp^2 hybridised respectively

Answer: D

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10. When one s and three p orbitals hybridise,

A. four equivalent orbitals at 90° to each other will be formed

B. four equivalent orbitals at 109° 28' to each other will be formed.

C. four equivalent orbitals, that are lying the same plane will be formed

D. none of these

Answer: B

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11. Which of these represents the correct order of their increasing bond order.

A. $C_2 < C_2^{2-} < O_2^{2-} < O_2$

B. $C_2^{2-} < C_2^{+} < O_2 < O_2^{2-}$

C. $O_2^{2-} < O_2 < C_2^{2-} < C_2^{+}$

D. $O_2^{2-} < C_2^{+} < O_2 < C_2^{2-}$

Answer: D

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12. Hybridisation of central atom in PCl_5 involves the mixing of orbitals.

A. $s, p_x, p_y, d_x2, d_x2 - y^2$

B. $s, p_x . p_y, p_{xy} . d_x2 - y^2$

C. $s, p_x, p_y, p_z, d_x2 -_y 2$

D. $px, py, d_{xy}, d_x2 -_y 2$

Answer:

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13. The correct order of $O - O$ bond length in hyrdrogen peroxide, ozone and oxygen is

A. $H_2O_2 > O_3 > O_2$

B. $O_2 > O_3 > H_2O_2$

C. $O_2 > H_2O_2 > O_3$

D. $O_3 > O_2 > H_2O_2$

Answer: B

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14. Which one of the following is diamagnetic ?

A. O_2

B. O_2^{2-}

C. $O_2\_(2+)$

D. None of these

Answer: B

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15. Bond order of a species is 2.5 and the number of electons in its bonding molecular orbital is found to be 8 The no. of electons in its antibonding molecular orbital is

A. three

B. four equivalent orbitals at 109° 28' to each other will be formed.

C. zero

D. cannot be calculated form the given information.

Answer: A

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16. Shape and hybridisation of IF_5 are

A. Trigonal bipyramidal, sp^3d^2

B. Trigonal bipyramidal, sp^3 d

C. Square pyramidal, sp^3d^2

D. Octahedral, sp^3d^2

Answer: C

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17. Pick out the incorrect statement from the following.

A. sp^3 hybrid orbitals are equivalent and are at an angle of $109^\circ 28'$ with each other.

B. dsp^2 hybrid orbitals are equivalent and bond angle between any two of them is 90°

C. All five sp^3 d hybrid orbitals are not equivalent. Out of these five sp^3 d hybrid orbitals, three are at an angle of 120°, remaining two are perpendicular to the plane containing the other three.

D. none of these

Answer: C

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18. The number of lone pair of electrons on C-atom present in CO_2 are .....

A. SeF_4, XeO_2F_2

B. SF_4, XeF_2

C. $XeOF_4, TeF_4$

D. $SeCl_4, XeF_4$

Answer: A

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19. In which of the following molecules / ions BF_3, NO_2^-, H_2 the central atom is sp^2 hybridised ?

A. NH_2^- and H_2O

B. NO_2^- and H_2O

C. BF_3 and NO_2^-

D. BF_3 and NH_2^-

Answer: C

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20. Some of the following properties of two species, NO_3^- and H_3O^+ are described below. Which one of them is correct ?

A. dissimilar in hybridisation for the central atom with different structure.

B. isostructural with same hybridisation for the Central atom.

C. different hybridisation for the central atom with same structure

D. none of these

Answer: A

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21. The types of hybridiration on the five carbon atom from right to left in the , 2,3 pentadiene.

A. $sp^3, sp^2, sp, sp^2, sp^3$

B. sp^3, sp, sp, sp, sp^3

C. $sp^2, sp, sp^2, sp^2, sp^3$

D. $sp^3, sp^3, sp^2, sp^3, sp^3$

Answer: A

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22. XeF_2 is isostructural with

A. $SbCl_2$

B. $BaCl_2$

C. TeF_2

D. ICl_2^-

Answer: D

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23. The percentage of s-character of the hybrid orbitals in methane, ethane, ethene and ethyne are respectively .....

A. $25, 25, 33.3, 50$

B. $50, 50, 33.3, 25$

C. $50, 25, 33.3, 50$

D. $50, 25, 25, 50$

Answer: A

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24. Of the following molecules, which have shape similar to carbon dioxide?

A. $SnCl_2$

B. NO_2

C. C_2H_2

D. All of these

Answer: C

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25. According to VSEPR theory, the repulsion between different parts of electrons obey the order .

A. $l.p - l.p > b.p - b.p > l.p - b.p$

B. $b.p - b.p > b.p - l.p > l.p - b.p$

C. $l.p - l.p > b.p - l.p > b.p - b.p$

D. $b.p - b.p > l.p - l.p > b.p - l.p$

Answer: C

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26. Shape of ClF_3 is

A. Planar triangular

B. Pyramidal

C. T' Shaped

D. none of these

Answer: C

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27. Non - zero dipole moment is shown by

A. CO_2

B. p-dichlorobenzene

C. carbon tetrachloride

D. water

Answer: D

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28. Which of the following conditions is not correct for resonating structures?

A. the contributing structure must have the same number of unpaired electrons.

B. the contributing structures should have similar energies.

C. the resonance hybrid should have higher energy than any of the contributing structure.

D. none of these

Answer: C

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29. Among the following , the compound that contains, ionic , covalent and co-ordinate linkage is

A. NH_4Cl

B. NH_3

C. $NaCl$

D. none of these

Answer: A

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30. CaO and NaCl have the same crystal structure and approximately the same radii. IfU is the lattice energy of NaCI. the approximate lattice energy of CaO is .....

A. U

B. $2U$

C. $U/2$

D. $4U$

Answer: D

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Textual Evaluation Solved Short Answer Questions

1. Define the following: (i) Bond order (ii) Hybridisation (iii) σ -bond

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2. What is a pi bond ?

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3. In CH_4, NH_3 and H_2O the central atom undergoes sp^3 hybridlsation - yet their bond

angles are different.

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4. Explain sp^2 hybridisation in BF_3.

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5. Draw the M.O diagram for oxygen molecule calculate its bond order and show that O_2 is paramagnetic.

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6. Draw MO diagram of CO and calculate its bond order .

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7. What do you understand by interphase ?

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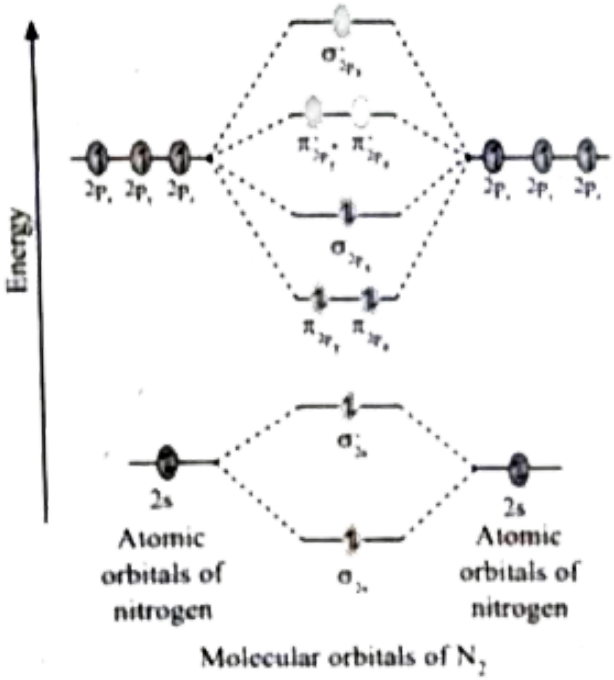
8. Discuss the formation of N2, molecule using MO Theory.



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9. What is dipole moment ?

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10. Linear form of carbondioxide molecule has two polar bonds. Yet the molecule has zero dipole moment why?

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11. Draw the Lewis structures for the following species.

HNO_3

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12. Explain the bond formation in $BeCl_2$ and $MgCl_2$.

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13. Which bond is stronger σ or π? Why ?

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14. Define bond energy.

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15. Hydrogen gas is diatomic where as inert gases are monoatomic - explain on the basis of MO theory.

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16. What is polar covalent bond? Explain with example.

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17. Considering x-axis as molecular axis, which out of the following will form a sigma bond.

(i) $1s$ and $2p_y$

(ii) $2p_x$ and $2p_x$

(iii) $2p_x$ and $2p_z$

(iv) $1s$ and $2p_z$

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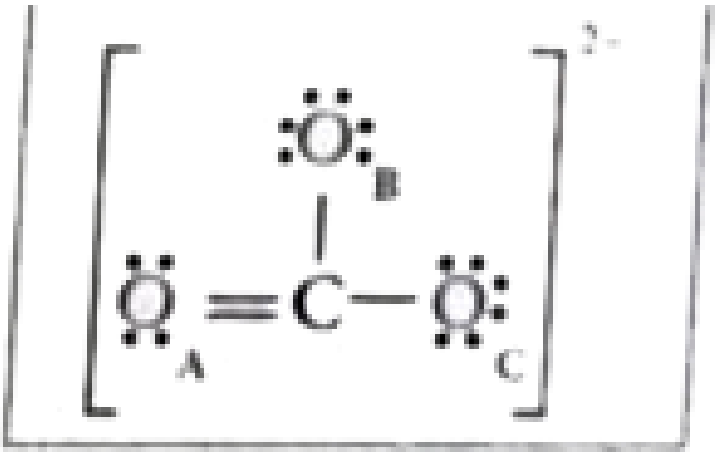
18. Explain resonance with reference to carbonate ion.



Lewis structure of CO_3^{2-}

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19. Explain the bond formation in ethylene and acetylene.

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20. What type of hybridisations are possible in the following geometeries ?

(a) octahedral

(b) tetrahedral

(c) square planar

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21. Explain VSEPR theory . Applying this theory to predict the shapes of IF_7, and SF_6.

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22. CO_2 and H_2O both are triatomic molecules but their dipole moment values are

different. Why?

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23. Which one of the following has highest bond order? N_2, N_2^+ or N_2^-?

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24. Explain the covalent character in ionic bond.

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25. Describe fajan's rule.

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In Text Question Evaluate Yourself

1. Draw the lewis structures for

(i) Nitrous acid $(HN0_2)$ (ii) Phosphoric acid

(iii) Sulphur troxide (SO_3)

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2. Calculate the formal charge on each atom of carbonyl chloride $(COCl_2)$

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3. Explain the ionic bond formation in MgO and CaF_2 :

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4. Write the resonance structures for (i) Ozone molecule (ii) N_2O

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5. Of the two molecules OCS and CS_2 which one has higher dipole moment value .Why?

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6. Arrange the following in the decreasing order of Bond angle

(i) CH_4, H_2O, NH_3

(ii) $C_2H_2, BF_3, \mathrm{CC1_4}$

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7. Bond angle in PH_4^+ is higher than in PH_3. Why?

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8. Explain the bond formation in SF_4 and CCl_(4)' using hybridisation concept.

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9. The observed bond length of N_2^+ is larger than N_2 while the bond length in NO^+ is less than in NO. Why ?

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10. Draw the MO diagram for acetylide ion C_2^{2-} and calculate its bond order.

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Additional Questions Solved Choose The Correct Answer

1. Which is the correct Lewis structure of Helium?

A. $\dot{H}e.$

B. $\dot{\ddot{H}}e.$

C. $\begin{matrix}\dot{\ddot{H}}e\\ \dot{\ddot{}}\end{matrix}$

D. $\dot{\ddot{H}}e$

Answer: D

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2. Which one of the following has coordinate covalent bond?

A. Alkali metals

B. Metals

C. Non metals

D. Metalloids

Answer: C

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3. Which one of the following bond is stronger ?

A. O_2

B. H_2

C. CO_2

D. N_2

Answer: D

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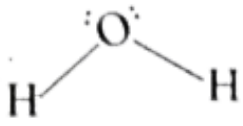
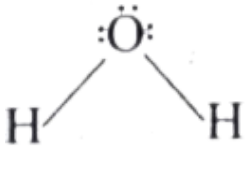
4. Draw the molecular structure of water.

A. 

B. 

C. 

D. 

Answer: B

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5. Which one of the following is true?

A. Carbon

B. Oxygen

C. Fluorine

D. Nitrogen

Answer: C

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6. Among $\dot{\underset{\cdot\cdot}{\overset{\cdot\cdot}{O}}} = C = \dot{\underset{\cdot\cdot}{\overset{\cdot\cdot}{O}}}$ and $:O \equiv C - \dot{\underset{\cdot\cdot}{\overset{\cdot\cdot}{O}}}:$,

which is a preferable structure for CO_2

molecule.

Why?

A. $\dot{\underset{\cdot\cdot}{\dot{O}}} = C = \dot{\underset{\cdot\cdot}{\dot{O}}}$

B. $: O \equiv C - \dot{\underset{\cdot\cdot}{\dot{O}}} :$

C. $\cdot \dot{\underset{\cdot\cdot}{\dot{O}}} \equiv C \equiv \dot{O} \cdot$

D. $O = \dot{\underset{\cdot\cdot}{\dot{C}}} = O$

Answer: A

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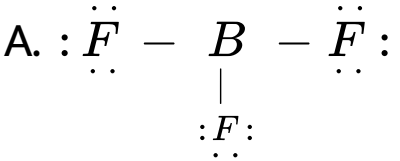
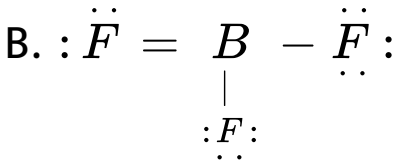
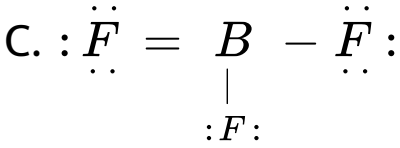
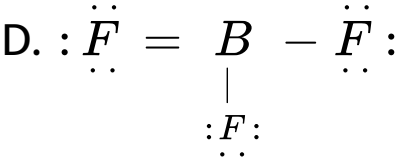
7. Which is the correct lewis structure of BF_3?

A. 

B. 

C. 

D. 

Answer: A

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8. Statement I : In sulphur hexafluoride, the central atom has more than eight valence electrons.

Statement II: The central atom can accommodate additional electron pairs by using outer vacant d orbitals.

A. 1) Statements I and II are correct and statement II is the correct explanation of statement I.

B. 2) Statements I and II are correct but statement II is not the correct

explanation of statement I.

C. 3) Statement I is correct but statement II is wrong

D. 4) Statement I is wrong but statement II is correct.

Answer: A

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9. Which one of the following molecule has complete octet?

A. 1) BF_3

B. 2) $BeCl_2$

C. 3) BCl_3

D. 4) CCl_4

Answer: D

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10. Which one of the following is not a statement?

A. KCl

B. NaI

C. MgO

D. CCl_4

Answer: D

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11. Which one of the following is an ionic or saline hydride?

A. CO_2

B. CH_4

C. CaF_2

D. $BeCl_2$

Answer: C

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12. During the formation of I mole of KCI crystal. the amount of energy released is .....

A. 1) 418.81 kJ

B. 2) 348.56 kJ

C. 3) 718 kJ

D. 4) 70.25 kJ

Answer: C

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13. Which one of the following is not a covalent hydride?

A. CaF_2

B. MgO

C. $\left[Fe(CN)_6\right]^{4-}$

D. KCl

Answer: C

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14. The distance between the nuclei of the two covalently bonded atoms is called.....

A. bond order

B. bond length

C. bond angle

D. bond enthalpy

Answer: B

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15. Length cannot be measured by .....

A. spectroscopic method

B. x-ray diffraction method

C. electron-diffraction method

D. all the above

Answer: D

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16. The value of carbon-carbon single bond length is .....

A. 1.43Å

B. 1.54Å

C. 1.33Å

D. 1.20Å

Answer: B

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17. The value of carbon-carbon double bond length is .....

A. 1.43Å

B. 1.20Å

C. 1.54Å

D. 1.33Å

Answer: D

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18. The value of carbon-carbon triple bond length is .....

A. 1.33Å

B. 1.20Å

C. 1.54Å

D. 1.43Å

Answer: B

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19. Among the following which one has bond order as 3?

A. N_2

B. O_2

C. HCHO

D. $\dot{C}H_4$

Answer: A

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20. Which one of the following has bond order as 2 ?

A. 1) N_2

B. 2) C_2H_4

C. 3) CH_4

D. 4) HCN

Answer: B

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21. Identify the molecule with bond order 1

A. 1) N_2

B. 2) O_2

C. 3) H_2

D. 4) C_2H_4

Answer: C

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22. Which one of the following has zero dipole moment?

A. 1) HF

B. 2) H_2

C. 3) CO

D. 4) NO

Answer: D

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23. Water loving polar molecules are called

A. H_2

B. O_2

C. F_2

D. NO

Answer: D

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24. Statement I: CuCl Is more covalent than NaCl.

Statement II: CuCl Is more covalent than $NaCl, Cu^+$ is Small and have $3s^2$ $3p^6$ $3d^{10}$ configuration and show greater polarisation.

A. 1) Statement I & ll are correct and II is the correct explanation of I.

B. 2) Statement I & || are correct but II is not the correct explanation ot l.

C. 3) Statement I is correct but II is wrong.

D. 4) Statement I is wrong and II is correct.

Answer: A

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25. Which of the following has see saw shape?

A. PCl_5

B. $IO_2F_2^-$

C. SOF_4

D. ClO_3

Answer: B

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26. Which one of the following has pentagonal bipyramidal shape?

A. SF_6

B. IF_4^+

C. AsF_5

D. SF_4

Answer: C

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27. Which one of the following has tetrahedral shape?

A. NH_4^+

B. CIO_4^-

C. HCHO

D. CH_4

Answer: C

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28. Discuss VSEPR model applied for linear, trigonal planar, tetrahedral and octahedral geometries of molecules.

A. O_3

B. CO_3^{2-}

C. NO_3^-

D. BCl_3

Answer: A

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29. Which one of the following has linear shape?

A. $PbCl_2$

B. $SnBr_2$

C. $BeCl_2$

D. CCl_2F_2

Answer: C

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30. Which one of the following is true?

A. HCHO

B. $BeCl_2$

C. $PbCl_2$

D. CF_2Cl_2

Answer: D

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31. Which one of the following has linear shape?

A. BrF_3, CIF_3

B. SF_4, IF_4^+

C. PCI_5, AsF_5

D. NH_3, PF_3

Answer: A

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32. Which one of the following has linear shape?

A. XeF_4

B. $XeOF_4$

C. IF_7

D. IOF_5

Answer: C

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33. Which of the following is a linear equations?

A. I_3^-

B. ICI_4^-

C. BrF_5

D. IOF_5

Answer: A

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34. Which one of the following bond is stronger ?

A. $H_2O < CH_4 < BF_3 < BeCl_2$

B. $BeCl_2 < BF_3 < CH_4 < H_2O$

C. $BF_3 < CH_4 < BeCl_2 < H_2O$

D. $CH_4 < BeCl_2 < H_2O < BF_3$

Answer: A

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35. Which one of the following hvbridisation takes place in the formation of $BeCl_2$?

A. sp^2

B. sp

C. sp^3

D. dsp^2

Answer: B

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36. Calculate the hybridisation of BF_3

A. sp^2

B. sp

C. sp^3

D. sp^3d

Answer: A

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37. Which one of the following has bond order as 2.5?

A. O_2

B. NO

C. CO

D. H_2

Answer: B

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38. Which one of the following is an electron deficient compound?

A. 1) Al_2Cl_6

B. 2) $AlBr_3$

C. 3) SF_6

D. 4) BF_3

Answer: D

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39. Apply the VSEPR model to XeF_4, which of the following molecular shape is consistent with the model?

A. Square planar

B. Tetrahedral

C. Square pyramidal

D. Octahedral

Answer: A

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40. On the basis of molecular orbital theory, select the most appropriate option.

A. The bond order of O_2 is 2.5 and it is paramagnetic

B. The bond order of O_2 is 1.5 and it is paramagnetic

C. The bond order of O_2 is 2 and it is diamagnetic

D. The bond order of O_2 is 2 and it is paramagnetic

Answer: D

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41. Which of the following molecule does not exist due to its zero bond order?

A. H_2^-

B. He_2^+

C. He_2

D. H_2^+

Answer: C

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42. Which of the following molecules have bond order equal to 1?

A. 1) NO, HF, HCl, Li_2, CO

B. 2) H_2, Li_2, HF, Br_2, HCl

C. 3) $Li_2, B_2, CO, NO, He_2^+$

D. 4) B_2, CO, He_2^+, NO, HF

Answer: B

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43. Arrange the following molecules in decreasing order of bond length.

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

B. $O_2^{2-} > O_2^- > O_2 > O_2^-$

C. $O_2^{2-} > O_2^- > O_2 > O_2^-$

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

Answer: B

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44. Among the following which shows the maximum covalent character?

A. 1) $MgCl_2$

B. 2) $FeCl_2$

C. 3) $SnCl_2$

D. 4) $AlCl_3$

Answer: D

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45. Which of the following has maximum number of lone pairs associated with Xe?

A. XeF_2

B. XeO_3

C. XeF_4

D. XeF_6

Answer: A

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46. During the formation of a chemical bond.....

A. energy decreases

B. energy increases

C. energy remains zero

D. energy remains constant

Answer: A

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47. Using MO theory, predict which of the following species has the shortest bond length?

A. O_2^{2+}

B. O_2^-

C. O_2^{2-}

D. O_2^+

Answer: D

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48. Identify the incorrect statement

A. XeO_4 molecule is tetrahedral

B. XeO_4 molecule is square planar

C. There are four $P\pi - d\pi$ bonds

D. There are four $sp^3 - p,$ s bonds

Answer: B

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49. Which of the following contains maximum number of lone pairs on the central atom?

A. ClO_3^-

B. XeF_4

C. SF_4

D. I_3^-

Answer: D

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50. Which one of the following is a correct set?

A. H_2O, sp^3, bent

B. H_2O, sp^2, linear

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

D. CH_4, $dsp,^2$ tetrahedal

Answer: A

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Additional Questions Solved Match The Following

1. Match the following columns

	List-I		List-II
A.	CH_4	1.	Coordinate bond
B.	NaCl	2.	Metallic bond
C.	$[Fe(CN)_6]^4$	3.	Electrovalent bond
D.	Gold	4.	Covalent bond

A.

A	B	C	D
2	4	3	1

B.

A	B	C	D
4	3	1	2

C.

A	B	C	D
3	1	2	4

D.

A	B	C	D
1	2	4	3

Answer: B

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2. Match the following columns

List-I	List-II
A. C — C	1. 1.20Å
B. C = C	2. 1.43Å
C. C ≡ C	3. 1.54Å
D. C — N	4. 1.33Å

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

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

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

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

Answer: A

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3. 

A.
A	B	C	D
3	4	2	1

B.
A	B	C	D
4	2	1	3

C.
A	B	C	D
1	3	4	2

D.
A	B	C	D
2	1	3	4

Answer: A

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4. 

A.
A	B	C	D
2	3	4	1

B.
A	B	C	D
3	4	1	2

C.
A	B	C	D
1	2	3	4

D.
A	B	C	D
4	1	2	3

Answer: B

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5.

A.
A	B	C	D
1	2	3	4

B.
A	B	C	D
3	4	1	2

C.
A	B	C	D
2	3	4	1

D.
A	B	C	D
4	1	2	3

Answer: C

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6. Match the following columns

1.	Nano in nature	(a)	Unimate
2.	Fluorapatite	(b)	Lotus leaf
3.	Self clearing process	(c)	Crystals of a mineral
4.	First digitally operated programmable robot	(d)	Morpho butterfly

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

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

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

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

Answer: B

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Watch Video Solution

7. 

A.
A	B	C	D
1	2	3	4

B.
A	B	C	D
3	4	2	1

C.
A	B	C	D
4	3	1	2

D.
A	B	C	D
2	1	4	3

Answer: C

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8. 

A.
A	B	C	D
1	2	3	4

B.
A	B	C	D
3	4	1	2

C.
A	B	C	D
4	1	2	3

D.
A	B	C	D
2	3	4	1

Answer: D

View Text Solution

9. 

A.
A	B	C	D
2	4	1	3

B.
A	B	C	D
3	2	4	1

C.
A	B	C	D
1	3	2	4

D.
A	B	C	D
4	1	3	2

Answer: A

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10. 

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

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

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

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

Answer: A

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11. 

A.
A	B	C	D
4	1	2	3

B.
A	B	C	D
3	2	1	4

C.
A	B	C	D
1	3	4	2

D.
A	B	C	D
2	4	3	1

Answer: A

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Additional Questions Solved Fill In The Blanks

1. The electrovalent bond is present in .....

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2. The structure of water molecule is

_____

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3. Which one is the preferred structure of CO_2

?

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4. In the formation of a chemical bond between Na^+ and Cl^-, they attain the stable configuration of .....

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5. The mutual sharing of one or more pair of electrons between the two combining atoms results in the formation of .....

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6. Formal charge of an atom can be calculated by the formula.....

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7. The formal charge on the carbon atom in the following structure $\ddot{O} = C = \ddot{O}$ is .....

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8. The formal charge on both oxygen atoms in the structure $\ddot{\underset{\cdot\cdot}{O}} = C = \ddot{\underset{\cdot\cdot}{O}}$ is .....

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9. The formal charge on singly bonded oxygen atom in the structure $:O \equiv C - \ddot{\underset{\cdot\cdot}{O}}:$ is .....

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10. The formal charge on the triply bonded oxygen atom in the structure $:O \equiv C - \ddot{\underset{\cdot\cdot}{O}}:$ is .....

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11. The complete transfer of one or more valence electron from one atom to another leads to the formation of .....

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12. The shape of the molecule is determined approximateiy by .....

Watch Video Solution

13. The unit of bond enthalpy is .....

Watch Video Solution

14. The high reactivity of fluorine is due to _____

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15. The unit of dipole moment is .....

Watch Video Solution

16. The dipole moment of CO_2 is .....

Watch Video Solution

17. The shape of sulphur hexafluoride is .....

Watch Video Solution

18. The type of hybridisation takes place in methane is .....

Watch Video Solution

19. The type of hybridisation takes place in SF_6 is .....

Watch Video Solution

20. The number of electrons present in hydrogen atom is _____.

Watch Video Solution

21. In SF_6 , the bond angle is .....

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22. Which of the following is the correct electronic configuration of noble gases?

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23. Water is a _____ molecule.

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24. In C_2H_4, type of bonds present are .....

Watch Video Solution

25. What is Eltonian pyramid?

Watch Video Solution

26. When magnesium reacts with oxygen, nature of bond formed is .....

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27. The number of lone pair of electrons in water molecule is .....

Watch Video Solution

28. Unsaturated compounds with two double bonds are called as

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29. Geometric radius of the Earth is _____ in the equatorial region .

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30. Calculate the hybridisation of BF_3

Watch Video Solution

31. N_2, CH_4, SO_3, H_2O

Watch Video Solution

32. Hybridisation which takes place in acetylene is .....

Watch Video Solution

33. Bond order of O_2, F_2, N_2 respectively are .....

Watch Video Solution

34. Hybridisation which takes place in acetylene is .....

Watch Video Solution

35. The hybridisation of orbitals of N atom in NO_3^-, NO_2^+ and NH_4^+ are respectively .....

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36. Digital circuits can be made to be respective use of :

Watch Video Solution

37. For a stable molecule, the value of bond order must be .....

Watch Video Solution

38. In acetylene molecule between the carbon atoms there are ..... σ and ..... π bonds.

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Additional Questions Solved Choose The Odd One Out

1. Choose the odd one out.

A. Hydrogen

B. Chlorine

C. Neon

D. Oxygen

Answer: C

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2. Choose the odd one out.

A. NaCl

B. CO_2

C. LiF

D. MgO

Answer: B

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3. Choose the odd one out.

A. Methane

B. Ceasium chloride

C. Ammonia

D. Boron trifluoride

Answer: B

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4. Choose the odd one out.

A. H_2

B. O_2

C. Cl_2

D. F_2

Answer: B

Watch Video Solution

5. Choose the odd one out

A. $BeCl_2$

B. CS_2

C. BF_3

D. HCN

Answer: C

Watch Video Solution

6. Choose the odd one out

A. XeO_2F_2

B. PCl_5

C. AsF_5

D. SOF_4

Answer: A

Watch Video Solution

Additional Questions Solved Choose The Correct Pair

1. Choose the correct pair

A. NaCl : ionic compound

B. NH_3 : coordinate compound

C. BF_3 : ionic compound

D. H_2 : ionic compound

Answer: A

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2. Choose the correct pair

A. O_2 : Bond order 3

B. H_2 : Bond order 2

C. N_2 : Bond order 3

D. Cl_2 : Bond order 2

Answer: C

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3. Choose the correct pair

A. 1) CH_4 : ionic bond

B. 2) BF_3 : dative bond

C. 3) NH_3 : metallic bond

D. 4) CCl_4 : covalent bond

Answer: D

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4. Choose the correct pair

A. 1) $CH_4 : 107^\circ 18'$

B. 2) $H_2O : 109^\circ 28'$

C. 3) $NH_3 : 104^\circ 35'$

D. 4) $BF_3 : 120^\circ$

Answer: D

Watch Video Solution

5. Choose the incorrect pair

A. 1) AB_(2)` : Linear

B. 2) AB_3 : V-shape (or) bent

C. 3) AB_4 : Trigonal planar

D. 4) AB_5 : T-shape

Answer: A

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Additional Questions Solved Choose The Incorrect Pair

1. Choose the incorrect pair

A. CS_2 : Linear

B. BF_3 : Trigonal planar

C. CH_4 : T-shape

D. NH_3 : Pyramidal

Answer: A

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2. Choose the incorrect pair

A. AB_3 : Trigonal planar

B. AB_3L_2 : T-shape

C. AB_5 : Trigonal bipyramidal

D. AB_3L : Bent

Answer: D

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3. Choose the incorrect pair

A. $AB_7 : IF_7$

B. $AB_4L_2 : ICI_4$

C. $AB_6 : XeOF_4$

D. $AB_5L : IF_5$

Answer: C

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4. Choose the incorrect pair

A. Fluorine : Bond order 1

B. Oxygen : Bond order 2

C. Nitrogen : Bond order 2

D. Cyanide : Bond order 3

Answer: C

Watch Video Solution

5. Choose the incorrect pair

A. $CH_4 : sp^3$

B. $PCl_5 : sp^3d$

C. $BeCl_2$: sp

D. $BF_3 : sp^3d^2$

Answer: D

Watch Video Solution

Additional Questions Solved Assertion And Reason

1. Assertion (A): HF, HCI, CO and No are polar molecules.

Reason (R): They have non zero dipole moments and so they are polar molecules.

A. Both (A) and (R) are correct and (R) is the correct explanation of (A).

B. Both (A) and (R) are correct but (R) is not the correct explanation of (A).

C. (A) is correct but (R) is wrong.

D. (A) is wrong but (R) is correct.

Answer: A

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2. Assertion (A): H_2, Li_2, C_2, N_2 are diamagnetic.

Reason (R): All have no unpaired electrons and so they are diamagnetic.

A. Both (A) and (R) are correct and (R) is the correct explanation of (A).

B. Both (A) and (R) are correct but (R) is not the correct explanation of (A).

C. (A) is correct but (R) is wrong.

D. (A) is wrong but (R) is corTect.

Answer: A

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3. Assertion (A): Smooth muscles do not show straitions.

Reason (R): They are voluntary muscles.

A. Both (A) and (R) are correct and (R) is the correct explanation of (A).

B. Both (A) and (R) are correct but (R) is not the correct explanation of (A).

C. (A) is correct but (R) is wrong.

D. (A) is wrong but (R) is corTect.

Answer: A

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4. Assertion (A): $B_2, O_2,$ NO are paramagnetic in nature.

A. Both (A) and (R) are correct and (R) is the correct explanation of (A).

B. Both (A) and (R) are correct but (R) is not the correct explanation of (A).

C. (A) is correct but (R) is wrong.

D. (A) is wrong but (R) is corTect.

Answer: B

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5. Assertion (A): Metals have high thermal conductivity.

Reason (R): Absence of band gap is the main reason for high thermal conductivity.

A. 1) Both (A) and (R) are correct and (R) is the correct explanation of (A).

B. 2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

C. 3) (A) is correct but (R) is wrong.

D. 4) (A) is wrong but (R) is correct.

Answer: B

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6. Assertion (A): Metals have high thermal conductivity.

Reason (R): Due to thermal excitation of many electrons from the valence band to the conductance band, metals have high thermal conductivity.

A. 1) Both (A) and (R) are correct and (R) is the correct explanation of (A).

B. 2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

C. 3) (A) is correct but (R) is wrong.

D. 4) (A) is wrong but (R) is correct.

Answer: A

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Additional Questions Solved Choose The Correct Statement

1. Choose the correct statement

A. The metallie luster is due to reflection of light by the electron cloud.

B. Metals have low melting point and low boiling point.

C. Metals have low thermal conductivity.

D. Electrical conductivity of metals is low.

Answer: A

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2. Choose the correct statement

A. NO molecules is diamagnetic

B. O_2 molecules is paramagnetic

C. N_2 molecules is paramagnetic

D. Li_2 molecules is paramagnetic

Answer: B

Watch Video Solution

3. Choose the correct statement

A. $BeCl_2$ undergoes sp^3 hybridisation

B. BF_3 undergoes sp^3d hybridisation

C. CH_4 undergoes sp^3d^2 hybridisation

D. PCl_5 undergoes sp^3d hybridisation

Answer: D

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Additional Questions Solved 2 Mark Questions

1. What are chemical messengers?

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2. State Octet rule.

Watch Video Solution

3. (i) What is meant by covalent bond?

(ii) Explain the covalent bonding in H_2, O_2, N_2.

Watch Video Solution

4. Draw the lewis structure of PCl_5 and SF_6

Watch Video Solution

5. The formal charge on the carbon atom in the following structure $\ddot{\underset{\cdot\cdot}{O}} = C = \ddot{\underset{\cdot\cdot}{O}}$ is .....

Watch Video Solution

6. The formal charge on the triply bonded oxygen atom in the structure $:O \equiv C - \ddot{\underset{\cdot\cdot}{O}}:$ is .....

Watch Video Solution

7. The formal charge on the carbon atom in the following structure $\ddot{\underset{\cdot\cdot}{O}} = C = \ddot{\underset{\cdot\cdot}{O}}$ is .....

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8. Draw the Lewis structures for the following molecules and ions:

H_2S, $SiCl_4$, BeF_2, CO_3^{2-}, HCOOH

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9. Draw the lewis structure of (i) Ammonia (ii) Methane (iii) Dinitrogen pentoxide

Watch Video Solution

10. Define bond energy.

Watch Video Solution

11. Resistance of the wire is inversely proportional to length of the wire.

Watch Video Solution

12. Define bond energy.

Watch Video Solution

13. Define electric resonance.

Watch Video Solution

14. What are polar molecules ? Give examples.

Watch Video Solution

15. What is polarisation?

Watch Video Solution

16. Arrange $NaCl, MgCl_2$ and $AlCl_3$ in the increasing order of covalent character.

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17. Lithium iodide is more covalent than Lithium chloride. Give reason.

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18. Explain the following:

(a) Lithium iodide is more covalent than lithium fluoride

(b) Lattice enthalpy of LiF is maximum among all the alkali metal halides.

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19. Draw the structure of AB_4L_2 and AB_7 type of molecules with example.

Watch Video Solution

20. Draw the structure of AB_4L_2 and AB_7 type of molecules with example.

Watch Video Solution

21. Explain the bond formation of hydrogen molecule.

Watch Video Solution

22. Explain the bond formation of hydrogen molecule.

Watch Video Solution

23. Identify the bond between H and F in HF molecule.

Watch Video Solution

24. What is meant by colloid ?

Watch Video Solution

25. Why metallic bonding is referred as electronic bonding?

Watch Video Solution

26. Metals have _____ density .

Watch Video Solution

27. Metals are ductile in nature. Why?

Watch Video Solution

28. The melting point of aluminium is _____.

Watch Video Solution

29. The crystals which are good conductors of electricity and heat are

Watch Video Solution

30. Metals have high thermal conductivity. Give reason.

Watch Video Solution

31. Except Cu, Ag and Au, most metals are black. Why?

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32. Write the favourable factors for the formation of ionic bond.

Watch Video Solution

33. Although geometries of NH_3 and H_2O molecules are distorted tetrahedral, bond angle in water is less than that of ammonia. Discuss.

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34. Write the significance/applications of dipole moment.

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35. CO_2 and H_2O both are triatomic molecules but their dipole moment values are different. Why?

Watch Video Solution

36. What is the total number of sigma and pi bonds in the following molecules?

(a) C_2H_2

(b) C_2H_4

Watch Video Solution

37. Use molecular orbital theory to explain why the Be_2 molecule does not exIst.

Watch Video Solution

38. Compare the relative stability of the following species and indicate their magnetic properties: O_2, O_2^+, O_2^- (superoxide), O_2^{2-} (peroxide)

Watch Video Solution

39. Account for the following:

(i) water is a liquid while H_2S is a gas

(ii) NH_3 has higher boiling point than PH_3.

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40. Why B_2 is paramagnetic in nature while C_2 is not?

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Additional Questions Solved 3 Mark Questions

1. Draw the lewis structure of (i) Nitrogen (ii) Carbon (iii) Oxygen.

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2. Draw the lewis structure of (i) Ammonia (ii) Methane (iii) Dinitrogen pentoxide

Watch Video Solution

3. Calculate the bond enthalpy of OH bond in water.

Watch Video Solution

4. Explain how the ionic character in a covalent bond is related to electronegativity?

Watch Video Solution

5. CuCl is more covalent than NaCl. Give reason.

Watch Video Solution

6. Draw the structure of AB_2, AB_3, AB_3L type of molecules with example.

Watch Video Solution

7. Give example and structure of (i) AB_3L (ii) AB_5 (iii) AB_2L_2 type of molecules with example.

Watch Video Solution

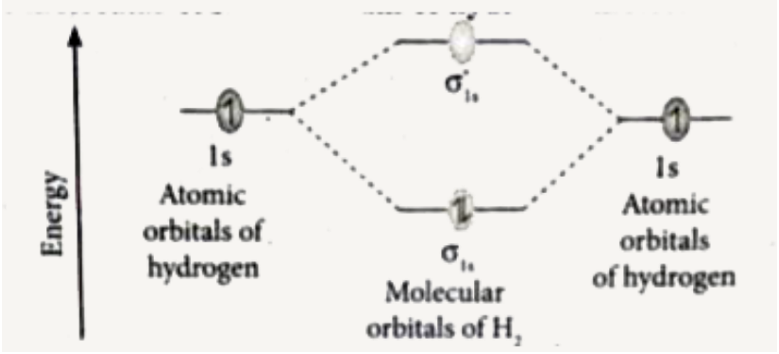
8. Draw the shape of (i) XeF_2 (ii) IOF_5 (iii) $XeOF_4$

Watch Video Solution

9. Explain the bonding in oxygen molecule.

Watch Video Solution

10. Explain about the molecular orbital diagram of hydrogen molecule.



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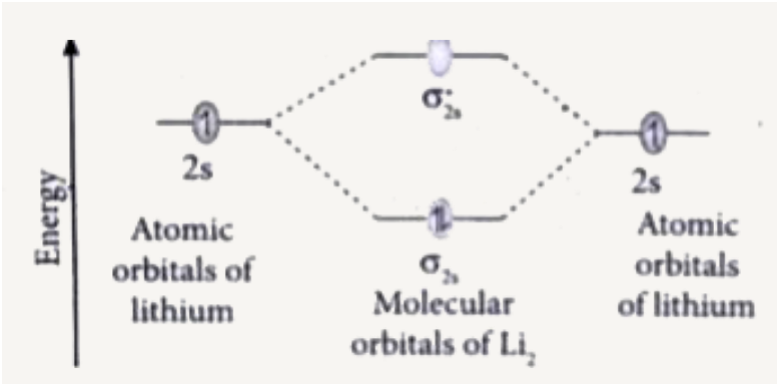
11. Draw and explain the M.O. diagram of lithium molecule.



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12. Draw and explain the M.O. diagram of Boron molecule.

Watch Video Solution

13. Draw and explain the molecular orbital diagram of carbon molecule.

Watch Video Solution

14. Write Lewis dot symbols for atoms of the following elements: Mg, Na, B, O, N, Br.

Watch Video Solution

15. Write Lewis symbols for the following atoms and ions: S and S^{2-} , Al and Al^{3+} , H and H^{-}

Watch Video Solution

16. Draw the Lewis structures for the following molecules and ions:

H_2S, $SiCl_4$, BeF_2, CO_3^{2-}, HCOOH

Watch Video Solution

17. Define Octet rule. Write its significance and limitations.

Watch Video Solution

18. Write the resonánce structure for SO_3, NO_2 and NO_3^-

Watch Video Solution

19. What do you understand by bond pairs and lóne pairs of electrons? Illustrate by giving one example of each type.

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20. Distinguish sigma and pi - bonds.

Watch Video Solution

21. Write the important conditions required for the linear combination of atomic orbitals to form molecular orbitals.

Watch Video Solution

22. What are Lewis structures? Write the Lewis structure of H_2, BeF_2 and H_2O.

Watch Video Solution

23. What are the main postulates of Valence Shell Electron Pair Repulsion (VSEPR) theory?

Watch Video Solution

24. Apart from tetrahedral geometry, another possible geometry for CH_4 is Square planar With four H atoms at the corners of the square and C atom at its centre. Explain why CH_4 is not square planar?

Watch Video Solution

25. Explain why BeH_2 molecule has a zero dipole moment although the Be - H bonds are polar.

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Additional Questions Solved 5 Mark Questions

1. Explain about Kossel-Lewis approach to chemical bonding.

Watch Video Solution

2. (i) What is meant by covalent bond?

(ii) Explain the covalent bonding in H_2, O_2, N_2.

Watch Video Solution

3. (i) What is an ionic bond?

(ii) Explain about the formation of ionic bond with a suitable example.

Watch Video Solution

4. (i) Define coordinate covalent bond.

(ii) strate the formation of coordinate covalent bond with a suitable example.

Watch Video Solution

5. Explain the bond formation of hydrogen molecule.

Watch Video Solution

6. What are the important features of valence bond theory?

Watch Video Solution

7. Explain about sp hybridisation with suitable example.

Watch Video Solution

8. Explain the formation of methane using VB theory?

Watch Video Solution

9. Explain sp^3 d hybridisation with a suitable example.

Watch Video Solution

10. Explain about sp^3d^2 hybridisation with an example.

Watch Video Solution

11. Explain about the salient features of molecular orbital theory.

Watch Video Solution

12. Explain the MO diagram for NO molecule.

Watch Video Solution

13. Explain about metallic bonding.

Watch Video Solution

14. Explain about the salient features of molecular orbital theory.

Watch Video Solution