

Practice Paper

Time : 2 Hour

11th standard (JEE BASED)
CHEMICAL BONDING

Total Marks : 200

Chemistry

* SECTION - A

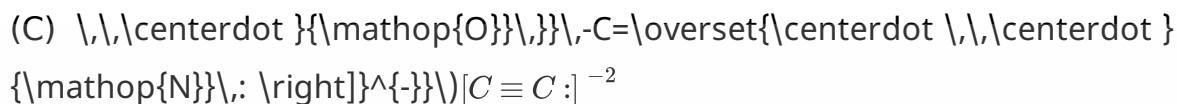
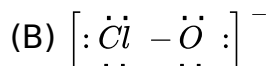
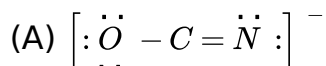
[160]

- The number of σ bonds, π bonds and lone pair of electrons in pyridine, respectively are:
(A) 12,2,1 (B) 11,2,0 (C) 12,3,0 (D) 11,3,1
- Which of the following is paramagnetic ?
(A) CN^- (B) NO^+ (C) CO (D) O_2^-
- Which one of the following is paramagnetic
(A) H_2O (B) NO_2 (C) SO_2 (D) CO_2
- In which bond angle is maximum
(A) NH_3 (B) NH_4^+ (C) PH_3 (D) SCl_2
- Hybridization of central I in I_3^- that is
(A) sp (B) sp^2 (C) sp^3 (D) sp^3d
- Which of the following overlaps is incorrect (assuming Z- axis is internuclear axis) ?
(A) $2p_y + 2p_y \rightarrow \pi$ - Bond formation
(B) $2p_x + 2p_x \rightarrow \sigma$ - Bond formation
(C) $3d_{xy} + 3dp_{xy} \rightarrow \pi$ -Bond formation
(D) $2s + 2p_y \rightarrow \pi$ - Bond formation
(E) $3d_{xy} + 3d_{xy} \rightarrow \delta$ - Bond formation
(F) $2p_s + 2p_s \rightarrow \sigma$ - Bond formation
(A) A,B,C (B) C,F (C) B,E (D) B,C,D
- Select the hybridisation which have non planar geometry when all are bond pair, but planar when there are 2 lone pairs on central atom :
(A) sp^3 (B) sp^3d (C) sp^3d^2 (D) All of the above
- Which of the following molecules will show dipole moment
(A) Methane (B) Carbon tetrachloride

(C) Chloroform

(D) Carbon dioxide

9. Correct lewis structure is



10. Nature of the bond formed between two elements depends on the

(A) Oxidation potential

(B) Electronegativity

(C) Ionization potential

(D) Electron affinity

11. The phosphate of a metal has the formula $MHPO_4$. The formula of its chloride would be



12. An atom with atomic number 20 is most likely to combine chemically with the atom whose atomic number is

(A) 11

(B) 14

(C) 16

(D) 10

13. Solid $NaCl$ is a bad conductor of electricity since

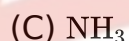
(A) In solid $NaCl$ there are no ions

(B) Solid $NaCl$ is covalent

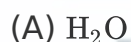
(C) In solid $NaCl$ there is no motion of ions

(D) In solid $NaCl$ there are no electrons

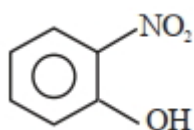
14. Which one of the following molecules has maximum dipole moment?



15. Select the compound from the following that will show intramolecular hydrogen bonding.



(D)



16. The total number of molecular orbitals formed from 2s and 2p atomic orbitals of a diatomic molecule

(A) 08

(B) 07

(C) 06

(D) 09

17. Match List–I with List–II :

List–I	List–II
A H_3O^+	I Tetrahedral
B Acetylide anion	II Linear
C NH_4^+	III Pyramidal
D ClO_2^-	IV Bent

Choose the correct answer from the options given below :

(A) A – III, B – II, C – I, D – IV

(B) A – III, B – I, C – II, D – IV

(C) A – III, B – IV, C – I, D – II

(D) A – III, B – IV, C – II, D – I

18. Which one of the following pairs is an example of polar molecular solids?

(A) $SO_2(s), NH_3(s)$ (B) $SO_2(s), CO_2(s)$ (C) $HCl(s), AlN(s)$ (D) $MgO(s), SO_2(s)$ 19. The bond order and magnetic behaviour of O_2^- ion are, respectively:

(A) 1.5 and paramagnetic

(B) 1.5 and diamagnetic

(C) 2 and diamagnetic

(D) 1 and paramagnetic

20. Identify the pair in which the geometry of the species is T– shape and square pyramidal, respectively

(A) ICl_2^- and ICl_5 (B) IO_3^- and $IO_2F_2^-$ (C) ClF_3 and IO_4^- (D) $XeOF_2$ and $XeOF_4$ 21. In the compound $CH_2 = CH - CH_2 - CH_2 - C \equiv CH$, the $C_2 - C_3$ bond is of the type(A) $sp - sp^2$ (B) $sp^3 - sp^3$ (C) $sp - sp^3$ (D) $sp^2 - sp^3$

22. In solid argon, the atoms are held together by

(A) Ionic bonds

(B) Hydrogen bonds

(C) Vander Waals forces

(D) Hydrophobic forces

23. σ_{2s}^* orbital is similar to orbital

(A) s

(B) p

(C) d

(D) f

24. Paramagnetism is exhibited by molecules

(A) Not attracted into a magnetic field

(B) Containing only paired electrons

(C) Carrying a positive charge

(D) Containing unpaired electrons

25. A molecule XY_2 contains two σ , two π -bonds and one lone pair of electron in the valence shell of X . The arrangement of lone pair as bond pair is
(A) square pyramidal (B) linear
(C) trigonal planar (D) unpredictable
26. The number of $sp^2 - s$ sigma bonds in benzene are
(A) 3 (B) 6 (C) 12 (D) none of these
27. With increasing bond order, stability of a bond
(A) Remains unaltered (B) Decreases (C) Increases (D) None of these
28. Which of the following statement is correct for peroxide ion
A. has completely filled antibonding molecular orbitals
B. is diamagnetic
C. has bond order one
D. is isoelectronic with Neon
(A) B, C (B) A, B, D (C) A, B, C (D) A, D
29. Molecular shape of XeF_3^+ and SNF_3 species are respectively
(A) T-shaped, Tetrahedral
(B) T-shape, square pyramidal
(C) See-saw, square pyramidal
(D) Square pyramidal, see-saw
30. The geometry of ClO_3^- , according to valence shell electron pair repulsion (VSEPR) theory will be
(A) Planar triangle (B) Pyramidal (C) Tetrahedral (D) Square planar
31. During the complete combustion of methane CH_4 , what change in hybridisation does the carbon atom undergo?
(A) sp^3 to sp (B) sp^3 to sp^2 (C) sp^2 to sp (D) sp^2 to sp^3
32. The nodal plane in the π -bond of ethene is located in
(A) the molecular plane
(B) a plane parallel to the molecular plane
(C) a plane perpendicular to the molecular plane which bisects the carbon-carbon σ bond at right angle
(D) a plane perpendicular to the molecular plane which contains the carbon-carbon bond
33. The salt having the least solubility in water is
(A) $BaCl_2$ (B) $Ba(NO_3)_2$ (C) $MgSO_4$ (D) $BaSO_4$

34. The stability of ionic crystal principally depends on
 (A) high electron affinity of anion forming species
 (B) the lattice energy of crystal
 (C) low $I.E.$ of cation forming species
 (D) low heat of sublimation of cation forming solid
35. Which of the following species used both axial set of d - orbitals in hybridisation of central atom?
 (A) PBr_4^+ (B) PCl_4^- (C) ICl_4^- (D) None of these
36. Match List I and List II and pick out correct matching codes from the given choices

List I	List II
Compound	Structure
(A) ClF_3	Square planar
(B) PCl_5	Tetrahedral
(C) IF_5	Trigonal bipyramidal
(D) CCl_4	Square pyramidal
(E) XeF_4	T-shaped

Codes

- (A) $A - 5, B - 4, C - 3, D - 2, E - 1$ (B) $A - 5, B - 3, C - 4, D - 2, E - 1$
 (C) $A - 5, B - 3, C - 4, D - 1, E - 2$ (D) $A - 4, B - 3, C - 5, D - 2, E - 1$
37. Assertion : Sigma (σ) is a strong bond, while pi (π) is a weak bond.
 Reason : Atoms rotate freely about pi (π) bond.
 (A) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
 (B) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
 (C) If the Assertion is correct but Reason is incorrect.
 (D) If both the Assertion and Reason are incorrect.
38. In $[Cu(NH_3)_4]SO_4$, ; Cu has following hybridization
 (A) dsp^2 (B) sp^3 (C) sp^2 (D) sp^3d^2
39. Amongst NO_3^- , AsO_3^{3-} , CO_3^{2-} , ClO_3^- , SO_3^{2-} and BO_3^{2-} , the non-planar species are
 (A) CO_3^{2-} , SO_3^{2-} , BO_3^{3-} (B) AsO_3^{3-} , ClO_3^- , SO_3^{2-}
 (C) NO_3^- , CO_3^{2-} , BO_3^{3-} (D) SO_3^{2-} , NO_3^- , BO_3^{3-}
40. "Hybridisation of central atom does not always change due to back bonding".
 This statement is valid for which of the following compounds ?

- (i) CCl_3^- (ii) CCl_2 (iii) $(SiH_3)_2O$ (iv) $N(SiH_3)_3$
 (A) (i), (ii) (B) (i), (iii) (C) (ii), (iii) (D) All

*** SECTION - B**

[40]

41. The bond order in N_2 molecule is
42. The dipole moment of chlorobenzene is $1.73 D$. The dipole moment of p -dichlorobenzene is expected to be D
43. The total number of anti bonding molecular orbitals, formed from $2s$ and $2p$ atomic orbitals in a diatomic molecule is _____
44. The number of molecules/ion/s having trigonal bipyramidal shape is
 $PF_5, BrF_5, PCl_5, [PtCl_4]^{2-}, BF_3, Fe(CO)_5$
45. The number of species from the following which have square pyramidal structure is $PF_5, BrF_4^-, IF_5, BrF_5, XeOF_4, ICl_4^-$
46. AX is a covalent diatomic molecule where A and X are second row elements of periodic table. Based on Molecular orbital theory, the bond order of AX is 2.5 . The total number of electrons in AX is (Round off to the Nearest Integer).
47. In the ground state of atomic Fe ($Z = 26$) the spin-only magnetic moment is $\times 10^{-1} BM$. (Round off to the Nearest Integer).
 [Given : $\sqrt{3} = 1.73, \sqrt{2} = 1.41$]
48. The spin-only magnetic moment value of B_2^+ species is $\times 10^{-2} BM$. (Nearest integer)
 [Given : $\sqrt{3} = 1.73$]
49. Among the triatomic molecules/ions, $BeCl_2, N_3^-, N_2O, NO_2^+, O_3, SCl_2, ICl_2^-, I_3^-$ and XeF_2 , the total number of linear molecule(s)/ion(s) where the hybridization of the central atom does not have contribution from the d -orbital(s) is
 [Atomic number: $S = 16, Cl = 17, I = 53$ and $Xe = 54$]
50. The percentage of p -character in the orbitals forming $P - P$ bonds in P_4 is

----- ** BEST OF YOUR KNOWLEDGE ** -----

॥ ज्ञानं एव श्रमस्य पुंजः ॥