Chapter Test 4	**PARISHRAM PUBLICATIONS PUNE** **NAME of Student : _____** **Subject : Chemistry** **Class : XI** **Max. Marks :- 180** **Topic : Chemical Bonding and Molecular Structure**	

NEET CHAPTER TEST

Marking Scheme:

(i) Each question is allotted 4 (four) marks for each correct response.

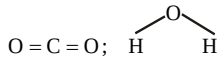
(ii) ¼ (one fourth) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.

Q.1 Which of the following molecules has trigonal planer geometry

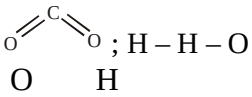
(1) IF_3 (2) PCl_3

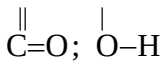
(3) NH_3 (4) BF_3

Q.2 Experiment shows that H_2O has a dipole moment while CO_2 has not. Point out the structures which best illustrate these facts

(1) 

(2) $O=C=O;\ H-O-H$

(3) 

(4) 

Q.3 The two types of bonds present in B_2H_6 are covalent and

(1) Three centre bond (2) Hydrogen bond

(3) Two centre bond (4) None of the above

Q.4 What is the correct mode of hybridisation of the central atom in the following compounds :

NO_2^+, SF_4, PF_6^-

(1) sp^2, sp^3, d^2sp^3 (2) sp^3, sp^3d^2, sp^3d^2

(3) sp, sp^3d, sp^3d^2 (4) sp, sp^2, sp^3

Q.5 Which one of the following is a correct set with respect to molecule, hybridisation and shape –

(1) $BeCl_2$, sp^2, linear

(2) $BeCl_2$, sp^2, triangular planar

(3) BCl_3, sp^2, triangular planar

(4) BCl_3, sp^3, tetrahedral

Q.6 Many ionic crystals dissolve in water because

(1) Water is an amphiprotic solvent.

(2) Water is a high boiling liquid.

(3) The process is accompanied by a positive heat of solution.

(4) Water decreases the interionic attraction in the crystal lattice due to solvation.

Q.7 The high melting point and insolubility in organic solvents of sulphanilic acid are due to its _____ structure.

(1) Simple ionic (2) Bipolar ionic

(3) Cubic (4) Hexagonal

Q.8 Which compound will have electrovalent bonding

(1) Ammonia (2) Water

(3) Calcium chloride (4) Chloromethane

Q.9 Which of the following compounds does not follow the octet rule for electron distribution

(1) PCl_5 (2) PCl_3

(3) H_2O (4) PH_3

Q.10 Sulphuric acid provides a example of

(1) Co-ordinate bonds

(2) Non-covalent compound

(3) Covalent and co-ordinate bond

(4) Non-covalent ion

Q.11 In the following which one have zero dipole moment

(1) BF_3 (2) C

(3) $BeCl_2$ (4) All of these

Q.12 Which molecule has the largest dipole moment

(1) HCl (2) HI

(3) HBr (4) HF

Q.13 Which of the following is the most polar

(1) BF_3 (2) $CHCl_3$

(3) CH_3OH (4) CH_3Cl

Q.14 Compound formed by sp^3d hybridisation will have structure

(1) Planar (2) Pyramidal

(3) Angular (4) Trigonal bipyramidal

Q.15 Which of the following pairs are isostructural ?

(1) CH_3^- and CH_3^+ (2) NH_4^+ and NH_3

(3) SO_4^{2-} and BF_4^- (4) NH_2^- and BeF_2

Q.16 In which of the following species is the underlined carbon having sp^3-hybridisation?

(1) $CH_3-\underline{C}OOH$ (2) $CH_3\underline{C}H_2NH_2$

(3) $CH_3\underline{C}OCH_3$ (4) $CH_2=\underline{C}H-CH_3$

Q.17 Which of the follwing statements is true?
(1) HF is less polar than HBr.
(2) Water does not contain any ions.
(3) Chemical bond formation takes place when forces of attraction overcome the forces of repulsion.
(4) In covalent bond, transfer of electrons takes place.

Q.18 A square planar complex is formed by hybridisation of which atomic orbital?
(1) s, p_x, p_y, d_{yz} (2) s, p_x, p_y, $d_{x^2-y^2}$
(3) s, p_x, p_y, d_{z^2} (4) s, p_x p_y, d_{xy}

Q.19 The reason for double helical structure of DNA is operation
(1) dipole-dipole interaction
(2) hydrogen bonding
(3) electrostatic attraction
(4) vander Wall's forces

Q.20 Which one of the following pairs of molecules will have permanent dipole moments for both members:
(1) NO_2 and CO_2 (2) NO_2 and O_3
(3) SiF_4 and CO_2 (4) SiF_4 and NO_2

Q.21 The pair of species having identical shapes for molecules of both species is:
(1) XeF_2, CO_2 (2) BF_3, PCl_3 (3) PF_5, IF_5 (4) CF_4, SF_4

Q.22 The correct order of bond angles (smallest first) in H_2S, NH_3, BF_3 and SiH_4 is:
(1) $H_2S < NH_3 < SiH_4 < BF_3$
(2) $NH_3 < H_2S < SiH_4 < BF_3$
(3) $H_2S < SiH_4 < NH_3 < BF_3$
(4) $H_2S < NH_3 < BF_3 < SiH_4$

Q.23 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?
(1) Bond length in NO^+ is equal to that in NO
(2) Bond length in NO is greater than in NO^+
(3) Bond length in NO^+ is greater than in NO
(4) Bond length is unpredictable

Q.24 Which one of the following has the regular tetrahedral structure?
(1) BF_4^- (2) SF_4
(3) XeF_4 (4) $[Ni(CN)_4]^{2-}$
(Atomic nos. : B = 5, S = 16, Ni = 28, Xe = 54)

Q.25 The maximum number of 90° angles between bond pair-bond pair of electrons is observed in:
(1) dsp^2 (2) sp^3d hybridisation
(3) dsp^3 hybridisation (4) sp^3d^2 hybridisation

Q.26 Lattice energy of an ionic compound depends upon:
(1) charge on the ion only
(2) size of the ion only
(3) packing of the ion only
(4) charge and size of the ion

Q.27 The molecular shapes of SF_4, CF_4 and XeF_4 are:
(1) the same with 2, 0 & 1 lone pair of electrons on the central atom, respectively.
(2) the same with 1, 1 and 1 lone pair of electrons on the central atoms, respectively.
(3) different with 0, 1 and 2 lone pair of electrons on the central atoms, respectively.
(4) different with 1, 0 and 2 lone pair of electrons on the central atoms, respectively.

Q.28 The bond dissociation energy of B – F in BF_3 is 646 kJ mol^{-1} whereas that of C – F in CF_4 is 515 kJ mol^{-1}. The correct reason for higher B–F bond dissociation energy as compared to that of C – F is –
(1) lower degree of $p\pi$–$p\pi$ interaction between B and F in BF_3 than that between C and F in CF_4.
(2) smaller size of B atoms as compared to that of C atom.
(3) stronger σ bond between B and F in BF_3 as compared to that between C and F in CF_4.
(4) significant $p\pi$–$p\pi$ interaction between B and F in BF_3 whereas there is no possibility of such interaction between C and F in CF_4.

Q.29 Among the following the maximum covalent character is shown by the compound :
(1) $FeCl_2$ (2) $SnCl_2$
(3) $AlCl_3$ (4) $MgCl_2$

Q.30 Which of the following pairs will have same bond order?
(1) F_2 and O_2^{2-} (2) N_2 and CO_2
(3) O_2 and O_2^- (4) N_2 and N_2^+

Q.31 The intermolecular interaction that is dependent on the inverse cube of distance between the molecules is
(1) Ion-dipole interaction (2) London force
(3) Hydrogen bond (4) Ion-ion interaction

Q.32 Which of the following formulae does not show the correct relationship?
(1) B.O. = $\frac{1}{2}(N_b - N_a)$
(2) B.O. $\propto \frac{1}{\text{Bond length}}$
(3) B.O. $\propto \frac{1}{\text{Bond dissociation energy}}$

(4) $N_b > N_a$, B.O. = + ve

Q.33 Which of the following species has tetrahedral geometry?

(1) BH_4^- (2) NH_2^-

(3) CO_3^{2-} (4) H_3O^+

Q.34 **Statement-1:** Boron always forms covalent bond.

Statement-2: The small size of B^{3+} favours formation of covalent bond.

(1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.

(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.

(3) Statement-1 is True, Statement-2 is True.

(4) Statement-1 is False, Statement-2 is True.

Q.35 Which of the following angle corresponds to sp^2 hybridisation?

(1) 90° (2) 120°

(3) 180° (4) 109°

Q.36 In which of the following molecules octet rule is not followed?

(1) NH_3 (2) CH_4

(3) CO_2 (4) NO

Q.37 The nodal plane in the π-bond of ethene is located in –

(1) a plane parallel to the molecular plane.

(2) the molecular plane

(3) a plane perpendicular to the molecular plane which bisects the Carbon-Carbon σ- bond at right angle.

(4) a plane perpendicular to the molecular plane which contains the Carbon-Carbon σ- bond

Q.38 Which of the following order of energies of molecular orbitals of N_2 is correct?

(1) $(\pi\ 2p_y) < (\sigma\ 2p_z) < (\pi^*\ 2p_x) \approx (\pi^*\ 2p_y)$

(2) $(\pi\ 2p_y) > (\sigma\ 2p_z) < (\pi^*\ 2p_x) \approx (\pi^*\ 2p_y)$

(3) $(\pi\ 2p_y) < (\sigma\ 2p_z) > (\pi^*\ 2p_x) \approx (\pi^*\ 2p_y)$

(4) $(\pi\ 2p_y) > (\sigma\ 2p_z) < (\pi^*\ 2p_x) \approx (\pi^*\ 2p_y)$

Q.39 Which of the following statements is true about hybridisation?

(1) The hybridised orbitals have different energies for each orbital.

(2) The number of hybrid orbitals is equal to the number of atomic orbitals that are hybridised.

(3) Hybrid orbitals form multiple bonds.

(4) The orbitals with different energies undergo hybridisation.

Q.40 Which of the following compounds shows maximum hydrogen bonding?

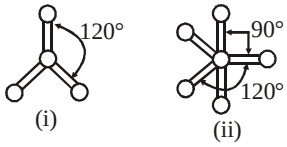
(1) HF (2) H_2O (3) NH_3 (4) CH_3OH

Q.41 If the electronic configuration of an element is $1s^2\ 2s^2\ 2p^6 3s^2\ 3p^6 3d^2\ 4s^2$, the four electrons involved in chemical bond formation will be

(1) $3p^6$ (2) $3p^6, 4s^2$

(3) $3p^6, 3d^2$ (4) $3d^2, 4s^2$

Q.42 Which molecule is depicted by the given ball and stick models?



(1) (i) $BeCl_2$, (ii) CH_4 (2) (i) BF_3, (ii) PCl_5

(3) (i) BF_4, (ii) CH_4 (4) (i) $BeCl_2$, (ii) PCl_5

Q.43 Hydrogen bonds are formed in many compounds e.g., H_2O, HF, NH_3. The boiling point of such compounds depends to a large extent on the strength of hydrogen bond and the number of hydrogen bonds. The correct decreasing order of the boiling points of above compounds is

(1) $HF > H_2O > NH_3$ (2) $H_2O > HF > NH_3$

(3) $NH_3 > HF > H_2O$ (4) $NH_3 > H_2O > HF$

Q.44 The correct sequence of increasing covalent character is represented by –

(1) $LiCl < NaCl < BeCl_2$

(2) $BeCl_2 < LiCl < NaCl$

(3) $NaCl < LiCl < BeCl_2$

(4) $BeCl_2 < NaCl < LiCl$

Q.45 Which of the following would have a permanent dipole moment –

(1) SiF_4 (2) SF_4 (3) XeF_4 (4) BF_3