NEET ANSWER KEY & SOLUTIONS

SUBJECT :- CHEMISTRY

CLASS :- 11th **PAPER CODE :- CWT-4**

CHAPTER :- CHEMICAL BONDING

ANSWER KEY

1.	(B)	**2.**	(A)	**3.**	(C)	**4.**	(A)	**5.**	(C)	**6.**	(D)	**7.**	(D)
8.	(D)	**9.**	(D)	**10.**	(B)	**11.**	(C)	**12.**	(A)	**13.**	(B)	**14.**	(A)
15.	(B)	**16.**	(B)	**17.**	(A)	**18.**	(C)	**19.**	(A)	**20.**	(D)	**21.**	(C)
22.	(D)	**23.**	(B)	**24.**	(C)	**25.**	(C)	**26.**	(D)	**27.**	(B)	**28.**	(A)
29.	(B)	**30.**	(B)	**31.**	(C)	**32.**	(A)	**33.**	(D)	**34.**	(B)	**35.**	(D)
36.	(C)	**37.**	(A)	**38.**	(D)	**39.**	(A)	**40.**	(A)	**41.**	(B)	**42.**	(C)
43.	(A)	**44.**	(C)	**45.**	(C)	**46.**	(D)	**47.**	(D)	**48.**	(A)	**49.**	(C)
50.	(D)												

SOLUTIONS

SECTION-A

1. (B)

Sol. NaCl is ionic crystal so it is formed by Na^+ and Cl^- ions.

2. (A)

Sol. Electronegativity difference between two combining elements must be greater than 1.7 for ionic compound and it is the essential condition for the formation of ionic compounds. It is ionic because electronegativity difference between two combining elements is 1.8.

3. (C)

Sol. $\text{Lattice energy} \propto \frac{1}{\text{size of cation}}$

$$LE \propto \frac{1}{r_+ + r_-}$$

4. (A)

Sol. When two atoms combine to form a stable molecule, there is attraction between the mobile electrons and kernel resulting into liberation of energy.

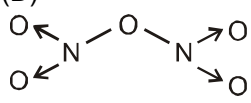
5. (C)

Sol. A stable molecule has lower potential energy which results from attraction between the mobile electrons and kernel leading to the liberation of energy.

6. (D)

Sol. The maximum covalency of an element is equal to the number of orbitals present in the valence shell.

7. (D)

Sol. 

8. (D)

Sol. In BCl_3 and PCl_5, B and P contain 6 and 10 electrons respectively in their valence shell. Therefore they violate octet rule.

9. (D)

Sol. Covalent bond is formed when electronegativity difference of two atom is equal to 1.7 or less than 1.7.

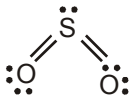
10. (B)

Sol. The species in which central atoms has higher valencies than their normal valencies are called as hypervalent species.

11. (C)

Sol. Element X has atomic number 7 so its electronic configuration will 2, 5 so it's lewis diagram would be  .

12. (A)

Sol.  ; All zero.

13. (B)

Sol. Resonance is due to delocalization of is electron.

14. (A)

Sol. ClO_4^- Bond order $= \frac{7}{4}$; ClO_3^-

Bond order $= \frac{5}{3}$

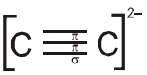
ClO_2^- Bond order $= \frac{3}{2}$; ClO^-

Bond order $= \frac{1}{1}$

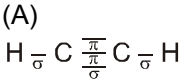
15. (B)

Sol. Due to small size of nitrogen, the lp–lp repulsion is more than that in P. Hence statement B is correct

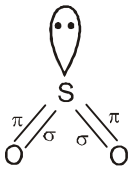
16. (B)

Sol. CaC_2 exists as Ca_2^+ and C_2^{2-} 

17. (A)

Sol. 

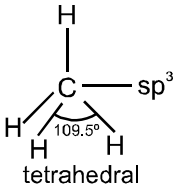
18. (C)

Sol. 

19. (A)

Sol. As the p-orbital in hybrid orbital increases than % p-character increases.

20. (D)

Sol. 

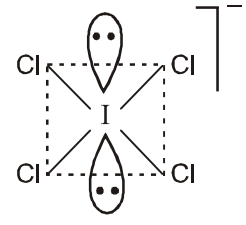
tetrahedral

21. (C)

Sol. To have minimum repulsions, the two lone pair occupy the trans positions in octahedral geometry.

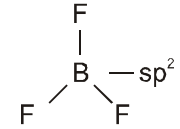
22. (D)

Sol. BF_4^- , NH_4^+ and XeO_4 are tetrahedral with sp^3 hybridisation. But ICl_4^- is square planar.

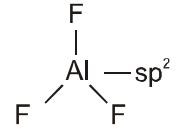


square planar (sp^3d^2)

23. (B)

Sol. 

(trigonal planar)



(trigonal planar)

24. (C)

Sol. H_2S– No hybridisation bond angle ≈ 93º
NH_3 – Pyramidal 104.5º
CH_4 – Tetrahedral 109º28'
BF_3 – Triaganalplaner 120º

25. (C)

Sol. The electron density is zero in the nodal plane during the formation of a molecular orbital from atomic orbitals of the same atom.

26. (D)

Sol. He_2 : $(\sigma 1s)_2$ $(\sigma^*1s)_2$; bond order = $\frac{1}{2}$ (2 – 2) = 0, He_2 molecule is, therefore, unstable and does not exists.

27. (B)

Sol. B_2 bond order = 1 ; C_2 bond order = 2 ; F_2 bond order = 1 ; O_2^- bond order = 1.5
bond order 1/bond length.

28. (A)

Sol. $(\sigma 1s)^2$ $(\sigma^*1s)^2$ $(\sigma 2s)^2$ $(\sigma^*2s)^2$ $(\pi 2p2x = \pi 2p2y)$ $(\sigma 2pz)^2$; number of anti bonding electrons in N_2 is 4.
* represents antibonding molecular orbitals.

29. (B)

Sol. OF is derivative of O_2 and isoelectronic with O_2–.
So $(\sigma 1s)_2$ $(\sigma^*1s)_2$ $(\sigma 2s)_2$ $(\sigma^*2s)_2$ $(\sigma 2pz)_2$ $(\pi 2p2x = \pi 2p2y)$ $(\pi^*2px2 = \pi^*2p1y)$
The bond order of OF 1/2(10 – 7) = 1.5.

30. (B)

Sol. According to Fajan's rule :
Covalent character in ionic compound is directly proportional to polararibility of anion and polarising power of cation.

31. (C)

Sol. According to Fajan's rule as the size of cation increases their polarising power decreases and thus the covalent character decreases.

32. (A)

Sol. As F^- has lowest polarisability on account of smallest size among O^{2-}, N^{3-} and C^{4-}, it causes less polarisation and, therefore, has lowest covalent character. Hence AlF_3 is the most ionic.

33. (D)

Sol. Factual according to Fajan's Rule.

34. (B)

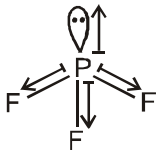
Sol. The ease of formation of ionic compounds i.e. stability to form ionic compounds increases as net ionization energy of electropositive element decreases. Hence, the correct order is Na+ > Mg^{2+} > Al^{3+}.

35. (D)

Sol. On account of larger difference in the electronegativity values of oxygen and hydrogen.

SECTION-B

36. (C)

Sol.  $\mu \neq 0$; SiF_4 , BF_3 and PF_5 are symmetrical molecules thus $\mu = 0$.

37. (A)

Sol. H_2O, $\mu = 6.17 \times 10^{-30}$ Cm; NH_3, $\mu = 4.90 \times 10^{-30}$ Cm;
NF_3, $\mu = 0.80 \times 10^{-30}$ Cm; CH_4, μ = zero.

38. (D)

Sol. Dipole moment = $4.8 \times 10^{-10} \times 1.275 \times 10^{-8} = 4.8 \times 1.275$

% ionic character = $\frac{1.03 \times 100}{1.275 \times 4.8} \approx 17\%$

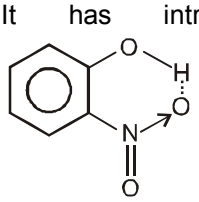
39. (A)

Sol. Because of $p\pi$-$d\pi$ delocalisation of lone pair of electrons present on N atoms (SiH_3) N is planar.

40. (A)

Sol. HF is least volatile (i.e. high boiling point) due to strong intermolecular hydrogen bonding.

41. (B)

Sol. It has intramolecular H-bonding 

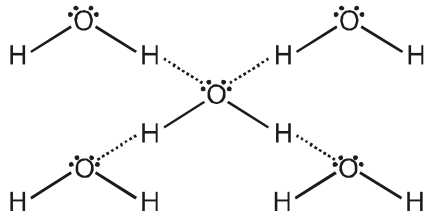
42. (C)

Sol. In CH_4, H_2Se and H_2S the central atoms are not more electronegative ; hence do not form hydrogen bonds with itself and other molecule. In N_2H_4 the nitrogen is more electronegative and thus is able to form hydrogen bond with itself and other molecules like water.

43. (A)

Sol. HI does not form hydrogen bonding owing to less electronegativity value of iodine.

44. (C)

Sol. 

45. (C)

Sol. Graphite has layered structure. Layers are held by van der Waal's forces and distance between two layers is 340 pm. Each layer is composed of planar hexagonal rings of carbon atoms. C – C bond length within the layer is 141.5 pm Each carbon atom in hexagonal ring undergoes sp^2 hybridisation and make three sigma bonds with three neighbouring carbon atoms. Fourth electron forms a π bond. The electrons are delocalised over the whole sheet.

46. (D)

Sol. London forces are extremely short range in action and the weakest of all attractive forces.

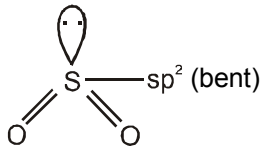
The order of strength of bonds/ forces is ionic bond > covalent bond > hydrogen bond > london force.

47. (D)

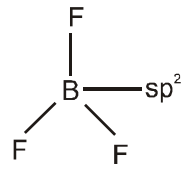
Sol. van der Waal's forces $\propto$ molecular weight.So AgBr will have maximum van der Waals forces.

48. (A)

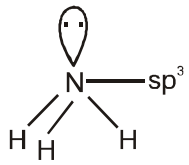
Sol. (A) $\underset{sp}{S=C=S}$ (linear)

(B) 

(bent)

(C) 

(trigonal planar)

(D) 

(trigonal pyramidal)

49. (C)

Sol. $SiCl_4$ undergoes hydrolysis due to the Presence of empty d-orbitals in the valence shell of Si, while C has no vacant d orbitals to accommodate electron pairs donated by water molecules during hydrolysis.

50. (D)

Sol. Statement-I is incorrect as BCl_3, BBr_3 and BI_3 are lewis acids.

Statement-II is correct because they electron deficient.