

CLASS XI CHE CH: 4

SET 3 –

1. According to VBT, a covalent bond is formed by –
 - a) overlap of half-filled orbitals
 - b) transfer of electrons
 - c) sharing of all electrons
 - d) overlap of filled orbitals
2. Which of the following overlaps gives a sigma (σ) bond?
 - a) Head-on overlap
 - b) Sidewise overlap
 - c) Parallel overlap
 - d) Lateral overlap
3. π -bond is formed by –
 - a) sidewise overlap of p orbitals
 - b) end-to-end overlap
 - c) s-s overlap
 - d) s-p overlap
4. In H_2 molecule, the type of overlap is –
 - a) s-s overlap
 - b) p-p overlap
 - c) s-p overlap
 - d) sp-sp overlap
5. In N_2 molecule, the number of σ and π bonds are –
 - a) $1\sigma, 2\pi$
 - b) $2\sigma, 1\pi$
 - c) 3σ
 - d) 3π
6. In O_2 molecule, the bond order is –
 - a) 2
 - b) 3
 - c) 1
 - d) 1.5
7. Bond order is defined as –
 - a) $\frac{1}{2} (N_b - N_a)$
 - b) $(N_b + N_a)/2$
 - c) (N_b/N_a)
 - d) $(N_a - N_b)/2$
8. In the bond order formula, N_b and N_a represent –
 - a) electrons in bonding and antibonding orbitals respectively
 - b) total valence electrons
 - c) atomic orbitals
 - d) nuclei
9. The bond order of N_2^+ ion is –
 - a) 2.5
 - b) 3
 - c) 2
 - d) 1
10. The bond order of O_2^- ion is –
 - a) 1.5
 - b) 2
 - c) 2.5
 - d) 3

CLASS XI CHE CH: 4

11. The bond order of O_2^{2-} ion is –
a) 1 b) 2 c) 3 d) 2.5
12. The bond order of CO molecule is –
a) 3 b) 2 c) 2.5 d) 1.5
13. Greater the bond order, –
a) greater bond energy and smaller bond length
b) smaller bond energy and longer bond length
c) lower stability
d) none
14. The molecule with highest bond energy is –
a) N_2 b) O_2 c) F_2 d) Cl_2
15. The magnetic nature of O_2 molecule is –
a) paramagnetic
b) diamagnetic
c) ferromagnetic
d) none
16. Paramagnetism of O_2 is explained by –
a) molecular orbital theory
b) valence bond theory
c) VSEPR theory
d) Lewis theory
17. According to MOT, combination of atomic orbitals takes place if –
a) energy difference is small and symmetry is similar
b) orbitals are dissimilar
c) nuclei are far apart
d) phases are opposite
18. When two atomic orbitals combine, the number of molecular orbitals formed is –
a) 2 b) 1 c) 3 d) 4
19. σ and π molecular orbitals differ in –
a) type of overlap
b) number of electrons
c) nuclei distance
d) none
20. In homonuclear diatomic molecules, the order of energy of MOs for O_2 and F_2 is –
a) $\sigma(2s) < \sigma^*(2s) < \sigma(2p_z) < \pi(2p_x, 2p_y) < \pi^*(2p_x, 2p_y) < \sigma^*(2p_z)$
b) $\pi(2p_x, 2p_y) < \sigma(2p_z) < \pi^*(2p_x, 2p_y) < \sigma^*(2p_z)$
c) $\sigma^*(2p_z) < \sigma(2p_z)$

CLASS XI CHE CH: 4

- d) none
21. The order of energy levels for N_2 molecule is –
a) $\sigma(2s) < \sigma^*(2s) < \pi(2p_x, 2p_y) < \sigma(2p_z)$
b) $\sigma(2s) < \sigma^*(2s) < \sigma(2p_z) < \pi(2p_x, 2p_y)$
c) $\pi^*(2p) < \sigma^*(2p)$
d) none
22. Which of the following species is paramagnetic?
a) O_2 b) N_2 c) CO d) F_2
23. Which of the following is diamagnetic?
a) N_2 b) O_2 c) O_2^- d) NO
24. The total number of electrons in N_2 molecule –
a) 14 b) 16 c) 12 d) 10
25. The total number of electrons in O_2 molecule –
a) 16 b) 14 c) 18 d) 10
26. In CO molecule, the type of bond is –
a) one σ and two π bonds
b) one σ bond only
c) two σ bonds
d) three π bonds
27. The bond order of He_2^+ ion is –
a) 0.5 b) 1 c) 2 d) 1.5
28. The bond order of B_2 molecule is –
a) 1 b) 2 c) 3 d) 0
29. B_2 molecule is –
a) paramagnetic
b) diamagnetic
c) non-magnetic
d) ionic
30. Which of the following molecules has the lowest bond order?
a) O_2^{2-} b) O_2^- c) O_2 d) O_2^+
31. Greater the bond order, the –
a) shorter the bond length
b) longer the bond length
c) weaker the bond
d) none

CLASS XI CHE CH: 4

32. The total number of bonds in CO_2 molecule –
a) 4 b) 2 c) 3 d) 5
33. The number of π bonds in CO_2 molecule –
a) 2 b) 1 c) 3 d) 0
34. σ -bond is –
a) stronger than π -bond
b) weaker than π -bond
c) equal to π -bond
d) none
35. Number of antibonding electrons in O_2 molecule –
a) 8 b) 10 c) 12 d) 6
36. Number of bonding electrons in O_2 molecule –
a) 10 b) 12 c) 14 d) 8
37. In NO molecule, total number of valence electrons =
a) 11 b) 10 c) 12 d) 14
38. The bond order of NO molecule is –
a) 2.5 b) 3 c) 2 d) 1.5
39. The bond order of NO^+ ion is –
a) 3 b) 2.5 c) 2 d) 1
40. The magnetic behaviour of NO molecule is –
a) paramagnetic
b) diamagnetic
c) non-magnetic
d) none
41. Which molecule has all electrons paired?
a) N_2 b) O_2 c) NO d) O_2^-
42. Which molecule shows delocalised π electrons?
a) Benzene b) CH_4 c) H_2O d) NH_3
43. Resonance is possible when –
a) there are multiple bonds and lone pairs
b) only single bonds exist
c) ions are present
d) no p-orbitals are available
44. Resonance stabilises the molecule by –
a) delocalisation of electrons

CLASS XI CHE CH: 4

- b) localisation of electrons
 - c) increasing polarity
 - d) removing charge
45. Bond energy and bond length are related as –
- a) inversely proportional
 - b) directly proportional
 - c) independent
 - d) none
46. Dipole moment is a measure of –
- a) polarity of bond
 - b) covalent character
 - c) ionic character
 - d) electronegativity
47. The unit of dipole moment is –
- a) Debye (D)
 - b) Coulomb
 - c) Joule
 - d) Newton
48. Molecule with zero dipole moment –
- a) CO_2 b) H_2O c) NH_3 d) SO_2
49. Molecule with non-zero dipole moment –
- a) H_2O b) CO_2 c) BF_3 d) CCl_4

Answer Key – Set 3

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