

# ANSWERS

## I. Multiple Choice Questions (Type-I)

1. (iii)      2. (i)      3. (i)      4. (i)      5. (i)      6. (iii)  
7. (ii)      8. (iii)      9. (iv)      10. (ii)      11. (i)      12. (ii)  
13. (iv)      14. (iii)      15. (ii)

## II. Multiple Choice Questions (Type-II)

16. (i), (ii)                      17. (ii), (iii)                      18. (i), (ii)  
19. (ii), (iii)                      20. (i), (ii), (iv)                      21. (ii), (iv)

## III. Short Answer Type

23. Boric acid acts as Lewis acid in water by accepting a pair of electrons from a hydroxyl ion :  
$$\text{B(OH)}_3 + 2\text{HOH} \longrightarrow [\text{B(OH)}_4]^- + \text{H}_3\text{O}^+$$
24. Species present in water is  $[\text{B(OH)}_4]^-$ . Boron is  $sp^3$  hybridised.
25.  $\text{BCl}_3$  and  $\text{AlCl}_3$  being electron deficient due to incomplete octet of central metal atom behave as Lewis acids.
26.  $\text{CCl}_4$  is a covalent compound. Hence, insoluble in water whereas  $\text{SiCl}_4$  is soluble because Si atom in  $\text{SiCl}_4$  can accommodate the lone pair of electrons obtained from oxygen atom of water molecule in  $d$ -orbitals.
27. (i) Very high Si-O bond enthalpy and ionic character of Si-O bond.  
(ii) Vacant  $3d$  orbitals are available on Si atom to accommodate electrons and expand coordination number upto 6.
29. [Hint : In  $\text{CO}_2$ , carbon is  $sp$  hybridised and it is a linear molecule. In  $\text{SiO}_2$ , Si is tetrahedrally bonded to four oxygen atoms.]
30. Negative
32. [Hint : Conc.  $\text{HNO}_3$  renders aluminium passive by forming a protective oxide layer on the surface.]
34. A :  $\text{Na}_2\text{B}_4\text{O}_7$  (Borax)  
X :  $\text{H}_3\text{BO}_3$   
Z :  $\text{B}_2\text{O}_3$
35. A :  $\text{BF}_3$   
X :  $\text{B}_2\text{H}_6$   
Y ;  $\text{H}_3\text{BO}_3$

#### IV. Matching Type

36. (i) → (e)      (ii) → (c)      (iii) → (d)      (iv) → (a), (b)
37. (i) → (c)      (ii) → (d)      (iii) → (a)      (iv) → (e)      (v) → (b)
38. (i) → (b),      (ii) → (c),      (iii) → (b),      (iv) → (a)      (v) → (b)  
(vi) → (c)

#### V. Assertion and Reason Type

39. (i)      40. (ii)

#### VI. Long Answer Type

45. [Hint : Absence of *d*-orbitals in boron.]
48. A = B<sub>2</sub>H<sub>6</sub>,    B = BH<sub>3</sub>.NMe<sub>3</sub>,    C = B(OH)<sub>3</sub> i.e. H<sub>3</sub>BO<sub>3</sub>.