ANSWERS

I. Multiple Choice Questions (Type-I)

1. (iii)	2. (ii)	3. (iii)	4. (ii)	5. (iv)	6. (iii)
7. (iii)	8. (ii)	9. (iii)	10. (ii)	11. (iv)	12. (i)
13. (iii)	14. (iv)	15. (i)	16. (ii)	17. (ii)	

II. Multiple Choice Questions (Type-II)

18. (ii), (iv)	19. (i), (iii)	20. (ii), (iii)	21. (i), (ii)
22. (i), (iv)	23. (i), (iii)	24. (i), (ii)	25. (i), (ii)
26. (i), (iii)	27. (ii), (iii)		

III. Short Answer Type

28. No

29. No

30. When the cell reaction reaches equilibrium.

31. It means that Zn is more reactive than hydrogen. When zinc electrode will be connected to SHE, Zn will get oxidised and H^+ will get reduced.

32. Different, see the NCERT textbook, page no. 84.

33. $Cu|Cu^{2+}||Ag^+|Ag$

34. Under the conditions of electrolysis of aqueous sodium chloride, oxidation of water at anode requires overpotential hence Cl^- is oxidised instead of water.

35. See NCERT textbook, page no. 65

36. 'A' will have negative polarity

    'B' will have positive polarity

37. Alternating current is used to prevent electrolysis so that concentration of ions in the solution remains constant.

38. See NCERT textbook, page no. 64

39. The pH of the solution will rise as NaOH is formed in the electrolytic cell.

40. Ions are not involved in the overall cell reaction of mercury cells.

41. Electrolyte 'B' is strong as on dilution the number of ions remains the same, only interionic attraction decreases therefore increase in $\wedge_m$ is small.

42. pH of the solution will not be affected as $[H^+]$ remains constant.

At anode : $2H_2O \longrightarrow O_2 + 4H^+ + 4e^-$

At cathode $4H^+ + 4e^- \longrightarrow 2H_2$

43. Conductivity decreases because number of ions per unit volume decreases.

44. Standard hydrogen electrode is the reference electrode whose electrode potential is taken to be zero. The electrode potential of other electrodes is measured with respect to it.

45. Anode : $Cu \longrightarrow Cu^{2+} + 2e^-$

Cathode : $Cl_2 + 2e^- \longrightarrow 2Cl^-$

Cu is anode as it is getting oxidised.

Cl_2 is cathode as it is getting reduced.

46. $Zn + Cu^{2+} \longrightarrow Zn^{2+} + Cu$

$$E_{Cell} = E^{\ominus}_{Cell} - \frac{0.059}{2}\log\frac{[Zn^{2+}]}{[Cu^{2+}]}$$

E_{Cell} decreases when concentration of Zn^{2+} ions, $[Zn^{2+}]$ increases.

47. Primary batteries contain a limited amount of reactants and are discharged when the reactants have been consumed. Secondary batteries can be recharged but take a long time to recharge. Fuel cell runs continuously as long as the reactants are supplied to it and products are removed continuously.

48. $Pb + PbO_2 + 2H_2SO_4 \longrightarrow 2PbSO_4 + 2H_2O$

Density of electrolyte decreases as water is formed and sulphuric acid is consumed as the product during discharge of the battery.

49. In the case of CH_3COOH, which is a weak electrolyte, the number of ions increase on dilution due to an increase in degree of dissociation.

$CH_3COOH + H_2O \rightleftharpoons CH_3COO^- + H_3O^+$

In the case of strong electrolyte the number of ions remains the same but the interionic attraction decreases.

IV. Matching Type

50. (i) → (c) (ii) → (d) (iii) → (a) (iv) → (b)

51. (i) → (d) (ii) → (a) (iii) → (b) (iv) → (c)

52. (i) → (d) (ii) → (c) (iii) → (a) (iv) → (b)

53. (i) → (d) (ii) → (c) (iii) → (b) (iv) → (a)

54. (i) → (d) (ii) → (c) (iii) → (a), (e) (iv) → (b)

55. (i) → (c) (ii) → (a) (iii) → (g) (iv) → (e)
(v) → (d) (vi) → (b) (vii) → (g) (f)

V. Assertion and Reason Type

56. (iii) 57. (iii) 58. (i) 59. (i) 60. (v)

61. (i) 62. (i) 63. (i) 64. (ii) 65. (iv)

VI. Long Answer Type

66. (i) Cell 'B' will act as electrolytic cell as it has lower emf

∴ The electrode reactions will be:

$Zn^{2+} + 2e^- \longrightarrow Zn$ at cathode

$Cu \longrightarrow Cu^{2+} + 2e^-$ at anode

(ii) Now cell 'B' acts as galvanic cell as it has higher emf and will push electrons into cell 'A'.

The electrode reaction will be:

At anode : $Zn \longrightarrow Zn^{2+} + 2e^-$

At cathode : $Cu^{2+} + 2e^- \longrightarrow Cu$

67. **Hint :** (i) Electrons move from Zn to Ag.

(ii) Ag is the cathode.

(iii) Cell will stop functioning.

(iv) When $E_{Cell} = 0$.

(v) Concentration of Zn^{2+} ions will increase and concentration of Ag^+ ions will decrease

(vi) When $E_{cell} = 0$ equilibrium is reached and concentration of Zn^{2+} ions and Ag^+ ions will not change.