Electrochemistry

1. **Assertion (A):** Cu is less reactive than hydrogen.

   Reason (R): $E^{o}_{Cu^{2+}/Cu}$ is negative.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

2. **Assertion (A):** E_{Cell} should have a positive value for the cell to function.

   Reason (R): $E_{cathode} < E_{anode}$

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

3. **Assertion (A):** Conductivity of all electrolytes decreases on dilution.

   Reason (R): On dilution number of ions per unit volume decreases.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

4. **Assertion (A):** $\wedge_m$ for weak electrolytes shows a sharp increase when the electrolytic solution is diluted.

   Reason (R): For weak electrolytes degree of dissociation increases with dilution of solution.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

5. **Assertion (A):** Electrolysis of NaCl solution gives chlorine at anode instead of O_2.

   Reason (R): Formation of oxygen at anode requires overvoltage.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

6. **Assertion (A):** Current stops flowing when $E_{Cell} = 0$.

   Reason (R): Equilibrium of the cell reaction is attained.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

7. **Assertion (A):** Molar conductivity increases with decrease in concentration for week electrolytes.

Reason (R): No. of ions increases and no. of ions per unit volume decreases due to dilution.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

8. **Assertion (A):** Conductivity decreases with the decreases in concentration both the weak and strong electrolytes.

Reason (R): No. of ions per unit volume linearly decreases in both electrolytes.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

9. **Assertion (A):** For a spontaneous process E_{cell} = – ve.

Reason (R): $\Delta G = nFE_{cell}$

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

10. **Assertion (A):** Although standard oxidation potential of Cl^- ion (–1.36V) is lower than of water (–1.23V) still it is Cl^- which is oxidized to Cl_2 at the anode during electrolysis of an aq. Solution of NaCl.

Reason (R): H_2O needs greater voltage for oxidation to O_2 than that needed for oxidation to Cl_2.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

11. **Assertion (A):** Metal-metal ion electrode are different from metal-metal insoluble salt ion electrode.

Reason (R): In standard metal-metal ion electrode metal ion conc. = 1 M whereas in standard insoluble salt electrode anion conc. = 1 M.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

12. **Assertion (A):** The equivalent conductance of an electrolyte (whether weak or strong) increases with dilution until a limiting value i.e. $\wedge_0$ or $\wedge_\infty$ is attained.

Reason (R): The increase in equivalent

conductance of a solution of a weak electrolyte is due to increase in number of ions while for a strong electrolyte it is due to increase in the velocity of ions upon dilution.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

13. **Assertion (A):** 1 Faraday of electricity deposits 1 gm of Ag or Cu or Al.
Reason (R): 1 mol of electrons are required to reduce 1 mol Al^{3+}.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

14. **Assertion (A):** In the Daniel cell, if the conc. of Cu^{2+} and Zn^{2+} ions are doubled, the emf of the cell does not change.
Reason (R): If the conc. of ions in contact with metal is doubled, the electrode potential will doubled.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ans.	3	3	1	1	1	1	1	3	4	1	1	1	4	3