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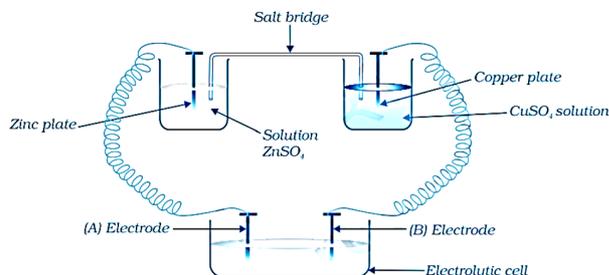
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ELECTROCHEMISTRY
Class 12 - Chemistry

1. In the electrolysis of acidulated water, it is desired to obtain 1.12 cc of hydrogen per second under S.T.P. **[1]**
   conditions. The current to be passed is

   a) 0.965 Amp   b) 9.65 Amp

   c) 19.3 Amp   d) 1.93 Amp

2. The SI units of molar conductance are: **[1]**

   a) Sm^3mol^{-1} b) $Sm^{-1}mol^{-1}$

   c) Sm^2mol^{-1} d) $Sm^{-2}mol$

3. Which of the following is a redox reaction? **[1]**

   a) $Mg(OH)_2 + 2NH_4Cl \rightarrow MgCl2 + 2NH_4OH$ b) $CaC_2O_4 + 2HCl \rightarrow CaCl_2 + H_2C_2O_4$

   c) $NaCl + KNO_3 \rightarrow NaNO_3 + KCl$ d) $Zn + 2AgCN \rightarrow 2Ag + Zn\,(CN)_2$

4. Rust is a mixture of : **[1]**

   a) FeO and Fe(OH)$_3$ b) Fe$_2$O$_3$ and Fe(OH)$_3$

   c) Fe$_3$O$_4$ and Fe(OH)$_3$ d) FeO and Fe(OH)$_2$

5. How much electricity in terms of Faraday is required to produce 20.0 g of Ca from molten CaCl$_2$? **[1]**

   a) 1F   b) 1.3F

   c) 1.2F   d) 0.8F

6. Suggest a list of metals that are extracted electrolytically. **[1]**

7. Following reactions can occur at cathode during the electrolysis of aqueous silver nitrate solution using Pt **[1]**
   electrodes:

   Ag$^+$(aq) + e$^-$ $\longrightarrow$ Ag(s); E^0 = 0.80 V

   H$^+$(aq) + e$^-$ $\longrightarrow \frac{1}{2}H_2$(g); E^0 = 0.00 V

   On the basis of their standard electrode potential values, which reaction is feasible at cathode and why?

8. Which allotrope of carbon is used for making electrodes? **[1]**

9. Value of standard electrode potential for the oxidation of Cl$^-$ ions is more positive than that of water, even then **[1]**
   in the electrolysis of aqueous sodium chloride, why is Cl$^-$ oxidized at anode instead of water?

10. Consider the following diagram in which an electrochemical cell is coupled to an electrolytic cell. What will be **[1]**
    the polarity of electrodes 'A' and 'B' in the electrolytic cell?

Salt bridge • Copper plate • CuSO₄ solution • Zinc plate • Solution ZnSO₄ • (A) Electrode • (B) Electrode • Electrolytic cell

11. **Assertion (A):** Sodium ions are discharged in preference to hydrogen ions at a mercury cathode. **[1]**

Reason (R): The nature of cathode can affect the order of discharge of cations.

    a) Both A and R are true and R is the correct explanation of A.

    b) Both A and R are true but R is not the correct explanation of A.

    c) A is true but R is false.

    d) A is false but R is true.

12. **Assertion (A):** A negative value of standard reduction potential means that reduction takes place on this electrode with reference to standard hydrogen electrode. **[1]**

Reason (R): The standard electrode potential of a half cell has a fixed value.

    a) Both A and R are true and R is the correct explanation of A.

    b) Both A and R are true but R is not the correct explanation of A.

    c) A is true but R is false.

    d) A is false but R is true.

13. **Assertion (A):** Copper is dissolved at anode and deposited at cathode. **[1]**

Reason (R): Oxidation takes place at anode and reduction at cathode.

    a) Both A and R are true and R is the correct explanation of A.

    b) Both A and R are true but R is not the correct explanation of A.

    c) A is true but R is false.

    d) A is false but R is true.

14. **Assertion (A):** Conductivity of an electrolyte decreases with decrease in concentration. **[1]**

Reason (R): Number of ions per unit volume increases on dilution.

    a) Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).

    b) Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of the Assertion (A).

    c) Assertion (A) is correct, but Reason (R) is incorrect statement.

    d) Assertion (A) is incorrect, but Reason (R) is correct statement.

15. **Assertion (A):** For a cell reaction $Zn(s) + Cu^{2+} (aq) \rightarrow Zn^{2+} (aq) + Cu (s)$; at the equilibrium, voltmeter gives zero reading. **[1]**

Reason (R): At the equilibrium, there is no change in the concentration of Cu^{2+} and Zn^{2+} ions.

    a) Both A and R are true and R is the correct explanation of A.

    b) Both A and R are true but R is not the correct explanation of A.

    c) A is true but R is false.

    d) A is false but R is true.

16. Match the items given in column I with that in column II: **[1]**

Column I	Column II
(a)	(i) The mass of substance liberated at electrode is directly proportional to the quantity of

Ostwald's dilution law.	electricity passed through the electrolyte.
(b) Kohlrausch's law.	(ii) The degree of ionisation of weak electrolytes approaches unity at infinite dilution.
(c) Faraday's First Law.	(iii) When same quantity of electricity is passed through different electrolytes connected in series then the mass of electrolyte liberated at electrode is in the ratio of their equivalent masses.
(d) Faraday's Second Law.	(iv) At infinite dilution each ion makes a definite contribution towards molar conductivity.

a) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)   b) (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii)

c) (a) - (iii), (b) - (ii), (c) - (iv), (d) - (i)   d) (a) - (i), (b) - (iii), (c) - (ii), (d) - (iv)

17.   Match the items given in column I with that in column II: **[1]**

Column I	Column II
(a) The cell reaction $2H_2 + O_2 \rightarrow 2H_2O$.	(i) Nickel-cadmium Storage Cell.
(b) Anodic Reaction is $Zn \rightarrow Zn^{2+} + 2e^-$.	(ii) Mercury Cell.
(c) Cathodic Reaction $HgO(s) + H_2O + 2e^- \rightarrow Hg(l) + 2OH^-$.	(iii) Bacon Cell.
(d) Anodic Reaction $Cd(s) + 2OH^-(aq) \rightarrow Cd(OH)_2(s) + 2e^-$.	(iv) Leclanche cell.

a) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)   b) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)

c) (a) - (iv), (b) - (ii), (c) - (iii), (d) - (i)   d) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

18.   Match the items given in column I with that in column II: **[1]**

Column I	Column II
(a) Ω^{-1} cm^{2}mol^{-1}	(i) Mercury Cell
(b) $\alpha_{dissoiation}$ is low	(ii) λ_m
(c) Decreases with dilution	(iii) Weak Electrolyte
(d) Electrolyte is a paste of KOH/ZnO	(iv) Conductivity

a) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)   b) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)

c) (a) - (iii), (b) - (iv), (c) - (i), (d) - (ii)   d) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)

19.   Match the column and choose correct option: **[1]**

(A) Conductance	(P) m^{-1}
(B) Conductivity	(Q) 5 cm^{-1}
(C) Molar conductance	(R) Siemen
(D) Cell constant	(S) 5 cm^2 mol^{-1}

a) (A) - (R), (B) - (S), C - (Q), (D) - (P)   b) (A) - (R), (B) - (Q), C - (S), (D) - (P)

c) (A) - (R), (B) - (P), C - (Q), (D) - (S)   d) (A) - (R), (B) - (Q), C - (P), (D) - (S)

20. Match the items given in column I with that in column II: **[1]**

Column I	Column II
(a) Cell Volage $\simeq$ 1.35 V	(i) Bacon Cell
(b) Electrolyte is aqueous solution of H_2SO_4 38% by mass	(ii) Mercury Cell
(c) Cell Volage $\simeq$ 1.4 V	(iii) Lead-storage Battery
(d) Used to power Apollo space Missions	(iv) Nickel-cadmium Storage Cell

a) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)   b) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)

c) (a) - (iii), (b) - (iv), (c) - (i), (d) - (ii)   d) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

21. **State True or False:**   **[5]**

(a) When an aqueous solution of NaCI is electrolysed, sodium metal is deposited at the cathode.   **[1]**

(b) Cell voltage is independent of the size of the cell or the electrodes.   **[1]**

(c) Silver nitrate solution can be stored in a copper container.   **[1]**

(d) Emf of a cell is the difference in the reduction potentials of cathode and anode.   **[1]**

(e) Electrolysis of a solution containing copper and iron, ions of iron deposits first.   **[1]**

22. **Fill in the blanks:**   **[5]**

(a) The quantity of electricity required to liberate one gram equivalent of a substance from its salt's solution is _____.   **[1]**

(b) The best electronic conductor is _____.   **[1]**

(c) An aqueous solution of ferric chloride has a pH _____ than 7.   **[1]**

(d) Addition of excess NaOH solution to a solution containing Zn^{2+} ion results in the formation of _____.   **[1]**

(e) In a Daniell cell, current flows from _____ to _____ outside the cell.   **[1]**