NCERT CORNER

NCERT Text Based Objective and Exemplar Problems

1. The cell reaction

$Hg_2Cl_2(s) + Cu(s) \longrightarrow Cu^{2+}(aq) + 2Cl^-(aq) + 2Hg(l)$,

is best represented by :

(a) $Cu(s)\,|\,Cu^{+2}(aq)\,||\,Hg_2Cl_2(s)\,|\,Hg(l)$

(b) $Cu(s)\,|\,Cu^{+2}(aq)\,||\,Hg(l)\,|\,HgCl_2(s)$

(c) $Cu(s)\,|\,Cu^{+2}(aq)\,||\,Cl^-(aq)\,|\,Hg_2Cl_2(s)\,|\,Hg(l)\,|\,Pt(s)$

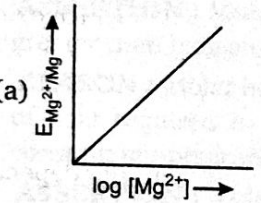
(d) $Hg_2Cl_2(s)\,|\,Cl^-(aq)\,||\,Cu^{+2}(aq)\,|\,Cu(s)$

2. Electrode potential for Mg electrode varies according to the equation

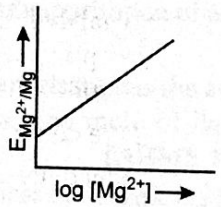
$$E_{Mg^{2+}/Mg} = E^{\circ}_{Mg^{2+}/Mg} - \frac{0.059}{2}\log\frac{1}{[Mg^{2+}]}$$

The graph of $E_{Mg^{2+}/Mg}$ *vs.* $\log[Mg^{2+}]$ is :

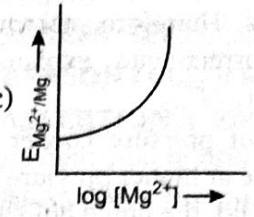
(a)



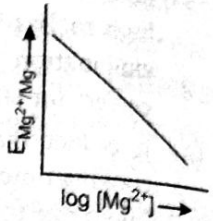
(b)



(c)



(d)



3. Which of the following statement is correct?

(a) E°_{cell} and $\Delta_r G$ of cell reaction both are extensive properties.

(b) E_{cell} and $\Delta_r G$ of cell reaction both are intensive properties.

(c) E°_{cell} is an intensive property while $\Delta_r G$ of cell reaction is an extensive property.

(d) E_{cell} is an extensive property while $\Delta_r G$ of cell reaction is an intensive property.

4. The difference between the electrode potentials of two electrodes when no current is drawn through the cell is called ..... .

(a) Cell potential (b) Cell emf

(c) Potential difference (d) Cell voltage

5. Which of the following statement is not correct about an inert electrode in a cell?

(a) It does not participate in the cell reaction.

(b) It provides surface either for oxidation or for reduction reaction.

(c) It provides surface for conduction of electrons.

(d) It provides surface for redox reaction.

6. An electrochemical cell can behave like an electrolytic cell when ..... :
(a) $E_{cell} = 0$ (b) $E_{cell} > E_{ext}$
(c) $E_{ext} > E_{cell}$ (d) $E_{cell} = E_{ext}$

7. Which of the statements about solutions of electrolytes is not correct?
(a) Conductivity of solution depends upon size of ions.
(b) Conductivity depends upon viscosity of solution.
(c) Conductivity does not depend upon solvation of ions present in solution.
(d) Conductivity of solution increases with temperature.

8. Using the data given below find out the strongest reducing agent.
$E^\circ_{Cr_2O_7^{2-}/Cr^{3+}} = 1.33\ V$, $E^\circ_{Cl_2/Cl^-} = 1.36\ V$
$E^\circ_{MnO_4^-/Mn^{2+}} = 1.51\ V$, $E^\circ_{Cr^{3+}/Cr} = -0.74\ V$
(a) Cl^- (b) Cr
(c) Cr^{3+} (d) Mn^{2+}

9. Use the data given in Q.8 and find out which of the following is the strongest oxidising agent ?
(a) Cl^- (b) Mn^{2+}
(c) MnO_4^- (d) Cr^{3+}

10. Using the data given in Q.8 and find out in which option the order of reducing power is correct.
(a) $Cr^{3+} < Cl^- < Mn^{2+} < Cr$
(b) $Mn^{2+} < Cl^- < Cr^{3+} < Cr$
(c) $Cr^{3+} < Cl^- < Cr_2O_7^{2-} < MnO_4^-$
(d) $Mn^{2+} < Cr^{3+} < Cl^- < Cr$

11. Use the data given in Q.8 and find out the most stable ion in its reduced form.
(a) Cl^- (b) Cr^{3+}
(c) Cr (d) Mn^{2+}

12. Use the data of Q.8 and find out the most stable oxidised species.
(a) Cr^{3+} (b) MnO_4^-
(c) $Cr_2O_7^{2-}$ (d) Mn^{2+}

13. The quantity of charge required to obtain one mole of aluminium from Al_2O_3 is :
(a) 1 F (b) 6 F
(c) 3 F (d) 2 F

14. The cell constant of a conductivity cell ..... .
(a) changes with change of electrolyte.
(b) changes with change of concentration of electrolyte.
(c) changes with temperature of electrolyte.
(d) remains constant for a cell.

15. While charging the lead storage battery ..... .
(a) $PbSO_4$ anode is reduced to Pb.
(b) $PbSO_4$ cathode is reduced to Pb.
(c) $PbSO_4$ cathode is oxidised to Pb.
(d) $PbSO_4$ anode is oxidised to PbO_2.

16. $\lambda^\circ_{m\,(NH_4OH)}$ is equal to ..... .
(a) $\lambda^\circ_{m\,(NH_4OH)} + \lambda^\circ_{m\,(NH_4Cl)} - \lambda^\circ_{(HCl)}$
(b) $\lambda^\circ_{m\,(NH_4Cl)} + \lambda^\circ_{m\,(NaOH)} - \lambda^\circ_{(NaCl)}$
(c) $\lambda^\circ_{m\,(NH_4Cl)} + \lambda^\circ_{m\,(NaCl)} - \lambda^\circ_{(NaOH)}$
(d) $\lambda^\circ_{m\,(NaOH)} + \lambda^\circ_{m\,(NaCl)} - \lambda^\circ_{(NH_4Cl)}$

17. In the electrolysis of aqueous sodium chloride solution which of the half cell reaction will occur at anode ?
(a) $Na^+(aq) + e^- \longrightarrow Na(s)$; $E^\circ_{cell} = -2.71\ V$
(b) $2H_2O(l) \rightarrow O_2(g) + 4H^+(aq) + 4e^-$; $E^\circ_{cell} = 1.23\ V$
(c) $H^+(aq) + e^- \longrightarrow \frac{1}{2}H_2(g)$; $E^\circ_{cell} = 0.00\ V$
(d) $Cl^-(aq) \longrightarrow \frac{1}{2}Cl_2(g) + e^-$; $E^\circ_{cell} = 1.36\ V$

18. Which statement is correct?
(a) A galvanic cell is an electro chemical cell that converts the chemical energy of a spontaneous redox reaction into electrical energy.
(b) If an external opposite potential is applied on Daniel cell is more than 1.1 V than it function as an electrolytic cell.
(c) In a galvanic cell, the half cell in which oxidation takes place is called anode and it has a negative potential with respect of the solution.
(d) All are correct

19. The conductivity of electrolytic solutions depends on:
(a) Size of the ions produced and their solvation
(b) The nature of the solvent and its viscosity
(c) Temperature
(d) All of the above