AIPMT 2009

1. Given :
(i) $Cu^{2+} + 2e^- \rightarrow Cu$, E° = 0.337 V
(ii) $Cu^{2+} + e^- \rightarrow Cu^+$, E° = 0.153 V
Electrode potential, E° for the reaction, $Cu^+ + e^- \rightarrow Cu$, will be :-
(1) 0.38 V (2) 0.52 V
(3) 0.90 V (4) 0.30 V

2. The equivalent conductance of $\frac{M}{32}$ solution of a weak monobasic acid is 8.0 mho cm^2 $eq^{-1}$and at infinite dilution is 400 mho cm^2 eq^{-1}. The dissociation constant of this acid is :-
(1) 1.25×10^{-4} (2) 1.25×10^{-5}
(3) 1.25×10^{-6} (4) 6.25×10^{-4}

3. Al_2O_3 is reduced by electrolysis at low potential and high current. If 4.0×10^4 A of current is passed through molten Al_2O_3 for 6 hours, what mass of aluminium is produced ? (Assume 100% current efficiency, At. mass of Al = 27 g mol^{-1})
(1) 1.3×10^4 g (2) 9.0×10^3 g
(3) 8.1×10^4 g (4) 2.4×10^5 g

AIPMT 2010

4. An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to:-
(1) Increase in number of ions.
(2) Increase in ionic mobility of ions.
(3) 100% ionisation of electrolyte at normal dilution.
(4) Increase in both i.e. number of ions and ionic mobility of ions.

5. Consider the following relations for emf of a electrochemical cell :
(a) emf of cell =(Oxidation potential of anode) – (Reduction potential of cathode)
(b) emf of cell = (Oxidation potential of anode) + (Reduction potential of cathode)
(c) emf of cell = (Reduction potential of anode) + (Reduction potential of cathode)
(d) emf of cell = (Oxidation potential of anode) – (Oxidation potential of cathode)
Which of the above relations are correct :
(1) (a) and (b) (2) (c) and (d)
(3) (b) and (d) (4) (c) and (a)

6. Which of the following expressions correctly represents the equivalent conductance of $Al_2(SO_4)_3$ at infinite dilution. Given that $\Lambda°_{Al^{3+}}$ and $\Lambda°_{SO_4^{2-}}$ are the equivalent conductances at infinite dilution of the respective ions :-
(1) $\Lambda°_{Al^{3+}} + \Lambda°_{SO_4^{2-}}$
(2) $\left(\Lambda°_{Al^{3+}} + \Lambda°_{SO_4^{2-}}\right) \times 6$
(3) $\frac{1}{3}\wedge^0_{Al^{3+}} + \frac{1}{2}\wedge^0_{SO_4^{2-}}$
(4) $2\Lambda°_{Al^{3+}} + 3\Lambda°_{SO_4^{2-}}$

7. For the reduction of silver ions with copper metals, the standard cell potential was found to be +0.46 V at 25 °C. The value of standard Gibbs energy. ΔG° will be (F = 96500 C mol^{-1})
(1) –98.0 kJ (2) –89.0 kJ
(3) –89.0 J (4) –44.5 kJ

AIPMT Pre. 2011

8. Standard electrode potential of three metals X, Y and Z are –1.2 V, +0.5 V and –3.0 V respectively. The reducing power of these metals will be :-
(1) Y > Z > X (2) Y > X > Z
(3) Z > X > Y (4) X > Y > Z

9. The electrode potentials for
$Cu^{2+}(aq) + e^- \rightarrow Cu^+(aq)$
and $Cu^+(aq) + e^- \rightarrow Cu(s)$
are +0.15 V and +0.50 V respectively. The value of will be :-
(1) 0.500 V (2) 0.325 V
(3) 0.650 V (4) 0.150 V

10. Standard electrode potential for Sn^{4+}/Sn^{2+} couple is +0.15 V and that for the Cr^{3+}/Cr couples is –0.74 V. These two couples in their standard state are connected to make a cell. The standard cell potential will be :-
(1) +1.19 V (2) +0.89 V
(3) +0.18 V (4) +1.83 V

11. If the E°_{cell} for a given reaction has a negative value, then which of the following gives the correct relationship for the values of ΔG° and K_{eq}?

(1) $\Delta G^\circ > 0; K_{eq} > 1$ (2) $\Delta G^\circ < 0; K_{eq} > 1$

(3) $\Delta G^\circ < 0; K_{eq} < 1$ (4) $\Delta G^\circ > 0; K_{eq} < 1$

AIPMT Mains 2011

12. A solution contains Fe^{2+}, Fe^{3+} and I^- ions. This solution was treated with iodine at 35 °C. E° for $Fe^{3+} \mid Fe^{2+}$ is +0.77 V and E° for $I_2 \mid 2I^-$ = 0.536 V. The favourable redox reaction is :-

(1) Fe^{2+} will be oxidised to Fe^{3+}

(2) I_2 will be reduced to I^-

(3) There will be no redox reaction

(4) I^- will be oxidised to I_2

AIPMT Pre. 2012

13. Limiting molar conductivity of NH_4OH

$\left(\text{i.e.} \overset{\circ}{\Lambda}_{m(NH_4OH)}\right)$ is equal to:-

(1) $\overset{\circ}{\Lambda}_{m(NH_4OH)} + \overset{\circ}{\Lambda}_{m(NH_4Cl)} - \overset{\circ}{\Lambda}_{m(HCl)}$

(2) $\overset{\circ}{\Lambda}_{m(NH_4Cl)} + \overset{\circ}{\Lambda}_{m(NaOH)} - \overset{\circ}{\Lambda}_{m(NaCl)}$

(3) $\overset{\circ}{\Lambda}_{m(NH_4Cl)} + \overset{\circ}{\Lambda}_{m(NaCl)} - \overset{\circ}{\Lambda}_{m(NaOH)}$

(4) $\overset{\circ}{\Lambda}_{m(NaOH)} + \overset{\circ}{\Lambda}_{m(NaCl)} - \overset{\circ}{\Lambda}_{m(NH_4Cl)}$

AIPMT Mains 2012

14. Molar conductivities (Λ_m°) at infinite dilution of NaCl, HCl and CH_3COONa are 126.4, 425.9 and 91.0 S cm^2 mol^{-1} respectively. Λ_m° for CH_3COOH will be :-

(1) 290.8 S cm^2 mol^{-1}

(2) 390.5 S cm^2 mol^{-1}

(3) 425.5 S cm^2 mol^{-1}

(4) 180.5 S cm^2 mol^{-1}

NEET-UG 2013

15. At 25 °C molar conductance of 0.1 molar aqueous solution of ammonium hydroxide is 9.54 ohm^{-1} cm^2 mol^{-1} and at infinite dilution its molar conductance is 238 ohm^{-1} cm^2 mol^{-1}. The degree of ionisation of ammonium hydroxide at the same concentration and temperature is :-

(1) 40.800 % (2) 2.080 %
(3) 20.800 % (4) 4.008 %

16. A hydrogen gas electrode is made by dipping platinum wire in a solution of HCl of pH = 10 and by passing hydrogen gas around the platinum wire at 1 atm pressure. The oxidation potential of electrode would be ?
(1) 1.18 V (2) 0.059 V
(3) 0.59 V (4) 0.118 V

17. A button cell used in watches function as following

$$Zn(s)+Ag_2O(s)+H_2O(\ell) \rightleftharpoons 2Ag(s)+Zn^{2+}(aq)+2OH^-(aq)$$

If half cell potentials are
$Zn^{2+}(aq) + 2e^- \rightarrow Zn(s)$; E° = –0.76 V
$Ag_2O(s) + H_2O(\ell) + 2e^- \rightarrow 2Ag(s) + 2OH^-(aq)$;
E° = 0.34 V
The standard cell potential will be :-
(1) 1.34 V (2) 1.10 V
(3) 0.42 V (4) 0.84 V

AIPMT 2014

18. When 0.1 mol MnO_4^{2-} is oxidised the quantity of electricity required to completely oxidise MnO_4^{2-} to MnO_4^- is :-

(1) 96500 C (2) 2×96500 C

(3) 9650 C (4) 96.50 C

19. The weight of silver (at wt. = 108) displaced by a quantity of electricity which displaces 5600 mL of O_2 at STP will be :-

(1) 5.4 g (2) 10.8 g

(3) 54.0 g (4) 108.0 g

AIPMT 2015

20. A device that converts energy of combustion of fuels like hydrogen and methane, directly into electrical energy is known as :-

(1) Electrolytic cell (2) Dynamo
(3) Ni-Cd cell (4) Fuel Cell

NEET-I 2016

21. The pressure of H_2 required to make the potential of H_2-electrode zero in pure water at 298 K is :-

(1) 10^{-14} atm (2) 10^{-12} atm
(3) 10^{-10} atm (4) 10^{-4} atm

NEET-II 2016

22. The molar conductivity of a 0.5 mol/dm^3 solution of $AgNO_3$ with electrolytic conductivity of 5.76×10^{-3} S cm^{-1} at 298 K is

(1) 0.086 S cm^2/mol (2) 28.8 S cm^2/mol
(3) 2.88 S cm^2/mol (4) 11.52 S cm^2/mol

23. During the electrolysis of molten sodium chloride, the time required to produce 0.10 mol of chlorine gas using a current of 3 A is

(1) 220 minutes (2) 330 minutes
(3) 55 minutes (4) 110 minutes

24. If the E°_{cell} for a given reaction has a negative value, which of the following gives the **correct** relationships for the values of ΔG° and K_{eq} ?

(1) $\Delta G^\circ < 0$; $K_{eq} > 1$ (2) $\Delta G^\circ < 0$; $K_{eq} < 1$
(3) $\Delta G^\circ > 0$; $K_{eq} < 1$ (4) $\Delta G^\circ > 0$; $K_{eq} > 1$

25. The number of electrons delivered at the cathode during electrolysis by a current of 1 A in 60 s is (charge on electron $= 1.60 \times 10^{-19}$ C)

(1) 3.75×10^{20} (2) 7.48×10^{23}
(3) 6×10^{23} (4) 6×10^{20}

NEET(UG) 2017

26. In the electrochemical cell :-

$Zn \mid ZnSO_4(0.01M) \mid\mid CuSO_4(1.0\ M) \mid Cu$, the emf of this Daniel cell is E_1. When the concentration of $ZnSO_4$ is changed to 1.0M and that of $CuSO_4$ changed to 0.01M, the emf changes to E_2.

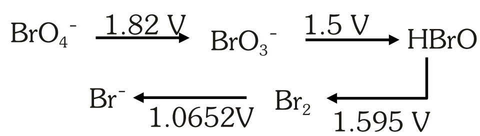
Which one of the relationship is correct between E_1 and E_2?

(Given, $\frac{RT}{F} = 0.059$)

(1) $E_1 < E_2$ (2) $E_1 > E_2$
(3) $E_2 = 0 \neq E_1$ (4) $E_1 = E_2$

NEET(UG) 2018

27. Consider the change in oxidation state of Bromine corresponding to different EMF values as shown in the diagram below:



Then the species undergoing disproportionation is:-

(1) BrO_3^- (2) BrO_4^-
(3) Br_2 (4) HBrO

NEET(UG) 2019

28. For a cell involving one electron $E^\circ_{cell} = 0.59V$ at 298 K, the equilibrium constant for the cell reaction is :-

$\left[\text{Given that } \frac{2.303RT}{F} = 0.059V \text{ at } T = 298K\right]$

(1) 1.0×10^2 (2) 1.0×10^5
(3) 1.0×10^{10} (4) 1.0×10^{30}

29. For the cell reaction

$2Fe^{3+}(aq) + 2I^-(aq) \rightarrow 2Fe^{2+}(aq) + I_2(aq)$

$E^\circ_{cell} = 0.24V$ at 298 K. The standard Gibbs energy $(\Delta_r G^\circ)$ of the cell reaction is :

[Given that Faraday constant F = 96500 C mol^{-1}]

(1) – 46.32 kJ mol^{-1} (2) – 23.16 kJ mol^{-1}
(3) 46.32 kJ mol^{-1} (4) 23.16 kJ mol^{-1}

NEET(UG) (Odisha) 2019

30. Following limiting molar conductivities are given as

$\lambda^0_{m(H_2SO_4)} = x\ S\,cm^2\ mol^{-1}$

$\lambda^0_{m(K_2SO_4)} = y\ S\,cm^2\ mol^{-1}$

$\lambda^0_{m(CH_3COOK)} = z\ S\,cm^2\ mol^{-1}$

λ^0_m (in S cm^2 mol^{-1}) for CH_3COOH will be-

(1) $x - y + 2z$ (2) $x + y - z$

(3) $x - y + z$ (4) $\frac{(x-y)}{2} + z$

31. The standard electrode potential (E°) values of $Al^{3+}|Al$, $Ag^{+}|Ag$, $K^{+}|K$ and $Cr^{3+}|Cr$ are –1.66 V, 0.80V, –2.93 V and –0.74 V respectively. The correct decreasing order of reducing power of the metal is :

(1) Ag > Cr > Al > K (2) K > Al > Cr > Ag

(3) K > Al > Ag > Cr (4) Al > K > Ag > Cr

NEET (UG) 2020

32. The number of Faradays(F) required to produce 20 g of calcium from molten $CaCl_2$ (Atomic mass of Ca = 40 g mol^{-1}) is :

(1) 4 (2) 1 (3) 2 (4) 3

33. On electrolysis of dil. sulphuric acid using Platinum (Pt) electrode, the product obtained at anode will be:

(1) SO_2 gas (2) Hydrogen gas

(3) Oxygen gas (4) H_2S gas

NEET (UG) 2020 (COVID-19)

34. Identify the reaction from following having top position in EMF series (Std.red. potential) according to their electrode potential at 298 K.

(1) $Mg^{2+} + 2e^- \rightarrow Mg(s)$ (2) $Fe^{2+} + 2e^- \rightarrow Fe(s)$

(3) $Au^{3+} + 3e^- \rightarrow Au(s)$ (4) $K^+ + 1e^- \rightarrow K(s)$

35. In a typical fuel cell, the reactants (R) and product (P) are :-

(1) R = $H_{2(g)}$, $O_{2(g)}$; P = $H_2O_{2(\ell)}$

(2) R = $H_{2(g)}$, $O_{2(g)}$; P = $H_2O_{(\ell)}$

(3) R = $H_{2(g)}$, $O_{2(g)}$, $Cl_{2(g)}$; P = $HClO_{4(aq)}$

(4) R = $H_{2(g)}$, $N_{2(g)}$; P = $NH_{3(aq)}$

NEET (UG) 2021

36. The molar conductance of NaCl, HCl and CH_3COONa at infinite dilution are 126.45,426.16 and 91.0 S cm^2 mol^{-1} respectively. The molar conductance of CH_3COOH at infinite dilution is. Choose the right option for your answer.

(1) 201.28 S cm^2 mol^{-1}

(2) 390.71 S cm^2 mol^{-1}

(3) 698.28 S cm^2 mol^{-1}

(4) 540.48 S cm^2 mol^{-1}

37. The molar conductivity of 0.007 M acetic acid is 20 S cm^2 mol^{-1}. What is the dissociation constant of acetic acid ? Choose the correct option.

$$\begin{bmatrix} \Lambda^{\circ}_{H^+} = 350\,S\,cm^2mol^{-1} \\ \Lambda^{\circ}_{CH_3COO^-} = 50\,S\,cm^2mol^{-1} \end{bmatrix}$$

(1) 1.75×10^{-4} mol L^{-1}

(2) 2.50×10^{-4} mol L^{-1}

(3) 1.75×10^{-5} mol L^{-1}

(4) 2.50×10^{-5} mol L^{-1}

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**2**	**2**	**3**	**2**	**3**	**1**	**2**	**3**	**2**	**2**	**4**	**4**	**2**	**2**	**4**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**3**	**2**	**3**	**4**	**4**	**1**	**4**	**4**	**3**	**1**	**2**	**4**	**3**	**1**	**4**
Que.	31	32	33	34	35	36	37								
Ans.	**2**	**2**	**3**	**3**	**2**	**2**	**3**								