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# NEET ELECTROCHEMISTRY — PYQS

**Max. Marks:** 276 **Questions:** 69

## Section A (MCQ) — 69 questions

**Q.1** Calculate emf of the half cell given below :
Pt(s) | $H_2$(g, 2 atm) | HCl(aq, 0.02 M)
$E°_{H_2/H^+} = 0$ V
(Given : $\frac{2.303RT}{F}$ = 0.059, log 2 = 0.3010)
[NEET (UG) 2026]
(1) −0.109 V (2) 0.109 V
(3) 0.035 V (4) −0.035 V

Scan or tap for the full solution

**Q.2** A solution of copper sulphate is electrolysed for 10 minutes with a current of 1.5 amperes. The mass of copper deposited at cathode is :
(Given : Molar mass of Cu = 63 g $mol^{-1}$; 1F = 96487 C $mol^{-1}$) [NEET (UG) 2026]
(1) 0.2938 g (2) 0.5876 g
(3) 2.4036 g (4) 1.7018 g

Scan or tap for the full solution

**Q.3** The standard electrode potential (E°) for the half-cell reaction $Fe^{3+} + e^- \longrightarrow Fe^{2+}$ at 298 K is
(Given : E°($Fe^{3+}$/Fe) = −0.04 V and
E°($Fe^{2+}$/Fe) = −0.44 V at 298 K)
[RE-NEET (UG) 2026]
(1) +0.92 V (2) +0.40 V (3) +0.76 V (4) −0.48 V

Scan or tap for the full solution

**Q.4** For a salt XY, which is a strong electrolyte, the plot of $\Lambda_m$ versus $\sqrt{c}$ has a slope of −90.0 S $cm^2$ $mol^{-3/2}$ $L^{1/2}$ at 298 K. At 0.01 M concentration of XY, the value of $\Lambda_m$ is 145.0 S $cm^2$ $mol^{-1}$. The limiting molar conductivity of $Y^-$ ion ($\lambda^0_{Y^-}$, in S $cm^2$ $mol^{-1}$) at 298 K will be
(Given : $\lambda^0_{X^+} = 74.0$ S $cm^2$ $mol^{-1}$)
[RE-NEET (UG) 2026]
(1) 76.0 (2) 80.0 (3) 100.0 (4) 90.0

Scan or tap for the full solution

**Q.5** If the molar conductivity ($\Lambda_m$) of a 0.050 mol $L^{-1}$ solution of a monobasic weak acid is 90 S $cm^2$ $mol^{-1}$, its extent (degree) of dissociation will be
[Assume $\Lambda_+°$ = 349.6 S $cm^2$ $mol^{-1}$ and $\Lambda_-°$ = 50.4 S $cm^2$ $mol^{-1}$.] [NEET (UG) 2025]
(1) 0.225 (2) 0.215 (3) 0.115 (4) 0.125

Scan or tap for the full solution

**Q.6** Match **List I** with **List II**.

| List I (Conversion) | | List II (Number of Faraday required) | |
|---|---|---|---|
| A. | 1 mole of $H_2O$ to $O_2$ | I. | 3F |
| B. | 1 mol of $MnO_4^-$ to $Mn^{2+}$ | II. | 2F |
| C. | 1.5 mol of Ca from molten $CaCl_2$ | III. | 1F |
| D. | 1 mol of FeO to $Fe_2O_3$ | IV. | 5F |

Choose the correct answer from the options given below : [NEET (UG) 2024]
(1) A-II, B-IV, C-I, D-III (2) A-III, B-IV, C-I, D-II
(3) A-II, B-III, C-I, D-IV (4) A-III, B-IV, C-II, D-I

Scan or tap for the full solution

**Q.7** Mass in grams of copper deposited by passing 9.6487 A current through a voltameter containing copper sulphate solution for 100 seconds is (Given : Molar mass of Cu:63 g $mol^{-1}$, 1 F = 96487 C)
[NEET (UG) 2024]
(1) 3.15 g (2) 0.315 g (3) 31.5 g (4) 0.0315 g

Scan or tap for the full solution

**Q.8** From the following select the one which is not an example of corrosion. [RE-NEET (UG) 2024]
(1) Rusting of iron object
(2) Production of hydrogen by electrolysis of water
(3) Tarnishing of silver
(4) Development of green coating on copper and bronze ornaments

Scan or tap for the full solution

**Q.9** The standard cell potential of the following cell $Zn \mid Zn^{2+}(aq) \parallel Fe^{2+}(aq) \mid Fe$ is 0.32 V. Calculate the standard Gibbs energy change for the reaction:

$Zn(s) + Fe^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Fe(s)$

(Given : 1 F = 96487 C) [RE-NEET (UG) 2024]

(1) $-61.75$ kJ $mol^{-1}$ (2) $+5.006$ kJ $mol^{-1}$

(3) $-5.006$ kJ $mol^{-1}$ (4) $+61.75$ kJ $mol^{-1}$

Scan or tap for the full solution

**Q.10** The conductivity of centimolar solution of KCl at 25°C is 0.0210 $ohm^{-1}$ $cm^{-1}$ and the resistance of the cell containing the solution at 25°C is 60 ohm. The value of cell constant is - [NEET (UG) 2023]

(1) 3.28 $cm^{-1}$ (2) 1.26 $cm^{-1}$

(3) 3.34 $cm^{-1}$ (4) 1.34 $cm^{-1}$

Scan or tap for the full solution

**Q.11** Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:

**Assertion (A):** In equation $\Delta_rG = -nFE_{cell}$, value of $\Delta_rG$ depends on n.

**Reason (R):** $E_{cell}$ is an intensive property and $\Delta_rG$ is an extensive property.

In the light of the above statements, choose the correct answer from the options given below: [NEET (UG) 2023]

(1) Both A and R are true but R is NOT the correct explanation of A.

(2) A is true but R is false.

(3) A is false but R is true.

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

Scan or tap for the full solution

**Q.12** At 298 K, the standard electrode potentials of $Cu^{2+}/Cu$, $Zn^{2+}/Zn$, $Fe^{2+}/Fe$ and $Ag^{+}/Ag$ are 0.34 V, −0.76 V, −0.44 V and 0.80 V, respectively.

On the basis of standard electrode potential, predict which of the following reaction cannot occur? [NEET (UG) 2022]

(1) $CuSO_4(aq) + Zn(s) \longrightarrow ZnSO_4(aq) + Cu(s)$

(2) $CuSO_4(aq) + Fe(s) \longrightarrow FeSO_4(aq) + Cu(s)$

(3) $FeSO_4(aq) + Zn(s) \longrightarrow ZnSO_4(aq) + Fe(s)$

(4) $2CuSO_4(aq) + 2Ag(s) \longrightarrow 2Cu(s) + Ag_2SO_4(aq)$

Scan or tap for the full solution

**Q.13** Given below are half cell reactions:

$MnO_4^- + 8H^+ + 5e^- \longrightarrow Mn^{2+} + 4H_2O$,

$E°_{Mn^{2+}/MnO_4^-} = -1.510$ V

$\frac{1}{2}O_2 + 2H^+ + 2e^- \longrightarrow H_2O$

$E°_{O_2/H_2O} = +1.223$ V

Will the permanganate ion, $MnO_4^-$ liberate $O_2$ from water in the presence of an acid? [NEET (UG) 2022]

(1) Yes, because $E°_{cell} = +0.287$ V

(2) No, because $E°_{cell} = -0.287$ V

(3) Yes, because $E°_{cell} = +2.733$ V

(4) No, because $E°_{cell} = -2.733$ V

Scan or tap for the full solution

**Q.14** Find the emf of the cell in which the following reaction takes place at 298 K

$Ni(s) + 2Ag^+ (0.001\ M) \longrightarrow Ni^{2+} (0.001\ M) + 2Ag(s)$

(Given that $E°_{cell} = 1.05$ V, $\frac{2.303\ RT}{F} = 0.059$ at 298 K) [NEET (UG) 2022]

(1) 1.0385 V (2) 1.385 V

(3) 0.9615 V (4) 1.05 V

Scan or tap for the full solution

**Q.15** Two half cell reactions are given below.

$Co^{3+} + e^- \longrightarrow Co^{2+}$, $E^0_{Co^{2+}/Co^{3+}} = -1.81$ V

$2Al^{3+} + 6e^- \longrightarrow 2Al(s)$, $E^0_{Al/Al^{3+}} = +1.66$ V

The standard EMF of a cell with feasible redox reaction will be : [NEET (UG) 2022 (Phase 2)]

(1) −3.47 V (2) +7.09 V (3) +0.15 V (4) +3.47 V

Scan or tap for the full solution

**Q.16** Standard electrode potential for the cell with cell reaction

$Zn(s) + Cu^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Cu(s)$

is 1.1 V. Calculate the standard Gibbs energy change for the cell reaction. (Given F = 96487 C $mol^{-1}$) [NEET (UG) 2022 (Phase 2)]

(1) $-200.27$ J $mol^{-1}$ (2) $-200.27$ kJ $mol^{-1}$

(3) $-212.27$ kJ $mol^{-1}$ (4) $-212.27$ J $mol^{-1}$

Scan or tap for the full solution

**Q.17** 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. [NEET (UG) 2021]

(1) 540.48 S $cm^2$ $mol^{-1}$ (2) 201.28 S $cm^2$ $mol^{-1}$
(3) 390.71 S $cm^2$ $mol^{-1}$ (4) 698.28 S $cm^2$ $mol^{-1}$

Scan or tap for the full solution

**Q.18** 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.

[$\Lambda°_{H^+} = 350\ S\,cm^2\,mol^{-1}$
$\Lambda°_{CH_3COO^-} = 50\ S\,cm^2\,mol^{-1}$] [NEET (UG) 2021]

(1) $2.50 \times 10^{-5}$ mol $L^{-1}$ (2) $1.75 \times 10^{-4}$ mol $L^{-1}$
(3) $2.50 \times 10^{-4}$ mol $L^{-1}$ (4) $1.75 \times 10^{-5}$ mol $L^{-1}$

Scan or tap for the full solution

**Q.19** On electrolysis of dil. sulphuric acid using Platinum (Pt) electrode, the product obtained at anode will be : [NEET (UG) 2020]

(1) Oxygen gas (2) $H_2S$ gas
(3) $SO_2$ gas (4) Hydrogen gas

Scan or tap for the full solution

**Q.20** 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 : [NEET (UG) 2020]

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

Scan or tap for the full solution

**Q.21** For a cell involving one electron $E^{\ominus}_{cell} = 0.59$ V at 298 K, the equilibrium constant for the cell reaction is :

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

[NEET (UG) 2019]

(1) $1.0 \times 10^{30}$ (2) $1.0 \times 10^{10}$
(3) $1.0 \times 10^{2}$ (4) $1.0 \times 10^{5}$

Scan or tap for the full solution

**Q.22** For the cell reaction
$2Fe^{3+}(aq) + 2I^-(aq) \longrightarrow 2Fe^{2+}(aq) + I_2(aq)$
$E^{\ominus}_{cell} = 0.24$ V at 298 K. The standard Gibbs energy ($\Delta_rG°$) of the cell reaction is :
[Given that Faraday constant F = 96500 C $mol^{-1}$]

[NEET (UG) 2019]

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

Scan or tap for the full solution

**Q.23** In the electrochemical cell :
Zn | $ZnSO_4$ (0.01 M) || $CuSO_4$ (1.0 M) | Cu,
the emf of this Daniell cell is $E_1$. When the concentration of $ZnSO_4$ is changed to 1.0 M and that of $CuSO_4$ changed to 0.01 M, the emf changes to $E_2$. From the following, which one is the relationship between $E_1$ and $E_2$? (Given, $\frac{2.303RT}{F} = 0.059$)

[NEET 2017]

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

Scan or tap for the full solution

**Q.24** The pressure of $H_2$ required to make the potential of $H_2$-electrode zero in pure water at 298 K is

[NEET 2016 (Phase 1)]

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

Scan or tap for the full solution

**Q.25** The molar conductivity of a 0.5 mol/$dm^3$ solution of $AgNO_3$ with electrolytic conductivity of $5.76 \times 10^{-3}$ S $cm^{-1}$ at 298 K is [NEET 2016 (Phase 2)]

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

Scan or tap for the full solution

**Q.26** During the electrolysis of molten sodium chloride, the time required to produce 0.10 mol of chlorine gas using a current of 3 amperes is

[NEET 2016 (Phase 2)]

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

Scan or tap for the full solution

**Q.27** 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 $K_{eq}$ ?

[NEET 2016 (Phase 2)]

(1) ΔG° > 0; $K_{eq} < 1$ (2) ΔG° > 0; $K_{eq} > 1$
(3) ΔG° < 0; $K_{eq} > 1$ (4) ΔG° < 0; $K_{eq} < 1$

Scan or tap for the full solution

**Q.28** The number of electrons delivered at the cathode during electrolysis by a current of 1 ampere in 60 seconds is (charge on electron = $1.60 \times 10^{-19}$ C)

[NEET 2016 (Phase 2)]

(1) $6 \times 10^{23}$ (2) $6 \times 10^{20}$
(3) $3.75 \times 10^{20}$ (4) $7.48 \times 10^{23}$

Scan or tap for the full solution

**Q.29** Zinc can be coated on iron to produce galvanized iron but the reverse is not possible. It is because [NEET 2016 (Phase 2)]

(1) zinc is lighter than iron
(2) zinc has lower melting point than iron
(3) zinc has lower negative electrode potential than iron
(4) zinc has higher negative electrode potential than iron

Scan or tap for the full solution

**Q.30** Aqueous solution of which of the following compounds is the best conductor of electric current ? [AIPMT 2015]

(1) Hydrochloric acid, HCl
(2) Ammonia, $NH_3$
(3) Fructose, $C_6H_{12}O_6$
(4) Acetic acid, $C_2H_4O_2$

Scan or tap for the full solution

**Q.31** A device that converts energy of combustion of fuels like hydrogen and methane, directly into electrical energy is known as [AIPMT 2015 (Cancelled)]

(1) dynamo (2) Ni-Cd cell
(3) fuel cell (4) electrolytic cell

Scan or tap for the full solution

**Q.32** When 0.1 mol $MnO_4^{2-}$ is oxidised the quantity of electricity required to completely oxidise $MnO_4^{2-}$ to $MnO_4^-$ is [AIPMT 2014]

(1) 96500 C (2) 2 × 96500 C
(3) 9650 C (4) 96.50 C

Scan or tap for the full solution

**Q.33** The weight of silver (at. wt. = 108) displaced by a quantity of electricity which displaces 5600 mL of $O_2$ at STP will be [AIPMT 2014]

(1) 5.4 g (2) 10.8 g (3) 54.0 g (4) 108.0 g

Scan or tap for the full solution

**Q.34** 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 [NEET 2013]

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

Scan or tap for the full solution

**Q.35** A button cell used in watches functions as follows.

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

If half cell potentials are

$Zn^{2+}(aq) + 2e^- \longrightarrow Zn(s)$; E° = −0.76 V

$Ag_2O(s) + H_2O(l) + 2e^- \longrightarrow 2Ag(s) + 2OH^-(aq)$, E° = 0.34 V

The cell potential will be [NEET 2013]

(1) 0.84 V (2) 1.34 V (3) 1.10 V (4) 0.42 V

Scan or tap for the full solution

**Q.36** A hydrogen gas electrode is made by dipping platinum wire in a solution of pH = 10 and by passing hydrogen gas around the platinum wire at one atm pressure. The oxidation potential of electrode would be [NEET 2013]

(1) 0.118 V (2) 1.18 V (3) 0.059 V (4) 0.59 V

Scan or tap for the full solution

**Q.37** Consider the half-cell reduction reaction

$Mn^{2+} + 2e^- \longrightarrow Mn$, E° = −1.18 V

$Mn^{2+} \longrightarrow Mn^{3+} + e^-$, E° = −1.51 V

The E° for the reaction $3Mn^{2+} \longrightarrow Mn + 2Mn^{3+}$, and possibility of the forward reaction are respectively [NEET 2013 (Karnataka)]

(1) −4.18 V and yes (2) +0.33 V and yes
(3) +2.69 V and no (4) −2.69 V and no

Scan or tap for the full solution

**Q.38** How many gram of cobalt metal will be deposited when a solution of cobalt (II) chloride is electrolyzed with a current of 10 amperes for 109 minutes (1 Faraday = 96,500 C; Atomic mass of Co = 59 u) [NEET 2013 (Karnataka)]

(1) 4.0 (2) 20.0 (3) 40.0 (4) 0.66

Scan or tap for the full solution

**Q.39** Standard reduction potentials of the half reactions are given below :

$F_2(g) + 2e^- \longrightarrow 2F^-(aq)$; E° = + 2.85 V

$Cl_2(g) + 2e^- \longrightarrow 2Cl^-(aq)$; E° = + 1.36 V

$Br_2(l) + 2e^- \longrightarrow 2Br^-(aq)$; E° = + 1.06 V

$I_2(s) + 2e^- \longrightarrow 2I^-(aq)$; E° = + 0.53 V

The strongest oxidising and reducing agents respectively are [AIPMT 2012 (Mains)]

(1) $F_2$ and $I^-$ (2) $Br_2$ and $Cl^-$
(3) $Cl_2$ and $Br^-$ (4) $Cl_2$ and $I_2$

Scan or tap for the full solution

**Q.40** Molar conductivities ($\Lambda°_m$) at infinite dilution of NaCl, HCl and $CH_3COONa$ are 126.4, 425.9 and 91.0 S cm$^2$ mol$^{-1}$ respectively. ($\Lambda°_m$) for $CH_3COOH$ will be [AIPMT 2012 (Mains)]

(1) 425.5 S cm$^2$ mol$^{-1}$ (2) 180.5 S cm$^2$ mol$^{-1}$
(3) 290.8 S cm$^2$ mol$^{-1}$ (4) 390.5 S cm$^2$ mol$^{-1}$

Scan or tap for the full solution

**Q.41** Limiting molar conductivity of $NH_4OH$ [i.e. $\Lambda^0_{m(NH_4OH)}$] is equal to [AIPMT 2012 (Prelims)]

(1) $\Lambda^0_{m(NH_4OH)} + \Lambda^0_{m(NaCl)} - \Lambda^0_{m(NaOH)}$
(2) $\Lambda^0_{m(NaOH)} + \Lambda^0_{m(NaCl)} - \Lambda^0_{m(NH_4Cl)}$
(3) $\Lambda^0_{m(NH_4OH)} + \Lambda^0_{m(NH_4Cl)} - \Lambda^0_{m(HCl)}$
(4) $\Lambda^0_{m(NH_4Cl)} + \Lambda^0_{m(NaOH)} - \Lambda^0_{m(NaCl)}$

Scan or tap for the full solution

**Q.42** A solution contains $Fe^{2+}$, $Fe^{3+}$ and $I^-$ ions. This solution was treated with iodine at 35 °C. E° for $Fe^{3+}/Fe^{2+}$ is +0.77 V and E° for $I_2/2I^-$ = 0.536 V. The favourable redox reaction is [AIPMT 2011 (Mains)]

(1) $I_2$ will be reduced to $I^-$
(2) there will be no redox reaction
(3) $I^-$ will be oxidised to $I_2$
(4) $Fe^{2+}$ will be oxidised to $Fe^{3+}$

Scan or tap for the full solution

**Q.43** 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 [AIPMT 2011 (Prelims)]

(1) Y > Z > X (2) Y > X > Z
(3) Z > X > Y (4) X > Y > Z

Scan or tap for the full solution

**Q.44** The electrode potentials for $Cu^{2+}_{(aq)} + e^- \longrightarrow Cu^+_{(aq)}$ and $Cu^+_{(aq)} + e^- \longrightarrow Cu_{(s)}$ are +0.15 V and +0.50 V respectively. The value of $E°_{Cu^{2+}/Cu}$ will be [AIPMT 2011 (Prelims)]

(1) 0.500 V (2) 0.325 V (3) 0.650 V (4) 0.150 V

Scan or tap for the full solution

**Q.45** Standard electrode potential for $Sn^{4+}/Sn^{2+}$ couple is +0.15 V and that for the $Cr^{3+}/Cr$ couple is −0.74 V. These two couples in their standard state are connected to make a cell. The cell potential will be [AIPMT 2011 (Prelims)]

(1) +1.19 V (2) +0.89 V (3) +0.18 V (4) +1.83 V

Scan or tap for the full solution

**Q.46** Which of the following expressions correctly represents the equivalent conductance at infinite dilution of $Al_2(SO_4)_3$. Given that $\Lambda°_{Al^{3+}}$ and $\Lambda°_{SO_4^{2-}}$ are the equivalent conductances at infinite dilution of the respective ions? [AIPMT 2010 (Mains)]

(1) $2\Lambda°_{Al^{3+}} + 3\Lambda°_{SO_4^{2-}}$
(2) $\Lambda°_{Al^{3+}} + \Lambda°_{SO_4^{2-}}$
(3) $(\Lambda°_{Al^{3+}} + \Lambda°_{SO_4^{2-}}) \times 6$
(4) $\frac{1}{3}\Lambda°_{Al^{3+}} + \frac{1}{2}\Lambda°_{SO_4^{2-}}$

Scan or tap for the full solution

**Q.47** Consider the following relations for emf of an electrochemical cell

(i) EMF of cell = (Oxidation potential of anode) − (Reduction potential of cathode)
(ii) EMF of cell = (Oxidation potential of anode) + (Reduction potential of cathode)
(iii) EMF of cell = (Reduction potential of anode) + (Reduction potential of cathode)
(iv) EMF of cell = (Oxidation potential of anode) − (Oxidation potential of cathode)

Which of the above relations are correct? [AIPMT 2010 (Mains)]

(1) (iii) and (i) (2) (i) and (ii)
(3) (iii) and (iv) (4) (ii) and (iv)

Scan or tap for the full solution

**Q.48** For the reduction of silver ions with copper metal, 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$^{-1}$) [AIPMT 2010 (Prelims)]

(1) −89.0 kJ (2) −89.0 J (3) −44.5 kJ (4) −98.0 kJ

Scan or tap for the full solution

**Q.49** An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to [AIPMT 2010 (Prelims)]

(1) increase in ionic mobility of ions
(2) 100% ionisation of electrolyte at normal dilution
(3) increase in both i.e., number of ions and ionic mobility of ions
(4) increase in number of ions.

Scan or tap for the full solution

**Q.50** Given :
(i) $Cu^{2+} + 2e^- \longrightarrow Cu$, $E° = 0.337$ V
(ii) $Cu^{2+} + e^- \longrightarrow Cu^+$, $E° = 0.153$ V
Electrode potential, E° for the reaction,
$Cu^+ + e^- \longrightarrow Cu$, will be [AIPMT 2009]
(1) 0.90 V (2) 0.30 V (3) 0.38 V (4) 0.52 V

Scan or tap for the full solution

**Q.51** $Al_2O_3$ is reduced by electrolysis at low potentials and high currents. If $4.0 \times 10^4$ amperes 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 $mol^{-1}$). [AIPMT 2009]
(1) $8.1 \times 10^4$ g (2) $2.4 \times 10^5$ g
(3) $1.3 \times 10^4$ g (4) $9.0 \times 10^3$ g

Scan or tap for the full solution

**Q.52** The equivalent conductance of M/32 solution of a weak monobasic acid is 8.0 mho $cm^2$ and at infinite dilution is 400 mho $cm^2$. The dissociation constant of this acid is [AIPMT 2009]
(1) $1.25 \times 10^{-6}$ (2) $6.25 \times 10^{-4}$
(3) $1.25 \times 10^{-4}$ (4) $1.25 \times 10^{-5}$

Scan or tap for the full solution

**Q.53** On the basis of the following E° values, the strongest oxidizing agent is
$[Fe(CN)_6]^{4-} \longrightarrow [Fe(CN)_6]^{3-} + e^-$; $E° = -0.35$ V
$Fe^{2+} \longrightarrow Fe^{3+} + e^-$; $E° = -0.77$ V [AIPMT 2008]
(1) $Fe^{3+}$ (2) $[Fe(CN)_6]^{3-}$
(3) $[Fe(CN)_6]^{4-}$ (4) $Fe^{2+}$

Scan or tap for the full solution

**Q.54** Kohlrausch's law states that at [AIPMT 2008]
(1) Infinite dilution, each ion makes definite contribution to conductance of an electrolyte whatever be the nature of the other ion of the electrolyte
(2) Infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte
(3) Finite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte
(4) Infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte depending on the nature of the other ion of the electrolyte.

Scan or tap for the full solution

**Q.55** Standard free energies of formation (in kJ/mol) at 298 K are −237.2, −394.4 and −8.2 for $H_2O(l)$, $CO_2(g)$ and pentane (g) respectively. The value of $E°_{cell}$ for the pentane-oxygen fuel cell is [AIPMT 2008]
(1) 1.0968 V (2) 0.0968 V
(3) 1.968 V (4) 2.0968 V

Scan or tap for the full solution

**Q.56** The equilibrium constant of the reaction:
$Cu_{(s)} + 2Ag^+_{(aq)} \longrightarrow Cu^{2+}_{(aq)} + 2Ag_{(s)}$;
E° = 0.46 V at 298 K is [AIPMT 2007]
(1) $2.0 \times 10^{10}$ (2) $4.0 \times 10^{10}$
(3) $4.0 \times 10^{15}$ (4) $2.4 \times 10^{10}$

Scan or tap for the full solution

**Q.57** The efficiency of a fuel cell is given by [AIPMT 2007]
(1) ΔG/ΔS (2) ΔG/ΔH (3) ΔS/ΔG (4) ΔH/ΔG

Scan or tap for the full solution

**Q.58** A hypothetical electrochemical cell is shown below.
$A \mid A^+(xM) \parallel B^+(yM) \mid B$
The emf measured is + 0.20 V. The cell reaction is [AIPMT 2006]
(1) $A + B^+ \longrightarrow A^+ + B$
(2) $A^+ + B \longrightarrow A + B^+$
(3) $A^+ + e^- \longrightarrow A$; $B^+ + e^- \longrightarrow B$
(4) the cell reaction cannot be predicted.

Scan or tap for the full solution

**Q.59** $E°_{Fe^{2+}/Fe} = -0.441$ V and $E°_{Fe^{3+}/Fe^{2+}} = 0.771$ V, the standard EMF of the reaction
$Fe + 2Fe^{3+} \longrightarrow 3Fe^{2+}$ will be [AIPMT 2006]
(1) 0.111 V (2) 0.330 V (3) 1.653 V (4) 1.212 V

Scan or tap for the full solution

**Q.60** 4.5 g of aluminium (at. mass 27 amu) is deposited at cathode from $Al^{3+}$ solution by a certain quantity of electric charge. The volume of hydrogen produced at STP from $H^+$ ions in solution by the same quantity of electric charge will be
[AIPMT 2005]
(1) 44.8 L (2) 22.4 L (3) 11.2 L (4) 5.6 L

Scan or tap for the full solution

**Q.61** The standard e.m.f. of a galvanic cell involving cell reaction with n = 2 is found to be 0.295 V at 25°C. The equilibrium constant of the reaction would be
[AIPMT 2004]
(1) $2.0 \times 10^{11}$ (2) $4.0 \times 10^{12}$
(3) $1.0 \times 10^{2}$ (4) $1.0 \times 10^{10}$

Scan or tap for the full solution

**Q.62** The e.m.f. of a Daniell cell at 298 K is $E_1$.

$$Zn \left| \begin{matrix} ZnSO_4 \\ (0.01\ M) \end{matrix} \right\| \begin{matrix} CuSO_4 \\ (1.0\ M) \end{matrix} \left| Cu \right.$$

When the concentration of $ZnSO_4$ is 1.0 M and that of $CuSO_4$ is 0.01 M, the e.m.f. changed to $E_2$. What is the relationship between $E_1$ and $E_2$?
[AIPMT 2003]
(1) $E_1 > E_2$ (2) $E_1 < E_2$
(3) $E_1 = E_2$ (4) $E_2 = 0 \neq E_1$

Scan or tap for the full solution

**Q.63** On the basis of the information available from the reaction,
$4/3\,Al + O_2 \longrightarrow 2/3\,Al_2O_3$, $\Delta G = -827$ kJ mol$^{-1}$ of $O_2$,
the minimum e.m.f. required to carry out an electrolysis of $Al_2O_3$ is
(F = 96500 C mol$^{-1}$) [AIPMT 2003]
(1) 2.14 V (2) 4.28 V (3) 6.42 V (4) 8.56 V

Scan or tap for the full solution

**Q.64** In electrolysis of NaCl when Pt electrode is taken then $H_2$ is liberated at cathode while with Hg cathode it forms sodium amalgam because
[AIPMT 2002]
(1) Hg is more inert than Pt
(2) more voltage is required to reduce $H^+$ at Hg than at Pt
(3) Na is dissolved in Hg while it does not dissolve in Pt
(4) concentration of $H^+$ ions is larger when Pt electrode is taken

Scan or tap for the full solution

**Q.65** Standard electrode potentials are
$Fe^{2+}/Fe$ [E° = −0.44 V] and
$Fe^{3+}/Fe^{2+}$ [E° = 0.77 V];
If $Fe^{2+}$, $Fe^{3+}$ and Fe blocks are kept together, then
[AIPMT 2001]
(1) $Fe^{3+}$ increases (2) $Fe^{3+}$ decreases
(3) $Fe^{2+}/Fe^{3+}$ remains unchanged (4) $Fe^{2+}$ decreases.

Scan or tap for the full solution

**Q.66** The most convenient method to protect the bottom of ship made of iron is [AIPMT 2001]
(1) coating it with red lead oxide
(2) white tin plating
(3) connecting it with Mg block
(4) connecting it with Pb block

Scan or tap for the full solution

**Q.67** Cell reaction is spontaneous when [AIPMT 2000]
(1) ΔG° is negative (2) ΔG° is positive
(3) $\Delta E°_{red}$ is positive (4) $\Delta E°_{red}$ is negative

Scan or tap for the full solution

**Q.68** Ionic conductances of $Ba^{2+}$ and $Cl^-$ ions at infinite dilution are 127 and 76 ohm$^{-1}$ cm$^2$ mol$^{-1}$ respectively. Equivalent conductance of $BaCl_2$ at infinite dilution is [AIPMT 2000]
(1) 139.5 (2) 101.5 (3) 203 (4) 279

Scan or tap for the full solution

**Q.69** For the disproportionation of copper
$2Cu^+ \longrightarrow Cu^{2+} + Cu$, E° is
(Given E° for $Cu^{2+}/Cu$ is 0.34 V and
E° for $Cu^{2+}/Cu^+$ is 0.15 V.) [AIPMT 2000]
(1) 0.49 V (2) −0.19 V (3) 0.38 V (4) −0.38 V

Scan or tap for the full solution

# ANSWER KEY

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ques.** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| **Ans.** | **2** | **1** | **3** | **2** | **1** | **1** | **2** | **2** | **1** | **2** | **4** |
| **Ques.** | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| **Ans.** | **4** | **1** | **3** | **4** | **3** | **3** | **4** | **1** | **4** | **2** | **3** |
| **Ques.** | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
| **Ans.** | **2** | **3** | **2** | **2** | **1** | **3** | **4** | **1** | **3** | **3** | **4** |
| **Ques.** | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 |
| **Ans.** | **1** | **3** | **4** | **4** | **2** | **1** | **4** | **4** | **3** | **3** | **2** |
| **Ques.** | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 |
| **Ans.** | **2** | **2** | **4** | **1** | **1** | **4** | **1** | **4** | **1** | **1** | **1** |
| **Ques.** | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 |
| **Ans.** | **3** | **2** | **1** | **4** | **4** | **4** | **1** | **1** | **2** | **2** | **3** |
| **Ques.** | 67 | 68 | 69 | | | | | | | | |
| **Ans.** | **1** | **1** | **3** | | | | | | | | |