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CHEMISTRY · JEE MAIN

Electrochemistry

Previous Year Questions with answers

228 questions · **180** papers · **2002–2026** · newest paper first

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What is in this PDF: every Electrochemistry question we hold from past JEE Main and AIEEE papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

Step-by-step solutions for every question are free in the EdLoop JEE app (Google Play) and on app.edloop.in. More chapters: pyq.edloop.in/free-pdfs/

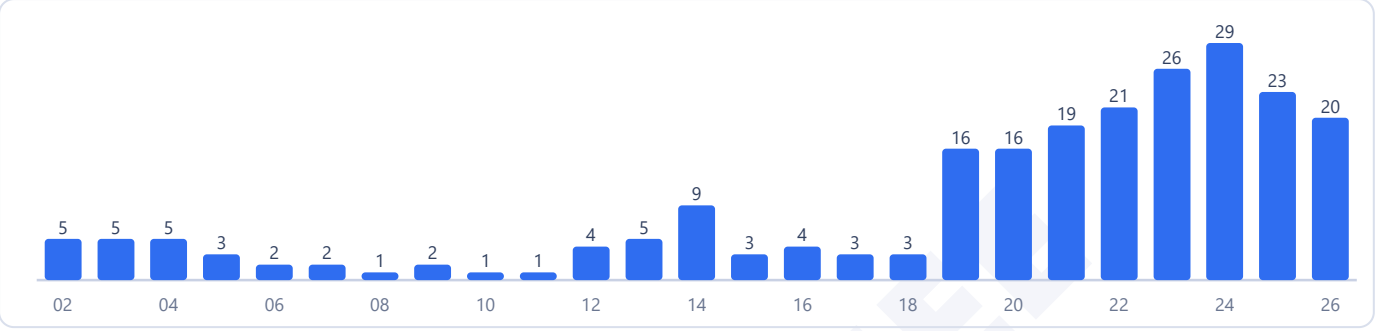
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Chapter at a glance

3.7%	228	146 of 162	138 / 90
of Chemistry questions, 2019–2026	questions, 2002–2026	papers asked it, 2019–2026	MCQ / numerical, 2002–2026

Trend. Rising: 1.2 questions per paper in 2024–2026 against 0.9 in 2019–2023.

Questions per year



Counts are the questions we hold: 228 in 180 papers. No question in this chapter was found repeated across papers.

Most-asked topics in this chapter (2002–2026)



How often it comes up

Electrochemistry explores galvanic cells and electrolytic conductance under Unit 7: Redox Reactions and Electrochemistry in the Class 12 chemistry syllabus, holding rank 13 among all 31 chemistry chapters with a 3.7 percent share of total chemistry questions. In the computerized exam period from 2019 to 2026, candidates answered 170 electrochemistry questions across 162 test papers, delivering an average frequency of 1.0 question per shift. The chapter featured in 146 of those 162 papers, and questions appeared every single year throughout the cycle. During the recent 2024 to 2026 cycle, testing registered 72 questions across 58 papers, raising the average to 1.2 questions per shift and lifting its subject share to 4.6 percent. This marks a trend that is up compared to the 3.7 percent share from the full 2019 to 2026 baseline. When measured against the 2002 to 2018 window, which recorded 58 questions across 38 papers for a 4.3 percent share, the recent share has stayed about the same. In 2026 specifically, 20 questions were distributed across 19 papers, showing up in 16 test sessions. A staggering 90 questions between 2019 and 2026 appeared as numerical answer questions, meaning more than half of all modern electrochemistry questions require precise numerical computation of cell voltages, conductivities, or deposited masses.

Most-asked topics

Questions in this chapter concentrate across four defined areas:

- **Electrochemical Cells**: 116 questions historically, with 85 asked between 2019 and 2026, tested up to 2026. This dominant area tests standard electrode potentials, electrochemical series rankings of oxidizing and reducing strength, galvanic cell notation, the Nernst equation for half-cells and full cells, concentration cells, equilibrium constants, and standard Gibbs free energy delta G standard equals minus n F E standard.

- **Conductance**: 52 total problems, including 45 between 2019 and 2026, continuing in 2026. Focus areas assess electrolytic resistance, specific conductivity kappa, molar conductivity, Kohlrausch's law for weak electrolyte dissociation, degree of dissociation alpha equals molar conductivity over limiting molar conductivity, and Debye-Huckel-Onsager plots.
- **Electrolysis**: 42 lifetime questions, with 28 from 2019 to 2026, tested through 2026. Concepts explore Faraday's first and second laws of electrolysis, quantitative mass and gas volume yields at standard temperature and pressure, overpotential considerations, and preferential discharge of competing ions during aqueous electrolysis.
- **Batteries & Corrosion**: 18 questions overall, including 12 between 2019 and 2026, last asked in 2025. Topics evaluate primary and secondary cells such as lead storage batteries and dry cells, fuel cells, rust electrochemistry, sacrificial protection, and cathodic protection.

What the questions look like

JEE Main problems in electrochemistry blend stoichiometric electrical calculations with logarithmic cell potential equations:

- **Nernst equation potential shifts**: Evaluating the non-standard electromotive force of a galvanic cell with specified reaction quotient Q, determining how varying pH or concentration influences cell voltage.
- **Kohlrausch limiting conductance and acid dissociation**: Calculating the limiting molar conductivity of a weak organic acid from conductance measurements of its sodium salt and strong inorganic electrolytes.
- **Sequential multi-stage electrolysis**: Determining the total volume of oxygen gas liberated at standard temperature and pressure after completing copper electrodeposition and continuing current flow for a designated duration.
- **Electrochemical series reduction strength ranking**: Arranging metals and transition metal cations in order of reducing power using measured standard reduction potentials.

How to practise it

Master the Nernst equation at twenty-nine-eight Kelvin: E cell equals E standard minus zero point zero five nine one divided by n, multiplied by the logarithm to base ten of reaction quotient Q. Identify n as the total number of electrons transferred in the balanced cell reaction.

In conductance problems, watch out for units. Molar conductivity equals specific conductivity kappa multiplied by one thousand divided by molarity when kappa is in Siemens per centimeter, but equals kappa divided by one thousand times molarity when expressed in SI units with meters.

For electrolysis, connect Faraday's constant with the mole concept. One mole of electrons carries ninety-six thousand five hundred coulombs. Mass deposited equals atomic mass multiplied by current and time, divided by n multiplied by ninety-six thousand five hundred.

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Q1 JEE Main 2026 · 8 Apr · Shift 2 MCQ

Given at 298 K : $E^{\ominus}_{Fe^{2+}/Fe} = X$ Volt

$E^{\ominus}_{Fe^{3+}/Fe} = Y$ Volt

The $E^{\ominus}_{Fe^{3+}/Fe^{2+}}$ in Volt at 298 K is given by :

(A) $2X - 3Y$

(B) $3Y - 2X$

(C) $3Y + 2X$

(D) $Y + X$

Answer: (B) $3Y - 2X$ · Official NTA final key

Q2 JEE Main 2026 · 6 Apr · Shift 1 MCQ

Consider the following data.

Electrolyte	Λ°_m (S cm^2 mol^{-1})
$BaCl_2$	x_1
H_2SO_4	x_2
HCl	x_3

$BaSO_4$ is sparingly soluble in water. If the conductivity of the saturated $BaSO_4$ solution is x S cm^{-1} then the solubility product of $BaSO_4$ can be given as

(Here $\Lambda_m = \Lambda^{\circ}_m$)

(A) $\dfrac{10^6\, x^2}{\alpha^2 (x_1 + x_2 - 2x_3)^2}$

(B) $\dfrac{x^2}{(x_1 + x_2 - 2x_3)^2}$

(C) $\dfrac{\alpha^2 (x_1 + x_2 - 2x_3)^2}{10^6\, x^2}$

(D) $\dfrac{x^2}{(x_1 + x_2 + 2x_3)^2}$

Answer: (A) $\dfrac{10^6\, x^2}{\alpha^2 (x_1 + x_2 - 2x_3)^2}$ · Official NTA final key

Q3 JEE Main 2026 · 6 Apr · Shift 2 MCQ

For a general redox reaction

Anode $Red_1 \rightarrow Ox_1^{n_1+} + n_1 e^-$

Cathode $Ox_2 + n_2 e^- \rightarrow Red_2^{n_2-}$

Which of the following statement is **incorrect** ?

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For a general redox reaction

Anode $\quad \mathrm{Red}_1 \rightarrow \mathrm{Ox}_1^{n_1^+} + n_1 e^-$

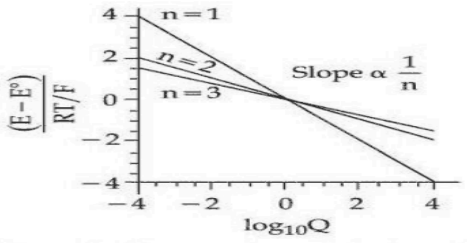
Cathode $\quad \mathrm{Ox}_2 + n_2 e^- \rightarrow \mathrm{Red}_2^{n_2-}$

Which of the following statement is **incorrect** ?

Options :

6911214275. The overall reaction can be written as $n_2\mathrm{Red}_1 + n_1\ \mathrm{Ox}_2 \rightleftharpoons n_2\mathrm{Ox}_1^{n_1^+} + n_1\mathrm{Red}_2^{n_2-}$

6911214276. The electrons do not appear in the overall reaction because electrons produced at the anode are consumed at the cathode.



6911214277. Here n is the number of electrons transferred in redox reaction.

6911214278. If the reaction is carried out reversibly, the electrical work done is equal to the ratio of charge and potential difference through which charge is moved.

(A) The overall reaction can be written as $n_2\mathrm{Red}_1 + n_1\ \mathrm{Ox}_2 \rightleftharpoons n_2\mathrm{Ox}_1^{n_1+} + n_1\mathrm{Red}_2^{n_2-}$

(B) The electrons do not appear in the overall reaction because electrons produced at the anode are consumed at the cathode.

(C) *see figure*

(D) If the reaction is carried out reversibly, the electrical work done is equal to the ratio of charge and potential difference through which charge is moved.

Answer: (D) If the reaction is carried out reversibly, the electrical work done is equal to the ratio of charge and potential difference through which charge is moved. · Official NTA final key

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Q4 JEE Main 2026 · 5 Apr · Shift 2 MCQ

One half cell in a voltaic cell is constructed by dipping silver rod in $\mathrm{AgNO_3}$ solution of unknown concentration, other half cell is Zn rod dipped in 1 molar solution of $\mathrm{ZnSO_4}$.

A voltage of 1.60 V is measured at 298 K for this cell. What is the concentration of $\mathrm{Ag^+}$ ions used in terms of $\log x$ ($x = [\mathrm{Ag^+}]$) ?

$\mathrm{E^\ominus_{Zn^{2+}/Zn}} = -0.76$ V, $\mathrm{E^\ominus_{Ag^+/Ag}} = +0.80$ V, $\frac{2.303\mathrm{RT}}{\mathrm{F}} = 0.059$ V

(A) $\frac{2}{3.9}$

(B) $\frac{4}{5.9}$

(C) $\frac{2.9}{2}$

(D) $\frac{5.9}{4}$

Answer: (B) $\frac{4}{5.9}$ · Official NTA final key

Q5 JEE Main 2026 · 5 Apr · Shift 2 Numerical

At 298 K, the molar conductivity of x% (w/w) MX solution (aqueous) is 123.5 S cm^2 mol^{-1}. The conductance of same solution is 1.9×10^{-3} S. The value of x is _____ $\times 10^{-2}$.

(Given : cell constant = 1.3 cm^{-1}; molar mass of MX is 75 g mol^{-1}, density of aqueous solution of MX at 298 K is 1.0 g mL^{-1})

Numerical value type: the answer is a number.

Answer: 15. · Official NTA final key

Q6 JEE Main 2026 · 4 Apr · Shift 2 Numerical

An electrochemical cell, consist of the following two redox couples, M^{x+} (aq)/M(s) [$E^{\ominus}_{red} = +0.15$ V] and Fe^{3+}(aq)/Fe(s) [$E^{\ominus}_{red} = -0.036$ V]. The cell EMF (E_{cell}) is recorded to be 0.2057 V. If the reaction quotient of the electrochemical reaction is found to be 10^{-2}, then the value of x is _____.(Nearest integer)

[Given : M is a p-block metal and $\frac{2.303RT}{F} = 0.059$ V]

Numerical value type: the answer is a number.

Answer: 2. · Official NTA final key

Q7 JEE Main 2026 · 2 Apr · Shift 1 MCQ

An electrochemical cell is constructed using half cells in the direction of spontaneous change

$Fe(OH)_2(s) + 2e^- \rightarrow Fe(s) + 2OH^-(aq) \quad E^{\theta} = -0.88$ V

and $AgBr(s) + e^- \rightarrow Ag(s) + Br^-(aq) \quad E^{\theta} = +0.07$ V

Which of the following option is **correct** ?

(A) Overall reaction $Fe(s) + 2OH^-(aq) + 2AgBr(s) \rightleftharpoons Fe(OH)_2(s) + 2Ag(s) + 2Br^-(aq)$

(B) $E^{\theta}_{cell} = -0.95$ V

(C) Fe is reduced in the electrochemical cell

(D) E^{θ}_{cell} is an extensive property

Answer: (A) Overall reaction $Fe(s) + 2OH^-(aq) + 2AgBr(s) \rightleftharpoons Fe(OH)_2(s) + 2Ag(s) + 2Br^-(aq)$ · Official NTA final key

Q8 JEE Main 2026 · 2 Apr · Shift 2 Numerical

Consider the following two half-cell reactions along with the standard reduction potential given :

$CO_2 + 6H^+ + 6e^- \longrightarrow CH_3OH + H_2O \quad E^{o}_{red} = 0.02$ V

$\frac{1}{2}O_2 + 2H^+ + 2e^- \longrightarrow H_2O \quad E^{o}_{red} = 1.23$ V

A fuel cell was set up using the above two reactions such that the cell operates under the standard condition of 1 bar pressure and 298 K temperature. The fuel cell works with 80% efficiency. If the work derived from the cell using 1 mol of CH_3OH is used to compress an ideal gas isothermally against a

constant pressure of 1 kPa, then the change in the volume of the gas,
$\Delta V =$ _____ m^3. (nearest integer)
Given : $F = 96500$ C mol^{-1}

Numerical value type: the answer is a number.

Answer: 560. · Official NTA final key

Q9 JEE Main 2026 · 28 Jan · Shift 2 Numerical

For strong electrolyte Λ_m increases slowly with dilution and can be represented by the equation

$\Lambda_m = \Lambda_m^\circ - Ac^{1/2}$

Molar conductivity values of the solutions of strong electrolyte AB at 18°C are given below :

c [mol L^{-1}]	0.04	0.09	0.16	0.25
Λ_m [S cm^2 mol^{-1}]	96.1	95.7	95.3	94.9

The value of constant A based on the above data [in S cm^2 mol^{-1}/(mol/L)$^{1/2}$] unit is _____.

Numerical value type: the answer is a number.

Answer: 4. · Official NTA final key

Q10 JEE Main 2026 · 28 Jan · Shift 2 Numerical

A volume of x mL of 5 M $NaHCO_3$ solution was mixed with 10 mL of 2 M H_2CO_3 solution to make an electrolytic buffer. If the same buffer was used in the following electrochemical cell to record a cell potential of 235.3 mV, then the value of x= _____ mL (nearest integer).

\mathrm{Sn(s)\,|\,Sn(OH)_6^{2-}\,(0.5\ M)\,||\,(0.5 M),|,HSnO_2^-\,(0.05\ M)\,|\,OH^-\,|\,Bi_2O_3(s)\,|\,Bi(s)}

Consider upto one place of decimal for intermediate calculations

Given :

$E^\circ_{HSnO_2^-|Sn(OH)_6^{2-}} = -0.9$ V

$E^\circ_{Bi_2O_3|Bi} = -0.44$ V

$pKa_{(H_2CO_3)} = 6.11$

$\frac{2.303\,RT}{F} = 0.059$ V

Antilog (1.29) = 19.5

Numerical value type: the answer is a number.

Answer: 78. · Official NTA final key

Q11 JEE Main 2026 · 24 Jan · Shift 1 Numerical

Electricity is passed through an acidic solution of Cu^{2+} till all the Cu^{2+} was exhausted, leading to the deposition of 300 mg of Cu metal. However, a current of 600 mA was continued to pass through the

same solution for another 28 minutes by keeping the total volume of the solution fixed at 200 mL. The total volume of oxygen evolved at STP during the entire process is _____ mL. (Nearest integer)

[Given:

Cu^{2+} (aq) $+2e^- \rightarrow$ Cu(s) $E^\circ_{red} = +0.34$ V

O_2(g) $+4H^+ + 4e^- \rightarrow 2H_2O$ $E^\circ_{red} = +1.23$ V

Molar mass of Cu $= 63.54$ g mol^{-1}

Molar mass of $O_2 = 32$ g mol^{-1}

Faraday Constant $= 96500$ C mol^{-1}

Molar volume at STP $= 22.4$ L]

Numerical value type: the answer is a number.

Answer: 111. · Official NTA final key

Q12 JEE Main 2026 · 24 Jan · Shift 2 Numerical

Molar conductivity of a weak acid HQ of concentration 0.18 M was found to be 1/30 of the molar conductivity of another weak acid HZ with concentration of 0.02 M. If $\lambda^\circ_{Q^-}$ happened to be equal with $\lambda^\circ_{Z^-}$, then the difference of the pK_a values of the two weak acids (pK_a(HQ) $-$ pK_a(HZ)) is _____ (Nearest integer).

[Given: degree of dissociation (α) $<< 1$ for both weak acids, λ°: limiting molar conductivity of ions]

Numerical value type: the answer is a number.

Answer: 2. · Official NTA final key

Q13 JEE Main 2026 · 23 Jan · Shift 1 MCQ

In the given electrochemical cell, Ag(s) | AgCl(s) | $FeCl_2$(aq), $FeCl_3$(aq) | Pt(s) at 298 K, the cell potential (E_{cell}) will increase when :

A. Concentration of Fe^{2+} is increased.

B. Concentration of Fe^{3+} is decreased.

C. Concentration of Fe^{2+} is decreased.

D. Concentration of Fe^{3+} is increased.

E. Concentration of Cl^- is increased.

Choose the **correct** answer from the options given below :

(A) A and E Only

(B) B Only

(C) C, D and E Only

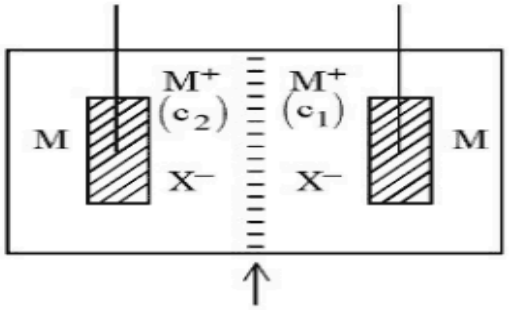
(D) A and B Only

Answer: (C) C, D and E Only · Official NTA final key

Q14 JEE Main 2026 · 23 Jan · Shift 2 MCQ

see figure

Q.64



Consider the above electrochemical cell where a metal electrode (M) is undergoing redox reaction by forming M^+ ($M \rightarrow M^+ + e^-$). The cation M^+ is present in two different concentrations c_1 and c_2 as shown above. Which of the following statement is correct for generating a positive cell potential?

Options
1. If c_1 is present at anode, then $c_1 > c_2$.
2. If c_1 is present at cathode, then $c_1 > c_2$.
3. If c_1 is present at anode, then $c_1 = c_2$.
4. If c_1 is present at cathode, then $c_1 < c_2$.

(A) If c_1 is present at anode, then $c_1 > c_2$.
(B) If c_1 is present at cathode, then $c_1 > c_2$.
(C) If c_1 is present at anode, then $c_1 = c_2$.
(D) If c_1 is present at cathode, then $c_1 < c_2$.

Answer: (B) If c_1 is present at cathode, then $c_1 > c_2$. · Official NTA final key

Q15 JEE Main 2026 · 22 Jan · Shift 1 Numerical

Consider the following electrochemical cell at 298K

$Pt|\ HSnO_2^-(aq)\ |\ Sn(OH)_6^{2-}(aq)\ ||\ OH^-(aq)\ |\ Bi_2O_3(s)\ |\ Bi\ (s).$

If the reaction quotient at a given time is 10^6, then the cell EMF (E_{cell}) is _____ $\times 10^{-1}$ V (Nearest integer).

Given the standard half-cell reduction potential as

$E^\circ_{Bi_2O_3/Bi,OH^-} = -0.44\ V$ and $E^\circ_{Sn(OH)_6^{2-}/HSnO_2^-,OH^-} = -0.90\ V$

Numerical value type: the answer is a number.

Answer: 4. · Official NTA final key

Q16 JEE Main 2026 · 22 Jan · Shift 2 MCQ

Consider the following reduction processes :

$Al^{3+} + 3e^- \longrightarrow Al(s),\ E^\circ = -1.66\ V$

$Fe^{3+} + e^- \longrightarrow Fe^{2+},\ E^\circ = +0.77\ V$

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

$Cr^{3+} + 3e^- \longrightarrow Cr(s)$, $E^\circ = -0.74$ V

The tendency to act as reducing agent decreases in the order :

(A) $Cr > Fe^{2+} > Al > Co^{2+}$

(B) $Al > Cr > Co^{2+} > Fe^{2+}$

(C) $Al > Cr > Fe^{2+} > Co^{2+}$

(D) $Al > Fe^{2+} > Cr > Co^{2+}$

Answer: (C) $Al > Cr > Fe^{2+} > Co^{2+}$ · Official NTA final key

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Q17 JEE Main 2026 · 22 Jan · Shift 2 Numerical

Consider the following electrochemical cell :

$Pt \,|\, O_2(g)(1\,bar) \,|\, HCl(aq) \,||\, M^{2+}(aq, 1.0\,M) \,|\, M(s)$

The pH above which, oxygen gas would start to evolve at anode is _____ (nearest integer).

Given : $E^\circ_{M^{2+}/M} = 0.994$ V

$E^\circ_{O_2/H_2O} = 1.23$ V } standard reduction potential

and $\frac{RT}{F}(2.303) = 0.059$ V at the given condition

Numerical value type: the answer is a number.

Answer: 4. · Official NTA final key

Q18 JEE Main 2026 · 21 Jan · Shift 1 Numerical

The pH and conductance of a weak acid (HX) was found to be 5 and 4×10^{-5} S, respectively. The conductance was measured under standard condition using a cell where the electrode plates having a surface area of 1 cm^2 were at a distance of 15 cm apart. The value of the limiting molar conductivity is _____ S m^2 mol^{-1}. (nearest integer)
(Given : degree of dissociation of the weak acid (α) $\ll$ 1)

Numerical value type: the answer is a number.

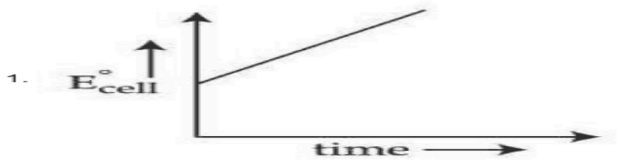
Answer: 6. · Official NTA final key

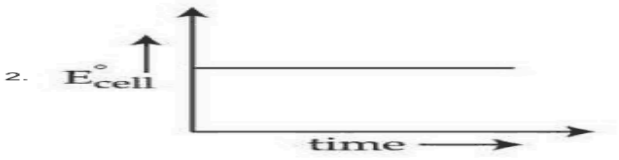
Q19 JEE Main 2026 · 21 Jan · Shift 2 MCQ

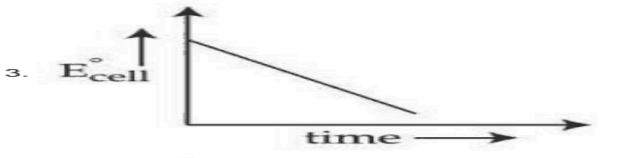
For a closed circuit Daniell cell, which of the following plots is the accurate one at a given temperature ?

Q.51 For a closed circuit Daniell cell, which of the following plots is the accurate one at a given temperature ?

Options

1. 

2. 

3. 

4. 

(A) *see figure*

(B) *see figure*

(C) *see figure*

(D) *see figure*

Answer: (B) · Official NTA final key

Q20 JEE Main 2026 · 21 Jan · Shift 2 Numerical

MX is a sparingly soluble salt that follows the given solubility equilibrium at 298 K.

$\mathrm{MX(s) \rightleftharpoons M^+(aq) + X^-(aq)}$; $\mathrm{K_{sp} = 10^{-10}}$

If the standard reduction potential for $\mathrm{M^+(aq) \xrightarrow{+e^-} M(s)}$ is $(\mathrm{E^{\ominus}_{M^+/M}}) = 0.79$ V, then the value of the standard reduction potential for the metal/metal insoluble salt electrode $\mathrm{E^{\ominus}_{X^-/MX(s)/M}}$ is _____ mV. (nearest integer)

[Given : $\frac{2.303\,\mathrm{RT}}{\mathrm{F}} = 0.059$ V]

Numerical value type: the answer is a number.

Answer: 200. · Official NTA final key

Q21 JEE Main 2025 · 8 Apr · Shift 2 Numerical

Consider the following half cell reaction

$Cr_2O_7^{2-}(aq) + 6e^- + 14H^+(aq) \longrightarrow 2Cr^{3+}(aq) + 7H_2O(l)$

The reaction was conducted with the ratio of $\frac{\left[Cr^{3+}\right]^2}{\left[Cr_2O_7^{2-}\right]} = 10^{-6}$. The pH value at which the EMF of the half cell will become zero is _____ . (nearest integer value)

[Given : Standard half cell reduction potential $E^\circ_{Cr_2O_7^{2-},H^+/Cr^{3+}} = 1.33\,V$, $\frac{2.303RT}{F} = 0.059\,V$.]

Numerical value type: the answer is a number.

Answer: 10. · Key from source paper

Q22 JEE Main 2025 · 7 Apr · Shift 1 MCQ

Given below are two statements:

Statement I: Mohr's salt is composed of only three types of ions-ferrous, ammonium and sulfate.

Statement II: If the molar conductance at infinite dilution for ferrous, ammonium and sulfate ions are x_1, x_2 and $x_3 Scm^2 mol^{-1}$, respectively then the molar conductance for Mohr's salt solution at infinite dilution would be given by $x_1 + x_2 + 2x_3$

In the light of the given statements, choose the correct answer from the options given below:

(A) Statement I is true but Statement II are false

(B) Both Statements I and Statement II are false

(C) Both Statements I and Statement II are true

(D) Statement I is false but Statement II is true

Answer: (A) Statement I is true but Statement II are false · Key from source paper

Q23 JEE Main 2025 · 7 Apr · Shift 1 Numerical

1 Faraday electricity was passed through $Cu^{2+}(1.5M, 1L)/Cu$ and 0.1 Faraday was passed through $Ag^{+}(0.2M, 1L)/Ag$ electrolytic cells. After this the two cells were connected as shown below to make an electrochemical cell. The emf of the cell thus formed at 298 K is _____ mV (nearest integer)

(see the figure above)

Given :

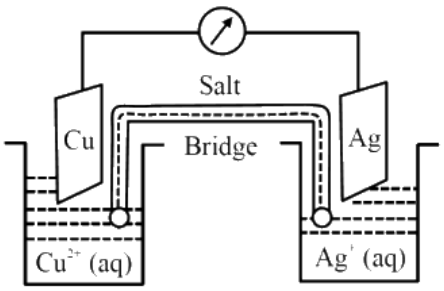
$E^{\circ}Cu^{2+}/Cu = 0.34V$

$E^{\circ}Ag^{+}/Ag = 0.8V$

$\frac{2.303RT}{F} = 0.06V$

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21. 1 Faraday electricity was passed through $Cu^{2+}(1.5M,1L)/Cu$ and 0.1 Faraday was passed through $Ag^{+}(0.2M,1L)/Ag$ electrolytic cells. After this the two cells were connected as shown below to make an electrochemical cell. The emf of the cell thus formed at 298 K is____mV (nearest integer)



Given :

$$E^{\circ}Cu^{2+}/Cu = 0.34\,V$$

$$E^{\circ}Ag^{+}/Ag = 0.8\,V$$

$$\frac{2.303RT}{F} = 0.06\,V$$

Numerical value type: the answer is a number.

Answer: 400. · Key from source paper

Q24 JEE Main 2025 · 7 Apr · Shift 2 MCQ

Given below are two statements :

1 M aqueous solutions of each of $Cu(NO_3)_2$, $AgNO_3$, $Hg_2(NO_3)_2$; $Mg(NO_3)_2$ are electrolysed using inert electrodes. Given : $E^{\theta}_{Ag^+/Ag} = 0.80V$, $E^{\theta}_{Hg_2^{2+}/Hg} = 0.79V$, $E^{\theta}_{Cu^{2+}/Cu} = 0.24V$ and $E^{\theta}_{Mg^{2+}/Mg} = -2.37V$.

Statement (I): With increasing voltage, the sequence of deposition of metals on the cathode will be Ag, Hg and Cu .

Statement (II) : Magnesium will not be deposited at cathode instead oxygen gas will be evolved at the cathode.

In the light of the above statements, choose the most appropriate answer from the options given below :

(A) Both Statement I and Statement II are correct
(B) Statement I is incorrect but Statement II is correct
(C) Statement I is correct but Statement II is incorrect
(D) Both Statement I and Statement II are incorrect

Answer: (C) Statement I is correct but Statement II is incorrect · Key from source paper

Q25 JEE Main 2025 · 4 Apr · Shift 1 MCQ

On charging the lead storage battery, the oxidation state of lead changes from x_1 to y_1 at the anode and from x_2 to y_2 at the cathode. The values of x_1, y_1, x_2, y_2 are respectively :

(A) $+2, 0, 0, +4$

(B) $+2, 0, +2, +4$

(C) $0, +2, +4, +2$

(D) $+4, +2, 0, +2$

Answer: (B) $+2, 0, +2, +4$ · Key from source paper

Q26 JEE Main 2025 · 4 Apr · Shift 2 Numerical

The molar conductance of an infinitely dilute solution of ammonium chloride was found to be $185\ S\ cm^2 mol^{-1}$ and the ionic conductance of hydroxyl and chloride ions are 170 and $70\ S\ cm^2 mol^{-1}$, respectively. If molar conductance of 0.02 M solution of ammonium hydroxide is $85.5\ S\ cm^2 mol^{-1}$, its degree of dissociation is given by $x \times 10^{-1}$. The value of x is _____ . (Nearest integer)

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q27 JEE Main 2025 · 3 Apr · Shift 1 MCQ

Correct order of limiting molar conductivity for cations in water at 298 K is :

(A) $H^+ > Na^+ > Ca^{2+} > Mg^{2+} > K^+$

(B) $H^+ > Na^+ > K^+ > Ca^{2+} > Mg^{2+}$

(C) $Mg^{2+} > H^+ > Ca^{2+} > K^+ > Na^+$

(D) $H^+ > Ca^{2+} > Mg^{2+} > K^+ > Na^+$

Answer: (D) $H^+ > Ca^{2+} > Mg^{2+} > K^+ > Na^+$ · Key from source paper

Q28 JEE Main 2025 · 3 Apr · Shift 2 MCQ

The standard cell potential ($E^{\ominus}_{cell}$) of a fuel cell based on the oxidation of methanol in air that has been used to power television relay station is measured as 1.21 V . The standard half cell reduction potential for O_2, $\left(E^{\circ}_{O_2/H_2O}\right)$ is 1.229 V .

Choose the correct statement:

(A) Oxygen is formed at the anode.

(B) The standard half cell reduction potential for the reduction of CO_2, $\left(E^{\circ}_{CO_2/CH_3OH}\right)$ is 19 mV

(C) Reduction of methanol takes place at the cathode.

(D) Reactants are fed at one go to each electrode.

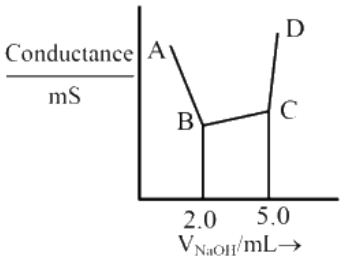
Answer: (B) The standard half cell reduction potential for the reduction of CO_2, $\left(E^{\circ}_{CO_2/CH_3OH}\right)$ is 19 mV · Key from source paper

Q29 JEE Main 2025 · 3 Apr · Shift 2 MCQ

40 mL of a mixture of CH_3COOH and HCl (aqueous solution) is titrated against 0.1 M NaOH solution conductometrically. Which of the following statement is correct?

(see the figure above)

2. 40 mL of a mixture of CH_3COOH and HCl (aqueous solution) is titrated against 0.1 M NaOH solution conductometrically. Which of the following statement is correct?



(1) CH_3COOH is neutralised first followed by neutralisation of HCl

(2) The concentration of CH_3COOH in the original mixture is 0.005 M

(3) Point 'C' indicates the complete neutralization of HCl

(4) The concentration of HCl in the original mixture is 0.005 M

(A) CH_3COOH is neutralised first followed by neutralisation of HCl

(B) The concentration of CH_3COOH in the original mixture is 0.005 M

(C) Point 'C' indicates the complete neutralization of HCl

(D) The concentration of HCl in the original mixture is 0.005 M

Answer: (D) The concentration of HCl in the original mixture is 0.005 M · Key from source paper

Q30 JEE Main 2025 · 2 Apr · Shift 1 Numerical

Consider the following electrochemical cell at standard condition.

$Au(s)|QH_2, Q|NH_4X(0.01M)||Ag^+(1M)^*Ag(s) E_{cell} = +0.4V$

The couple QH_2/Q represents quinhydrone electrode, the half cell reaction is given below

(see the figure above)

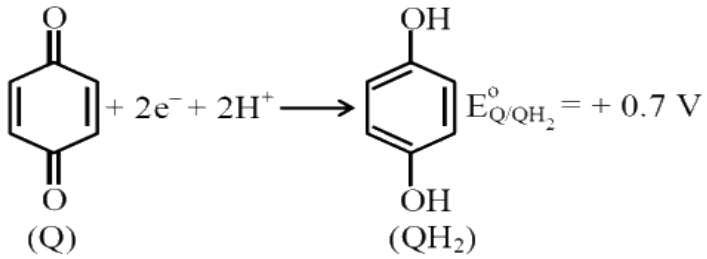
[Given : $E^\circ_{Ag^+/Ag} = +0.8V$ and $\frac{2.303RT}{F} = 0.06$ V]

The pK_b value of the ammonium halide salt (NH_4X) used here is _____ . (nearest integer)

25. Consider the following electrochemical cell at standard condition.

$$Au(s)\left|QH_2, Q\right| NH_4X(0.01M) \,\|\, Ag^+(1M)^* Ag(s) \quad E_{cell} = +0.4V$$

The couple QH_2 / Q represents quinhydrone electrode, the half cell reaction is given below



[Given : $E^{\circ}_{Ag^-/Ag} = +0.8V$ and $\frac{2.303RT}{F} = 0.06$ V]

The pK_b value of the ammonium halide salt (NH_4X) used here is _____ . (nearest integer)

Numerical value type: the answer is a number.

Answer: 6. · Key from source paper

Q31 JEE Main 2025 · 2 Apr · Shift 2 Numerical

0.2%(w/v) solution of NaOH is measured to have resistivity $870.0 m\Omega m$. The molar conductivity of the solution will be _____ $\times 10^2 mS\ dm^2 mol^{-1}$. (Nearest integer)

Numerical value type: the answer is a number.

Answer: 23. · Key from source paper

Q32 JEE Main 2025 · 29 Jan · Shift 1 MCQ

The molar conductivity of a weak electrolyte when plotted against the square root of its concentration, which of the following is expected to be observed ?

(A) A small decrease in molar conductivity is observed at infinite dilution.
(B) Molar conductivity decreases sharply with increase in concentration.
(C) A small increase in molar conductivity is observed at infinite dilution.
(D) Molar conductivity increases sharply with increase in concentration.

Answer: (B) Molar conductivity decreases sharply with increase in concentration. · Key from source paper

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Q33 JEE Main 2025 · 29 Jan · Shift 1 MCQ

For a $\mathrm{Mg}\,|\mathrm{Mg}^{2+}(\mathrm{aq})|\,|\mathrm{Ag}^{+}(\mathrm{aq})|\mathrm{Ag}$ the correct Nernst Equation is :

(A) $E_{cell} = E^{o}_{cell} - \frac{RT}{2F} \ln \frac{[Ag^+]}{[Mg^{2+}]}$

(B) $E_{cell} = E^{o}_{cell} + \frac{RT}{2F} \ln \frac{[Ag^+]^2}{[Mg^{2+}]}$

(C) $E_{cell} = E^{o}_{cell} - \frac{RT}{2F} \ln \frac{[Ag^+]^2}{[Mg^{2+}]}$

(D) $E_{cell} = E^{o}_{cell} - \frac{RT}{2F} \ln \frac{[Mg^{2+}]}{[Ag^+]}$

Answer: (B) $E_{cell} = E^{o}_{cell} + \frac{RT}{2F} \ln \frac{[Ag^+]^2}{[Mg^{2+}]}$ · Key from source paper

Q34 JEE Main 2025 · 29 Jan · Shift 2 MCQ

O_2 gas will be evolved as a product of electrolysis of : (A) an aqueous solution of $AgNO_3$ using silver electrodes. (B) an aqueous solution of $AgNO_3$ using platinum electrodes. (C) a dilute solution of H_2SO_4 using platinum electrodes. (D) a high concentration solution of H_2SO_4 using platinum electrodes. Choose the correct answer from the options given below :

(A) (A) and (C) only

(B) (B) and (C) only

(C) (A) and (D) only

(D) (B) and (D) only

Answer: (B) (B) and (C) only · Key from source paper

Q35 JEE Main 2025 · 29 Jan · Shift 2 MCQ

Match List - I with List - II :

List - I Applications	List - II Batteries/Cell
(A) Transistors	(I) Anode - Zn/Hg ; Cathode - HgO + C
(B) Hearing aids	(II) Hydrogen fuel cell
(C) Invertors	(III) Anode - Zn ; Cathode - Carbon
(D) Apollo space ship	(IV) Anode - Pb ; Cathode - Pb\ PbO_2

Choose the correct answer from the options given below :

(A) (A)-(III), (B)-(II), (C)-(IV), (D)-(I)

(B) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)

(C) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)

(D) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

Answer: (C) (A)-(III), (B)-(I), (C)-(IV), (D)-(II) · Key from source paper

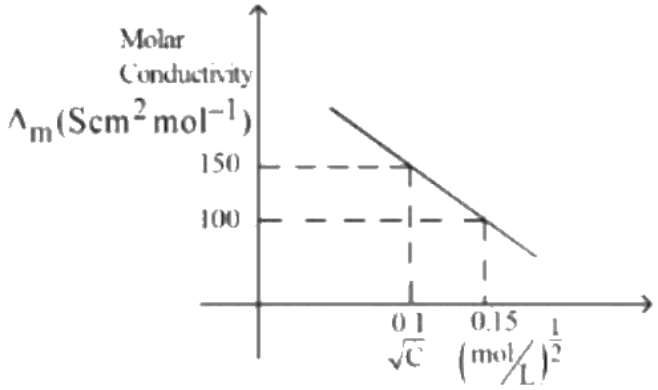
Q36 JEE Main 2025 · 28 Jan · Shift 1 Numerical

Given below is the plot of the molar conductivity vs $\sqrt{\text{concentration}}$ for KCl in aqueous solution.

(see the figure above)

If, for the higher concentration of KCl solution, the resistance of the conductivity cell is 100Ω, then the resistance of the same cell with the dilute solution is ' x ' Ω The value of x is _____ (Nearest integer)

Q75. Given below is the plot of the molar conductivity vs $\sqrt{\text{concentration}}$ for KCl in aqueous solution.



If, for the higher concentration of KCl solution, the resistance of the conductivity cell is 100Ω, then the resistance of the same cell with the dilute solution is ' x ' Ω The value of x is _____ (Nearest integer)

Numerical value type: the answer is a number.

Answer: 150. · Key from source paper

Q37 JEE Main 2025 · 28 Jan · Shift 2 Numerical

Electrolysis of 600 mL aqueous solution of NaCl for 5 min changes the pH of the solution to 12 . The current in Amperes used for the given electrolysis is _____ . (Nearest integer).

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q38 JEE Main 2025 · 24 Jan · Shift 1 MCQ

For the given cell $Fe^{2+}_{(aq)} + Ag^{+}_{(aq)} \rightarrow Fe^{3+}_{(aq)} + Ag_{(s)}$ The standard cell potential of the above reaction is Given: $Ag^{+} + e^{-} \rightarrow Ag\ E^{\theta} = xV\ Fe^{2+} + 2e^{-} \rightarrow Fe\ E^{\theta} = yV\ Fe^{3+} + 3e^{-} \rightarrow Fe\ E^{\theta} = zV$

(A) $x + y - z$

(B) $x + 2y$

(C) $x + 2y - 3z$

(D) $y - 2x$

Answer: (C) $x + 2y - 3z$ · Key from source paper

Q39 JEE Main 2025 · 24 Jan · Shift 2 MCQ

Based on the data given below : $E^{\circ}_{Cr_2O_7^{2-}/Cr^{3+}} = 1.33$ 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 the strongest reducing agent is :

(A) Cr

(B) Cl^-

(C) MnO_4^-

(D) Mn^{2+}

Answer: (A) Cr · Key from source paper

Q40 JEE Main 2025 · 23 Jan · Shift 1 MCQ

$FeO_4^{2-} \xrightarrow{+2.0v} Fe^{3+} \xrightarrow{0.8v} Fe^{2+} \xrightarrow{-0.5v} Fe^0$ In the above diagram, the standard electrode potentials are given in volts (over the arrow). The value of $E^O_{FeO_4^{2-}/Fe^{2+}}$ is

(A) 2.1 V

(B) 1 .7 V

(C) 1 .4 V

(D) 1 .2 V

Answer: (B) 1 .7 V · Key from source paper

Q41 JEE Main 2025 · 23 Jan · Shift 2 MCQ

Standard electrode potentials for a few half cells are mentioned below : $E^\circ_{Cu^{2+}/Cu} = 0.34$ V, $E^\circ_{Zn^{2+}/Zn} = -0.76$ V $E^\circ_{Ag^+/Ag} = 0.80$ V, $E^\circ_{Mg^{2+}/Mg} = -2.37$ V Which one of the following cells gives the most negative value of ΔG° ?

(A) $Zn\,|Zn^{2+}(1M)||Ag^+(1M)|Ag$

(B) $Zn\,|Zn^{2+}(1M)||Mg^{2+}(1M)|Mg$

(C) $Ag\,|Ag^+(1M)||Mg^{2+}(1M)|Mg$

(D) $Cu\,|Cu^{2+}(1M)||Ag^+(1M)|Ag$

Answer: (A) $Zn\,|Zn^{2+}(1M)||Ag^+(1M)|Ag$ · Key from source paper

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Q42 JEE Main 2025 · 22 Jan · Shift 1 MCQ

A solution of aluminium chloride is electrolysed for 30 minutes using a current of 2 A . The amount of the aluminium deposited at the cathode is [Given : molar mass of aluminium and chlorine are 27 g mol^{-1} and 35.5 g mol^{-1} respectively. Faraday constant $= 96500 C mol^{-1}$]

(A) 1.660 g

(B) 0.336 g

(C) 0.441 g

(D) 1.007 g

Answer: (B) 0.336 g · Key from source paper

Q43 JEE Main 2025 · 22 Jan · Shift 2 MCQ

Given below are two statements : Statement (I) : Corrosion is an electrochemical phenomenon in which pure metal acts as an anode and impure metal as a cathode. Statement (II) : The rate of corrosion is more in alkaline medium than in acidic medium. In the light of the above statements, choose the correct answer from the options given below :

(A) Both Statement I and Statement II are true
(B) Statement I is false but Statement II is true
(C) Statement I is true but Statement II is false
(D) Both Statement I and Statement II are false

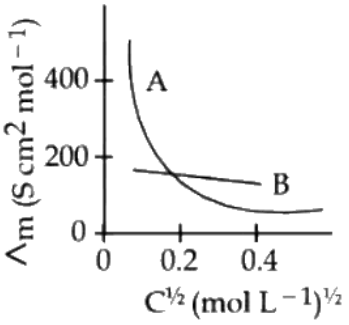
Answer: (C) Statement I is true but Statement II is false · Key from source paper

Q44 JEE Main 2024 · 9 Apr · Shift 1 MCQ

The molar conductivity for electrolytes A and B are plotted against $C^{1/2}$ as shown below. Electrolytes A and B respectively are :

(see the figure above)

Q40. The molar conductivity for electrolytes A and B are plotted against $C^{1/2}$ as shown below. Electrolytes A and



B respectively are :

(1) A: strong electrolyte ; B: weak electrolyte
(2) A: weak electrolyte ; B: weak electrolyte
(3) A: weak electrolyte ; B: strong electrolyte
(4) A: strong electrolyte ; B: strong electrolyte

(A) A: strong electrolyte ; B: weak electrolyte
(B) A: weak electrolyte ; B: weak electrolyte
(C) A: weak electrolyte ; B: strong electrolyte
(D) A: strong electrolyte ; B: strong electrolyte

Answer: (C) A: weak electrolyte ; B: strong electrolyte · Key from source paper

Q45 JEE Main 2024 · 9 Apr · Shift 1 Numerical

The standard reduction potentials at 298 K for the following half cells are given below :

$\mathrm{Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O,\ E^\circ = 1.33\ V}$

$\mathrm{Fe^{3+}(aq) + 3e^- \rightarrow Fe\ E^\circ = -0.04\ V}$

$\mathrm{Ni^{2+}(aq) + 2e^- \rightarrow Ni\ E^\circ = -0.25\ V}$

$Ag^{+}(aq) + e^{-} \rightarrow Ag\ E^{\circ} = 0.80\ V$

$Au^{3+}(aq) + 3e^{-} \rightarrow Au\ E^{\circ} = 1.40\ V$

Consider the given electrochemical reactions, The number of metal(s) which will be oxidized by $Cr_2O_7^{2-}$, in aqueous solution is _____

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q46 JEE Main 2024 · 9 Apr · Shift 2 MCQ

Which out of the following is a correct equation to show change in molar conductivity with respect to concentration for a weak electrolyte, if the symbols carry their usual meaning :

(A) $\Lambda_m - \Lambda_m^0 + AC^{\frac{1}{2}} = 0$

(B) $\Lambda_m^2 C - K_a \Lambda_m^{\circ 2} + K_a \Lambda_m \Lambda_m = 0$

(C) ${\Lambda^2}_m C + K_a \Lambda_m^{\circ 2} - K_a \Lambda_m \Lambda_m^{\circ} = 0$

(D) $\Lambda_m - \Lambda_m^{\circ} - AC^{\frac{1}{2}} = 0$

Answer: (B) $\Lambda_m^2 C - K_a \Lambda_m^{\circ 2} + K_a \Lambda_m \Lambda_m = 0$ · Key from source paper

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Q47 JEE Main 2024 · 9 Apr · Shift 2 MCQ

Match List I with List II

List - I (Cell)	List - II (Use/Property/Reaction)
A. Leclanche cell	I. Converts energy of combustion into electrical energy
B. Ni − Cd cell	II. Does not involve any ion in solution and is used in hearing aids
C. Fuel cell	III. Rechargeable
D. Mercury cell	IV. Reaction at anode $Zn \rightarrow Zn^{2+} + 2e^{-}$

Choose the correct answer from the options given below:

(A) A-II, B-III, C-IV, D-I

(B) A-I, B-II, C-III, D-IV

(C) A-III, B-I, C-IV, D-II

(D) A-IV, B-III, C-I, D-II

Answer: (D) A-IV, B-III, C-I, D-II · Key from source paper

Q48 JEE Main 2024 · 8 Apr · Shift 2 MCQ

The emf of cell $Tl \,|\, Tl^{+}_{(0.001M)} \,||\, Cu^{2+}_{(0.01M)} \,|\, Cu$ is 0.83 V at 298 K. It could be increased by :

(A) decreasing concentration of both Tl^{+} and Cu^{2+} ions
(B) increasing concentration of Cu^{2+} ions
(C) increasing concentration of Tl^{+} ions
(D) increasing concentration of both Tl^{+} and Cu^{2+} ions

Answer: (B) increasing concentration of Cu^{2+} ions · Key from source paper

Q49 JEE Main 2024 · 8 Apr · Shift 2 MCQ

The reaction; $\frac{1}{2}H_{2\,(g)} + AgCl_{(s)} \rightarrow H^{+}_{(aq)} + Cl^{-}_{(aq)} + Ag_{(s)}$ occurs in which of the following galvanic cell :

(A) $Ag\,|\,AgCl_{(s)}\,|\,KCl_{(soln.)}\,|\,AgNO_{3\,(aq.)}\,|\,Ag$
(B) $Pt\,|\,H_{2(\,g)}\,|\,HCl_{(soln.)}\,|\,AgCl_{(s)}\,|\,Ag$
(C) $Pt\,|\,H_{2(\,g)}\,|\,KCl_{(soln.\,)}\,|\,AgCl_{(s)}\,|\,Ag$
(D) $Pt\,|\,H_{2(\,g)}\,|\,HCl_{(soln.)}\,|\,AgNO_{3(aq)}\,|\,Ag$

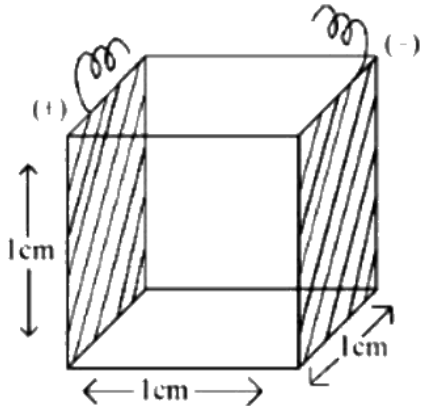
Answer: (B) $Pt\,|\,H_{2(\,g)}\,|\,HCl_{(soln.)}\,|\,AgCl_{(s)}\,|\,Ag$ · Checked by our team

Q50 JEE Main 2024 · 6 Apr · Shift 1 MCQ

A conductivity cell with two electrodes (dark side) are half filled with infinitely dilute aqueous solution of a weak electrolyte. If volume is doubled by adding more water at constant temperature, the molar conductivity of the cell will -

(see the figure above)

Q42. A conductivity cell with two electrodes (dark side) are half filled with infinitely dilute aqueous solution of a weak electrolyte. If volume is doubled by adding more water at constant temperature, the molar conductivity



of the cell will -

(1) decrease sharply
(2) increase sharply
(3) remain same or can not be measured accurately
(4) depend upon type of electrolyte

(A) decrease sharply
(B) increase sharply
(C) remain same or can not be measured accurately
(D) depend upon type of electrolyte

Answer: (C) remain same or can not be measured accurately · Key from source paper

Q51 JEE Main 2024 · 6 Apr · Shift 2 MCQ

How can an electrochemical cell be converted into an electrolytic cell?

(A) Applying an external opposite potential lower than E^0 cell.
(B) Reversing the flow of ions in salt bridge.
(C) Applying an external opposite potential greater than E^0 cell-
(D) Exchanging the electrodes at anode and cathode.

Answer: (C) Applying an external opposite potential greater than E^0 cell- · Key from source paper

Q52 JEE Main 2024 · 5 Apr · Shift 1 MCQ

The reaction at cathode in the cells commonly used in clocks involves.

(A) reduction of Mn from +7 to +2
(B) reduction of Mn from +4 to +3
(C) oxidation of Mn from +3 to +4
(D) oxidation of Mn from +2 to +7

Answer: (B) reduction of Mn from +4 to +3 · Key from source paper

Q53 JEE Main 2024 · 5 Apr · Shift 1 MCQ

Molar ionic conductivities of divalent cation and anion are 57 S $\mathrm{cm^2\,mol^{-1}}$ and 73 S $\mathrm{cm^2\,mol^{-1}}$ respectively. The molar conductivity of solution of an electrolyte with the above cation and anion will be :

(A) 187 S $\mathrm{cm^2\,mol^{-1}}$
(B) 260 S $\mathrm{cm^2\,mol^{-1}}$
(C) 130 S $\mathrm{cm^2\,mol^{-1}}$
(D) 65 S $\mathrm{cm^2\,mol^{-1}}$

Answer: (C) 130 S $\mathrm{cm^2\,mol^{-1}}$ · Key from source paper

Q54 JEE Main 2024 · 5 Apr · Shift 2 MCQ

The quantity of silver deposited when one coulomb charge is passed through $\mathrm{AgNO_3}$ solution :

(A) 1 g of silver
(B) 1 electrochemical equivalent of silver
(C) 1 chemical equivalent of silver
(D) 0.1 g atom of silver

Answer: (B) 1 electrochemical equivalent of silver · Key from source paper

Q55 JEE Main 2024 · 5 Apr · Shift 2 MCQ

For the electro chemical cell If $E^0_{(M^{2+}/M)} = 0.46$ V and $E^0_{(X/X^{2-})} = 0.34$ V. Which of the following is correct?

(A) $M + X \rightarrow M^{2+} + X^{2-}$ is a spontaneous reaction
(B) $E_{cell} = 0.80$ V
(C) $E_{cell} = -0.80$ V
(D) $M^{2+} + X^{2-} \rightarrow M + X$ is a spontaneous reaction

Answer: (D) $M^{2+} + X^{2-} \rightarrow M + X$ **is a spontaneous reaction** · Key from source paper

Q56 JEE Main 2024 · 4 Apr · Shift 1 MCQ

What pressure (bar) of H_2 would be required to make emf of hydrogen electrode zero in pure water at $25^\circ C$?

(A) 10^{-7}
(B) 0.5
(C) 1
(D) 10^{-14}

Answer: (D) 10^{-14} · Key from source paper

Q57 JEE Main 2024 · 4 Apr · Shift 1 MCQ

One of the commonly used electrode is calomel electrode. Under which of the following categories, calomel electrode comes?

(A) Oxidation - Reduction electrodes
(B) Metal ion - Metal electrodes
(C) Gas - Ion electrodes
(D) Metal - Insoluble Salt - Anion electrodes

Answer: (D) Metal - Insoluble Salt - Anion electrodes · Key from source paper

Q58 JEE Main 2024 · 4 Apr · Shift 2 MCQ

For a strong electrolyte, a plot of molar conductivity against (concentration)$^{1/2}$ is a straight line, with a negative slope, the correct unit for the slope is

(A) $Scm^2\,mol^{-3/2}\,L^{-1/2}$
(B) $Scm^2\,mol^{-3/2}\,L^{1/2}$
(C) $Scm^2\,mol^{-3/2}\,L$
(D) $Scm^2\,mol^{-1}\,L^{1/2}$

Answer: (B) $Scm^2\,mol^{-3/2}\,L^{1/2}$ · Key from source paper

Q59 JEE Main 2024 · 4 Apr · Shift 2 MCQ

Fuel cell, using hydrogen and oxygen as fuels, A. has been used in spaceship B. has as efficiency of 40% to produce electricity C. uses aluminum as catalysts D. is eco-friendry E. is actually a type of Galvanic cell only Choose the correct answer from the options given below:

(A) A, B, D, E only
(B) A, D, E only
(C) A, B, D only
(D) A, B, C only

Answer: (B) A, D, E only · Key from source paper

Q60 JEE Main 2024 · 1 Feb · Shift 1 Numerical

The potential for the given half cell at 298K is - ..... $\times 10^{-2}$V.

$2H^{+}_{(aq)} + 2e^{-} \rightarrow H_2(g)$

$H^{+} = 1M,\ P_{H_2} = 2$ atm

(Given 2.303 RT / F = 0.06 V, log2 = 0.3)

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q61 JEE Main 2024 · 1 Feb · Shift 2 Numerical

The amount of electricity in Coulomb required for the oxidation of 1 mol of H_2O to O_2 is _____ $\times 10^5$ C.

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q62 JEE Main 2024 · 1 Feb · Shift 2 Numerical

Consider the following redox reaction: $MnO_4^- + H^+ + H_2C_2O_4 \rightleftharpoons Mn^{2+} + H_2O + CO_2$

The standard reduction potentials are given as below E°_{red}

$E^0_{MnO_4^-/Mn^{2+}} = +1.51$ V; $E^0_{CO_2/H_2C_2O_4} = -0.49$ V

If the equilibrium constant of the above reaction is given as $K_{eq} = 10^x$, then the value of x = _____ (nearest integer)

Numerical value type: the answer is a number.

Answer: 338. · Key from source paper

Q63 JEE Main 2024 · 31 Jan · Shift 1 MCQ

The metals that are employed in the battery industries are A. Fe, B. Mn, C. Ni, D. Cr, E. Cd

Choose the correct answer from the options given below:

(A) B, C and E only
(B) A, B, C, D and E
(C) A, B, C and D only
(D) B, D and E only

Answer: (A) B, C and E only · Key from source paper

Q64 JEE Main 2024 · 31 Jan · Shift 1 MCQ

Identify the factor from the following that does not affect electrolytic conductance of a solution.

(A) The nature of the electrolyte added.
(B) The nature of the electrode used.
(C) Concentration of the electrolyte.
(D) The nature of solvent used.

Answer: (B) The nature of the electrode used. · Key from source paper

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Q65 JEE Main 2024 · 31 Jan · Shift 1 Numerical

One Faraday of electricity liberates $x \times 10^{-1}$ gram atom of copper from copper sulphate, x is _____.

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q66 JEE Main 2024 · 31 Jan · Shift 2 Numerical

The values of conductivity of some materials at 298.15 K in Sm^{-1} are 2.1×10^{3}, 1.0×10^{-16}, 1.2×10, 3.91, 1.5×10^{-2}, 1×10^{-7}, 1.0×10^{3}. The number of conductors among the materials is _____.

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q67 JEE Main 2024 · 30 Jan · Shift 2 MCQ

Reduction potential of ions are given below:

ClO_4^-	IO_4^-	BrO_4^-
E° = 1.19 V	E° = 1.65 V	E° = 1.74 V

The correct order of their oxidising power is:

(A) $ClO_4^- > IO_4^- > BrO_4^-$
(B) $BrO_4^- > IO_4^- > ClO_4^-$
(C) $BrO_4^- > ClO_4^- > IO_4^-$
(D) $IO_4^- > BrO_4^- > ClO_4^-$

Answer: (B) $BrO_4^- > IO_4^- > ClO_4^-$ · Key from source paper

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Q68 JEE Main 2024 · 29 Jan · Shift 1 Numerical

The mass of zinc produced by the electrolysis of zinc sulphate solution with a steady current of 0.015 A for 15 minutes is _____ $\times 10^{-4}$ g. (Atomic mass of zinc = 65.4 amu)

Numerical value type: the answer is a number.

Answer: 46. · Key from source paper

Q69 JEE Main 2024 · 29 Jan · Shift 2 Numerical

A constant current was passed through a solution of $AuCl_4^-$ ion between gold electrodes. After a period of 10.0 minutes, the increase in mass of cathode was 1.314 g. The total charge passed through the solution is _____ $\times 10^{-2}$ F. (Given atomic mass of Au = 197)

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q70 JEE Main 2024 · 27 Jan · Shift 1 Numerical

The mass of silver (Molar mass of Ag : 108 g mol^{-1}) displaced by a quantity of electricity which displaces 5600 mL of O_2 at S.T.P. will be _____ g.

Numerical value type: the answer is a number.

Answer: 108. · Key from source paper

Q71 JEE Main 2024 · 27 Jan · Shift 2 MCQ

Which of the following statements is not correct about rusting of iron?

(A) Coating of iron surface by tin prevents rusting, even if the tin coating is peeling off.
(B) When pH lies above 9 or 10 , rusting of iron does not take place.
(C) Dissolved acidic oxides SO_2, NO_2 in water act as catalyst in the process of rusting.
(D) Rusting of iron is envisaged as setting up of electrochemical cell on the surface of iron object.

Answer: (A) Coating of iron surface by tin prevents rusting, even if the tin coating is peeling off. · Key from source paper

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Q72 JEE Main 2024 · 27 Jan · Shift 2 Numerical

The hydrogen electrode is dipped in a solution of pH = 3 at $25^\circ C$. The potential of the electrode will be - _____ $\times 10^{-2}$ V. $\frac{2.303RT}{F} = 0.059$ V Round off the answer to the nearest integer.

Numerical value type: the answer is a number.

Answer: 18. · Key from source paper

Q73 JEE Main 2023 · 15 Apr · Shift 1 Numerical

The number of correct statements from the following is _____
(A) Conductivity always decreases with decrease in concentration for both strong and weak electrolytes.
(B) The number of ions per unit volume that carry current in a solution increases on dilution.
(C) Molar conductivity increases with decrease in concentration.
(D) The variation in molar conductivity is different for strong and weak electrolytes.
(E) For weak electrolytes, the change in molar conductivity with dilution is due to decrease in degree of dissociation.

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q74 JEE Main 2023 · 13 Apr · Shift 1 Numerical

A metal surface of 100 cm^2 area has to be coated with nickel layer of thickness 0.001 mm. A current of 2A was passed through a solution of $Ni(NO_3)_2$ for x seconds to coat the desired layer. The value of x is _____. (Nearest integer)
(ρNi (density of Nickel) is 10 g mL^{-1}, Molar mass of Nickel is 60 g mol^{-1} F = 96500 $Cmol^{-1}$)

Numerical value type: the answer is a number.

Answer: 161. · Checked by our team

Q75 JEE Main 2023 · 13 Apr · Shift 2 Numerical

At 298 K, the standard reduction potential for Cu^{2+} / Cu electrode is 0.34 V. Given : $K_{sp}Cu(OH)_2 = 1 \times 10^{-20}$ Take $\frac{2.303RT}{F}$ = 0.059 V The reduction potential at pH = 14 for the above couple is $(-)x \times 10^{-2}$ V. The value of x is

Numerical value type: the answer is a number.

Answer: 25. · Key from source paper

Q76 JEE Main 2023 · 12 Apr · Shift 1 MCQ

For lead storage battery pick the correct statements
A. During charging of battery, $PbSO_4$ on anode is converted into PbO_2
B. During charging of battery, $PbSO_4$ on cathode is converted into PbO_2
C. Lead storage battery consists of grid of lead packed with PbO_2 as anode
D. Lead storage battery has ~38% solution of sulphuric acid as an electrolyte
Choose the correct answer from the options given below:

(A) A, B, D only
(B) B, C, D only
(C) B, C only
(D) B, D only

Answer: (D) B, D only · Key from source paper

Q77 JEE Main 2023 · 11 Apr · Shift 1 Numerical

In an electrochemical reaction of lead, at standard temperature, if $E^o_{Pb^{2+}/Pb} = m$ Volt and $E^o_{Pb^{4+}/Pb} = n$ Volt, then the value of $E^\circ Pb^{2+}/Pb^{4+}$ is given by $m - xn$. The value of x is _____ (Nearest integer)

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q78 JEE Main 2023 · 11 Apr · Shift 2 Numerical

The number of correct statements from the following is _____
A. E_{cell} is an intensive parameter
B. A negative E^o means that the redox couple is a stronger reducing agent than the H^+/H_2 couple.
C. The amount of electricity required for oxidation or reduction depends on the stoichiometry of the electrode reaction.
D. The amount of chemical reaction which occurs at any electrode during electrolysis by a current is proportional to the quantity of electricity passed through the electrolyte.

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q79 JEE Main 2023 · 10 Apr · Shift 1 Numerical

$FeO_4^{2-} \xrightarrow{+2.2\ V} Fe^{3+} \xrightarrow{+0.70\ V} Fe^{2+} \xrightarrow{-0.45\ V} Fe^0$

$E^\theta_{FeO_4^{2-}/Fe^{2+}}$ is $x \times 10^{-3}$ V. The value of x is _____

Numerical value type: the answer is a number.

Answer: 1825. · Key from source paper

Q80 JEE Main 2023 · 10 Apr · Shift 2 Numerical

The specific conductance of 0.0025M acetic acid is $5 \times 10^{-5}\ S\ cm^{-1}$ at a certain temperature. The dissociation constant of acetic acid is _____ $\times 10^{-7}$ (Nearest integer).
Consider limiting molar conductivity of CH_3COOH as $400\ S\ cm^2\ mol^{-1}$

Numerical value type: the answer is a number.

Answer: 66. · Key from source paper

Q81 JEE Main 2023 · 8 Apr · Shift 1 MCQ

The reaction occurs in which of the given galvanic cell?

$\frac{1}{2}H_2(g) + AgCl(s) \rightleftharpoons H^+(aq) + Cl^-(aq) + Ag(s)$

(A) $Pt\,|H_2(g)|\,HCl(sol^n)\,|\,AgCl(s)|\,Ag$

(B) $Ag\,|\,AgCl(s)|\,KCl(sol^n)\,|\,AgNO_3\,|\,Ag$

(C) $Pt\,|H_2(g)|\,HCl(sol^n)\,|\,AgNO_3(sol^n)\,|\,Ag$

(D) $Pt\,|H_2(g)|\,KCl(sol^n)\,|\,AgCl(s)|\,Ag$

Answer: (A) $Pt\,|H_2(g)|\,HCl(sol^n)\,|\,AgCl(s)|\,Ag$ · Key from source paper

Q82 JEE Main 2023 · 8 Apr · Shift 2 Numerical

The number of incorrect statements from the following is _____

A. The electrical work that a reaction can perform at constant pressure and temperature is equal to the reaction Gibbs energy.

B. E°_{cell} is dependent on the pressure.

C. $\frac{dE_{cell}}{dT} = \frac{\Delta_r S^\circ}{nF}$

D. A cell is operating reversibly if the cell potential is exactly balanced by an opposing source of potential difference.

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q83 JEE Main 2023 · 6 Apr · Shift 1 MCQ

The standard electrode potential of M^+ / M in aqueous solution does not depend on

(A) Hydration of a gaseous metal ion

(B) Sublimation of a solid metal

(C) Ionisation of a solid metal atom

(D) Ionisation of a gaseous metal atom

Answer: (C) Ionisation of a solid metal atom · Key from source paper

Q84 JEE Main 2023 · 6 Apr · Shift 2 MCQ

The product, which is not obtained during the electrolysis of brine solution is

(A) H_2

(B) HCl

(C) NaOH

(D) Cl_2

Answer: (B) HCl · Key from source paper

Q85 JEE Main 2023 · 6 Apr · Shift 2 Numerical

The standard reduction potentials at 295 K for the following half cells are given below:

$NO_3^- + 4H^+ + 3e^- \rightarrow NO(g) + 2H_2O \quad E^o = 0.97\ V$

$V^{2+}(aq) + 2e^- \rightarrow V(s) \quad E^o = -1.19\ V$

$Fe^{3+}(aq) + 3e^- \rightarrow Fe(s) \quad E^o = -0.04\ V$

$Ag^+(aq) + e^- \rightarrow Ag(s) \quad E^o = 0.80\ V$

$Au^{3+}(aq) + 3e^- \rightarrow Au(s) \quad E^o = 1.40\ V$

The number of metal(s) which will be oxidised by NO_3^- in aqueous solution is _____ .

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q86 JEE Main 2023 · 1 Feb · Shift 1 Numerical

At what pH, given half cell MnO_4^- (0.1M) | Mn^{2+} (0.001 M) will have electrode potential of 1.282 V ? (Nearest Integer)

Given $E^o_{MnO_4^-/Mn^{2+}}$ = 1.54 V, $\frac{2.303RT}{F}$ = 0.059 V

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q87 JEE Main 2023 · 1 Feb · Shift 2 Numerical

1×10^{-5} M $AgNO_3$ is added to 1 L of saturated solution of AgBr. The conductivity of this solution at 298 K is _____ $\times 10^{-8}\ S\ m^{-1}$.

[Given : K_{sp}(AgBr) = 4. 9 $\times 10^{-13}$ at 298 K

$\lambda^0_{Ag^+}$ = $6 \times 10^{-3}\ Sm^2\ mol^{-1}$

$\lambda^0_{Br^-}$ = $8 \times 10^{-3}\ Sm^2\ mol^{-1}$

$\lambda^0_{NO_3^-}$ = $7 \times 10^{-3}\ Sm^2\ mol^{-1}$]

Numerical value type: the answer is a number.

Answer: 13069. · Checked by our team

Q88 JEE Main 2023 · 31 Jan · Shift 1 MCQ

Which one of the following statements is correct for electrolysis of brine solution?

(A) Cl_2 is formed at cathode

(B) O_2 is formed at cathode

(C) H_2 is formed at anode

(D) OH^- is formed at cathode

Answer: (D) OH^- is formed at cathode · Key from source paper

Q89 JEE Main 2023 · 31 Jan · Shift 1 Numerical

The logarithm of equilibrium constant for the reaction $Pd^{2+} + 4Cl^- \rightleftharpoons PdCl_4^{2-}$ is (Nearest integer)
Given: $\frac{2.303RT}{F}$ = 0.06 V
$Pd^{2+}_{(aq)} + 2e^- \rightleftharpoons Pd(s)$ E^o = 0.83 V
$PdCl_4^{2-}(aq) + 2e^- \rightleftharpoons Pd(s) + 4Cl^-(aq)$
E^o = 0.65 V

Numerical value type: the answer is a number.

Answer: 6. · Key from source paper

Q90 JEE Main 2023 · 31 Jan · Shift 2 Numerical

The resistivity of a 0.8M solution of an electrolyte is $5 \times 10^{-3} \Omega$cm. Its molar conductivity is $10^4 \Omega^{-1}$ cm ^{2} mol^{-1}. (Nearest integer)

Numerical value type: the answer is a number.

Answer: 25. · Key from source paper

Q91 JEE Main 2023 · 30 Jan · Shift 1 Numerical

Consider the cell
Pt_s H_{2g}, 1atm H^+ aq, 1M | Fe^{3+} aq, Fe^{2+} aq Pt s
When the potential of the cell is 0.712 V at 298 K, the ratio Fe^{2+} / Fe^{3+} is _____ (Nearest integer)
Given: $Fe^{3+} + e^- = Fe^{2+}$, $E^\circ Fe^{3+}, Fe^{2+}$ Pt = 0.771, $\frac{2.303RT}{F}$ = 0.06 V

Numerical value type: the answer is a number.

Answer: 10. · Key from source paper

Q92 JEE Main 2023 · 30 Jan · Shift 2 Numerical

The electrode potential of the following half cell at 298 K
$X|X^{2+}(0.001M)||Y^{2+}(0.01M)|Y$ is _____ $\times 10^{-2}$ V (Nearest integer)
Given : $E^0_{X^{2+}|X}$ = -2.36 V
$E^0_{Y^{2+}|Y}$ = +0.36 V
$\frac{2.303RT}{F}$ = 0.06 V

Numerical value type: the answer is a number.

Answer: 275. · Key from source paper

Q93 JEE Main 2023 · 29 Jan · Shift 1 Numerical

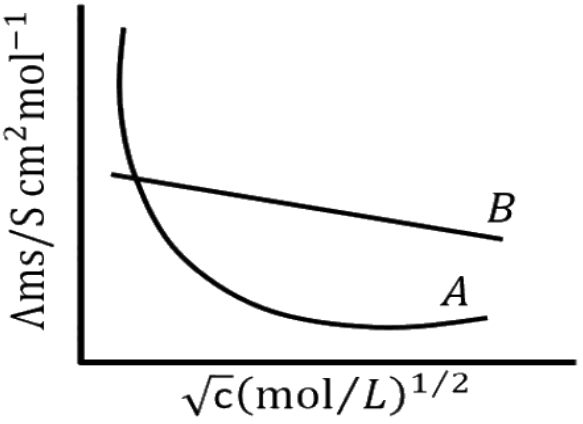
Following figure shows dependence of molar conductance of two electrolytes on concentration. Λ^0_m is the limiting molar conductivity.

(see the figure above)

The number of **Incorrect** statement(s) from the following is _____

(A) Λ_m^0 for electrolyte A is obtained by extrapolation
(B) For electrolyte B, Λ_m Vs $\sqrt{c}$ graph is a straight line with intercept equal to Λ_m^0
(C) At infinite dilution, the value of degree of dissociation approach zero for electrolyte B.
(D) Λ_m for any electrolyte A or B can be calculated using λ° for individual ions.

Q48. Following figure shows dependence of molar conductance of two electrolytes on concentration. Λ_m^0 is the limiting molar conductivity.



The number of **Incorrect** statement(s) from the following is _____
(A) Λ_m^0 for electrolyte A is obtained by extrapolation
(B) For electrolyte B, Λ_m Vs $\sqrt{c}$ graph is a straight line with intercept equal to Λ_m^0
(C) At infinite dilution, the value of degree of dissociation approach zero for electrolyte B.
(D) Λ_m for any electrolyte A or B can be calculated using λ° for individual ions.

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q94 JEE Main 2023 · 29 Jan · Shift 2 Numerical

The equilibrium constant for the reaction $Zn(s) + Sn^{2+}(aq) \rightleftharpoons Zn^{2+}(aq) + Sn(s)$ is 1×10^{20} at 298 K. The magnitude of standard electrode potential of Sn/Sn^{2+} if $E^0_{Zn^{2+}/Zn} = -0.76$ V is _____ $\times 10^{-2}$ V. (Nearest integer)
Given : $\frac{2.303\,RT}{F} = 0.059$ V

Numerical value type: the answer is a number.

Answer: 17. · Key from source paper

Q95 JEE Main 2023 · 25 Jan · Shift 1 Numerical

Consider the cell $Pt(s)|H_2(s)(1atm)|H^+(aq, [H^+] = 1)||Fe^{3+}(aq), Fe^{2+}(aq)|Pt(s)$
Given: $E^\circ_{Fe^{3+}/Fe^{2+}} = 0.771$ V and $E^\circ_{H^+/\frac{1}{2}H_2} = 0$ V, T = 298 K
If the potential of the cell is 0.712 V the ratio of concentration of Fe^{2+} to Fe^{3+} is _____ (Nearest integer)

Numerical value type: the answer is a number.

Answer: 10. · Key from source paper

Q96 JEE Main 2023 · 25 Jan · Shift 2 Numerical

$\mathrm{Pt(s)H_2(g)(1\ bar)|H^+(aq)(1M)||M^{3+}(aq), M^+(aq)|Pt(s)}$

The E_{cell} for the given cell is 0.1115 V at 298 K

When $\frac{[\mathrm{M^+(aq)}]}{[\mathrm{M^{3+}(aq)}]} = 10^a$

The value of a is _____

Given : $E^{\theta}_{\mathrm{M^{3+}/M^+}} = 0.2$ V

$\frac{2.303RT}{F} = 0.059$ V

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q97 JEE Main 2023 · 24 Jan · Shift 1 Numerical

At 298 K, a 1 litre solution containing 10 mmol of $\mathrm{Cr_2O_7^{2-}}$ and 100mmol of $\mathrm{Cr^{3+}}$ shows a pH of 3.0.
Given : $\mathrm{Cr_2O_7^{2-} \rightarrow Cr^{3+}}$; $E^0 = 1.330$ V and $\frac{2.303RT}{F} = 0.059$ V

The potential for the half cell reaction is x $\times$ 10^{-3} V. The value of x is _____.

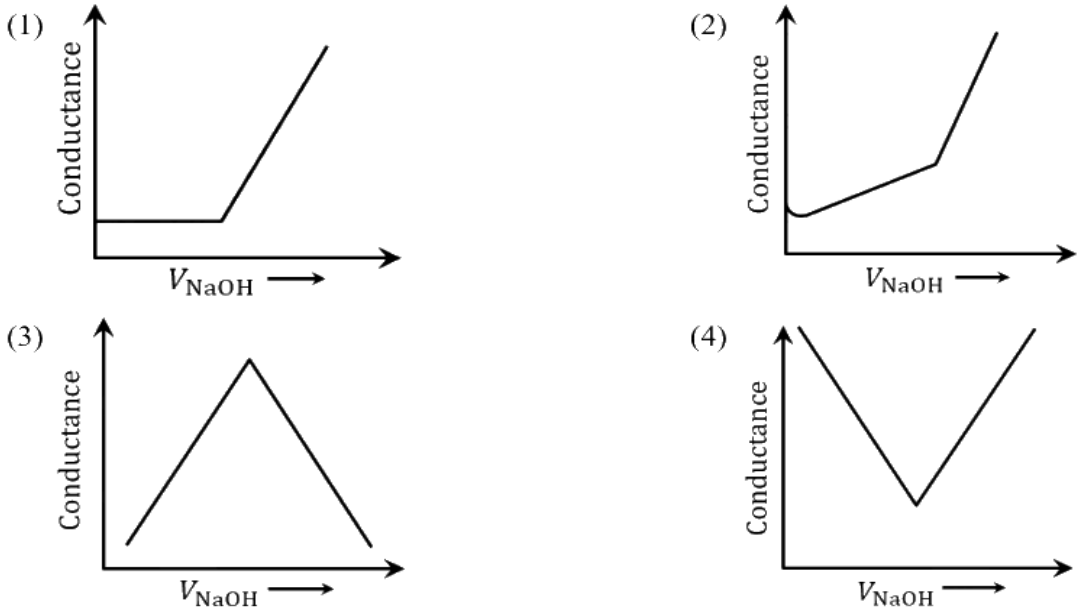
Numerical value type: the answer is a number.

Answer: 917. · Key from source paper

Q98 JEE Main 2023 · 24 Jan · Shift 2 MCQ

Choose the correct representation of conductometric titration of benzoic acid vs sodium hydroxide.

Q37. Choose the correct representation of conductometric titration of benzoic acid vs sodium hydroxide.



(A) *see figure*
(B) *see figure*
(C) *see figure*
(D) *see figure*

Answer: (B) · Key from source paper

Q99 JEE Main 2022 · 29 Jul · Shift 1 Numerical

Resistance of a conductivity cell (cell constant 129 m^{-1}) filled with 74.5 ppm solution of KCl is 100 Ω (labelled as solution 1). When the same cell is filled with KCl solution of 149 ppm, the resistance is 50 Ω (labelled as solution 2). The ratio of molar conductivity of solution 1 and solution 2 is i.e. $\frac{\Lambda_1}{\Lambda_2}$ = x $\times 10^{-3}$. The value of x is _____ Given, molar mass of KCl is 74.5 $\mathrm{g\ mol}^{-1}$)

Numerical value type: the answer is a number.

Answer: 1000. · Key from source paper

Q100 JEE Main 2022 · 29 Jul · Shift 2 Numerical

For a cell, $\mathrm{Cu(s)|Cu^{2+}(0.001\ M)||Ag^{+}(0.01\ M)|Ag(s)}$ the cell potential is found to be 0.43 V at 298 K. The magnitude of standard electrode potential for $\mathrm{Cu^{2+}|Cu}$ is _____ $\times 10^{-2}$ V
Given: $E^{\Theta}_{\mathrm{Ag^{+}/Ag}} = 0.80$ V and $\frac{2.303RT}{F} = 0.06$ V

Numerical value type: the answer is a number.

Answer: 34. · Key from source paper

Q101 JEE Main 2022 · 28 Jul · Shift 1 MCQ

Match List-I with List-II.
List-I
A. $\mathrm{Cds + 2NiOH_3s \rightarrow CdOs + 2NiOH_2s + H_2Ol}$
B. $\mathrm{ZnHg + HgOs \rightarrow ZnOs + Hgl}$
C. $\mathrm{2PbSO_4s + 2H_2Ol \rightarrow Pbs + PbO_2s + 2H_2SO_4aq}$
D. $\mathrm{2H_2g + O_2g \rightarrow 2H_2Ol}$
List-II
I. Primary battery
II. Discharging of secondary battery
III. Fuel cell
IV. Charging of secondary battery
Choose the correct answer from the options given below

(A) A - I, B - II, C - III, D - IV
(B) A - IV, B - I, C - IV, D - III
(C) A - II, B - I, C - IV, D - III
(D) A - II, B - I, C - III, D - IV

Answer: (C) A - II, B - I, C - IV, D - III · Key from source paper

Q102 JEE Main 2022 · 27 Jul · Shift 2 MCQ

Given below are two statements:
Statement I: For KI, molar conductivity increases steeply with dilution.
Statement II: For carbonic acid, molar conductivity increases slowly with dilution. In the light of the above statements, choose the correct answer from the options given below

(A) Statement I is correct and Statement II is incorrect
(B) Both Statement I and Statement II are false
(C) Statement I is true but Statement II is false
(D) Statement I is false but Statement II is true

Answer: (B) Both Statement I and Statement II are false · Key from source paper

Q103 JEE Main 2022 · 26 Jul · Shift 1 Numerical

The amount of charge in F (Faraday) required to obtain one mole of iron from $\mathrm{Fe_3\,O_4}$ is _____ .
(Round off the answer to the nearest integer)

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q104 JEE Main 2022 · 25 Jul · Shift 1 Numerical

The cell potential for $\mathrm{Zn|Zn^{2+}(aq)\,||\,Sn^{x+}|Sn}$ is $0.801\mathrm{V}$ at 298 K. The reaction quotient for the above reaction is 10^{-2}. The number of electrons involved in the given electrochemical cell reaction is _____ .
(Given $\mathrm{E^0_{Zn^{2+}|Zn}} = -0.763$ V, $\mathrm{E^0_{Sn^{x+}|Sn}} = +0.008$ V and $\frac{2.303RT}{F} = 0.06$ V)

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q105 JEE Main 2022 · 25 Jul · Shift 2 MCQ

The molar conductivity of a conductivity cell filled with 10 moles of 20 mL NaCl solution is Λ_{m1} and that of 20 moles another identical cell heaving 80 mL NaCl solution is Λ_{m2}, The conductivities exhibited by these two cells are same.
The relationship between Λ_{m2} and Λ_{m1} is

(A) $\Lambda_{m2} = 2\Lambda_{m1}$

(B) $\Lambda_{m2} = \Lambda_{m1}/2$

(C) $\Lambda_{m2} = \Lambda_{m1}$

(D) $\Lambda_{m2} = 4\Lambda_{m1}$

Answer: (A) $\Lambda_{m2} = 2\Lambda_{m1}$ · Key from source paper

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Q106 JEE Main 2022 · 29 Jun · Shift 1 Numerical

A dilute solution of sulphuric acid is electrolysed using a current of $0.10\ \mathrm{A}$ for 2 hours to produce hydrogen and oxygen gas. The total volume of gases produced at STP is cm^3. (Nearest integer) [Given : Faraday constant $\mathrm{F} = 96500\ \mathrm{C\,mol^{-1}}$ at STP, molar volume of an ideal gas is $22.7\ \mathrm{L\,mol^{-1}}$]

Numerical value type: the answer is a number.

Answer: 127. · Key from source paper

Q107 JEE Main 2022 · 29 Jun · Shift 2 Numerical

The cell potential for the given cell at $298\ \mathrm{K}$ $\mathrm{Pt|H_2(g, 1\ bar)||H^+(aq)||\ Cu^{2+}(aq)|\ Cu(s)}$ is $0.31\ \mathrm{V}$. The pH of the acidic solution is found to be 3, whereas the concentration of $\mathrm{Cu^{2+}}$ is $10^x\ \mathrm{M}$. The value of x is _____.

(Given: $\mathrm{E^{\ominus}_{Cu^{2+}/Cu}} = 0.34\ \mathrm{V}$ and $\dfrac{2.303\,RT}{F} = 0.06\ \mathrm{V}$)

Numerical value type: the answer is a number.

Answer: 7. · Key from source paper

Q108 JEE Main 2022 · 28 Jun · Shift 1 Numerical

The solubility product of a sparingly soluble salt $\mathrm{A_2X_3}$ is 1.1×10^{-23}. If specific conductance of the solution is $3 \times 10^{-5}\ \mathrm{S\,m^{-1}}$, the limiting molar conductivity of the solution is $\mathrm{x} \times 10^{-3}\ \mathrm{S\,m^2\,mol^{-1}}$. The value of x is

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q109 JEE Main 2022 · 28 Jun · Shift 1 Numerical

The quantity of electricity in Faraday needed to reduce $1\ \mathrm{mol}$ of $\mathrm{Cr_2O_7^{2-}}$ to $\mathrm{Cr^{3+}}$ is

Numerical value type: the answer is a number.

Answer: 6. · Key from source paper

Q110 JEE Main 2022 · 28 Jun · Shift 2 Numerical

For the given reactions

$\mathrm{Sn^{2+} + 2e^- \rightarrow Sn}$

$\mathrm{Sn^{4+} + 4e^- \rightarrow Sn}$ the electrode potentials are ; $\mathrm{E^{\circ}_{Sn^{2+}/Sn}} = -0.140\ \mathrm{V}$ and $\mathrm{E^{\circ}_{Sn^{4+}/Sn}} = 0.010\ \mathrm{V}$. The

magnitude of standard electrode potential for Sn^{4+}/Sn^{2+} i.e. $E^{\circ}_{Sn^{4+}/Sn^{2+}}$ is _____ $\times 10^{-2}$ V(Nearest integer)

Numerical value type: the answer is a number.

Answer: 16. · Key from source paper

Q111 JEE Main 2022 · 27 Jun · Shift 1 Numerical

The limiting molar conductivities of NaI, $NaNO_3$ and $AgNO_3$ are $12.7, 12.0$ and $13.3\ mSm^2\ mol^{-1}$, respectively (all at $25\ ^{\circ}C$). The limiting molar conductivity of AgI at this temperature is _____ $mSm^2\ mol^{-1}$.

Numerical value type: the answer is a number.

Answer: 14. · Key from source paper

Q112 JEE Main 2022 · 27 Jun · Shift 2 Numerical

For the reaction taking place in the cell:
$Pt(s)H_2(g)H^+(aq)\ ||\ Ag^+(aq)|Ag(s)$
$E_{cell} = +0.5332\ V$.
The value of $\Delta_f G^{\ominus}$ is $kJ\ mol^{-1}$. (in nearest integer)

Numerical value type: the answer is a number.

Answer: 51. · Key from source paper

Q113 JEE Main 2022 · 26 Jun · Shift 1 MCQ

The $\left(\frac{\partial E}{\partial T}\right)_P$ of different types of half cells are as follows :
A B C D
$1 \times 10^{-4}\ 2 \times 10^{-4}\ 0.1 \times 10^{-4}\ 0.2 \times 10^{-4}$
(Where E is the electromotive force). Which of the above half cells would be preferred to be used as reference electrode

(A) A
(B) B
(C) C
(D) D

Answer: (C) C · Key from source paper

Q114 JEE Main 2022 · 26 Jun · Shift 2 Numerical

$Cu(s) + Sn^{2+}(0.001M) \rightarrow Cu^{2+}(0.01M) + Sn(s)$
The Gibbs free energy change for the above reaction at $298\ K$ is $x \times 10^{-1}\ kJ\ mol^{-1}$. The value of x is _____ [nearest integer]
[Given : $E^{\ominus}_{Cu^{2+}/Cu} = 0.34\ V$; $E^{\ominus}_{Sn^{2+}/Sn} = -0.14\ V$; $F = 96500\ Cmol^{-1}$]

Numerical value type: the answer is a number.

Answer: 983. · Key from source paper

Q115 JEE Main 2022 · 25 Jun · Shift 1 Numerical

In a cell, the following reactions take place

$Fe^{2+} \rightarrow Fe^{3+} + e^- \; E^{\circ}_{Fe^{3+}/Fe^{2+}} = 0.77\ V$

$2I^- \rightarrow I_2 + 2e^- \; E^{0}_{I_2/I^-} = 0.54\ V$

The standard electrode potential for the spontaneous reaction in the cell is $x \times 10^{-2}$ V at 298 K. The value of x is - (Nearest Integer)

Numerical value type: the answer is a number.

Answer: 23. · Key from source paper

Q116 JEE Main 2022 · 25 Jun · Shift 2 MCQ

The correct order of reduction potentials of the following pairs is

A. Cl_2/Cl^-

B. I_2/I^-

C. Ag^+/Ag

D. Na^+/Na

E. Li^+/Li

Choose the correct answer from the options given below.

(A) $A > B > C > E > D$

(B) $A > C > B > E > D$

(C) $A > B > C > D > E$

(D) $A > C > B > D > E$

Answer: (D) $A > C > B > D > E$ · Key from source paper

Q117 JEE Main 2022 · 25 Jun · Shift 2 Numerical

A solution of Fe_2SO_{43} is electrolyzed for 'x' min with a current of 1.5 A to deposit 0.3482 g of Fe. The value of x is - [nearest integer]

Given : $1\ F = 96500\ C\ mol^{-1}$. Atomic mass of Fe $= 56\ g\ mol^{-1}$

Numerical value type: the answer is a number.

Answer: 20. · Key from source paper

Q118 JEE Main 2022 · 24 Jun · Shift 1 Numerical

The cell potential for the following cell $Pt|H_2(g)|H^+(aq)||\ Cu^{2+}(0.01\ M)|\ Cu(s)$ is 0.576 V at 298 K. The pH of the solution is (Nearest integer)

(Given : $E^{o}_{Cu^{2+}/Cu} = 0.34$ V and $\frac{2.303RT}{F} = 0.06$ V)

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q119 JEE Main 2022 · 24 Jun · Shift 2 Numerical

The resistance of a conductivity cell containing $0.01\ \mathrm{M}$ KCl solution at $298\ \mathrm{K}$ is $1750\ \Omega$. If the conductivity of $0.01\ \mathrm{M}$ KCl solution at $298\ \mathrm{K}$ is $0.152 \times 10^{-3}\ \mathrm{S\ cm^{-1}}$, then the cell constant of the conductivity cell is _____ $\times 10^{-3}\ \mathrm{cm^{-1}}$

Numerical value type: the answer is a number.

Answer: 266. · Key from source paper

Q120 JEE Main 2021 · 1 Sep · Shift 2 Numerical

If the conductivity of mercury at 0°C is 1.07×10^{6} S m^{-1} and the resistance of a cell containing mercury is 0.243Ω, then the cell constant of the cell is $x \times 10^{4}$ m^{-1}. The value of x is _____. (Nearest integer)

Numerical value type: the answer is a number.

Answer: 26. · Key from source paper

Q121 JEE Main 2021 · 31 Aug · Shift 1 Numerical

Consider the following cell reaction $\mathrm{Cd_{(s)} + Hg_2SO_{4(s)} + \frac{9}{5}H_2O_{(l)} \rightleftharpoons CdSO_4 \cdot \frac{9}{5}H_2O_{(s)} + 2Hg_{(l)}}$.
The value of E^0_{cell} is 4.315 V at 25°C. If $\Delta H^{\circ} = -825.2$ kJ mol^{-1}, the standard entropy change ΔS° in J K^{-1} is _____. (Nearest integer)
[Given : Faraday constant = 96487 C mol^{-1}]

Numerical value type: the answer is a number.

Answer: 25. · Key from source paper

Q122 JEE Main 2021 · 31 Aug · Shift 2 MCQ

Match List - I with List - II :
List - I (Parameter)
(a) Cell constant
(b) Molar conductivity
(c) Conductivity
(d) Degree of dissociation of electrolyte
List - II (Unit)
(i) $\mathrm{S\ cm^2\ mol^{-1}}$
(ii) Dimensionless
(iii) $\mathrm{m^{-1}}$
(iv) $\mathrm{\Omega^{-1}\ m^{-1}}$

(A) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)
(B) (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)
(C) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)
(D) (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

Answer: (A) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii) · Key from source paper

Q123 JEE Main 2021 · 27 Aug · Shift 2 Numerical

The resistance of conductivity cell with cell constant $1.14\ \mathrm{cm^{-1}}$, containing $0.001\mathrm{M}$ KCl at $298\ \mathrm{K}$ is 1500Ω. The molar conductivity of $0.001\mathrm{M}$ KCl solution at $298\ \mathrm{K}$ in $\mathrm{S\ cm^2\ mol^{-1}}$ is (Integer answer)

Numerical value type: the answer is a number.

Answer: 760. · Key from source paper

Q124 JEE Main 2021 · 26 Aug · Shift 1 MCQ

Given below are two statements:
Statement I : The limiting molar conductivity of KCl (strong electrolyte) is higher compared to that of $\mathrm{CH_3COOH}$ (weak electrolyte).
Statement II : Molar conductivity decreases with decrease in concentration of electrolyte.
In the light of the above statements, choose the most appropriate answer from the options given below:

(A) Statement I is false but Statement II is true
(B) Both Statement I and Statement II are true
(C) Statement I is true but Statement II is false
(D) Both Statement I and Statement II are false

Answer: (D) Both Statement I and Statement II are false · Key from source paper

Q125 JEE Main 2021 · 26 Aug · Shift 2 Numerical

For the galvanic cell,
$\mathrm{Zn(s) + Cu^{2+}(0.02M) \rightarrow Zn^{2+}(0.04M) + Cu(s)}$
$\mathrm{E_{cell} = \ldots \times 10^{-2}\ V}$ (Nearest integer)
[Use : $\mathrm{E^0\ Cu/Cu^{2+}} = -0.34\ \mathrm{V}$, $\mathrm{E_{Zn/Zn^{2+}}} = +0.76\ \mathrm{V}$, $\frac{2.303\,\mathrm{RT}}{\mathrm{F}} = 0.059\ \mathrm{V}$]

Numerical value type: the answer is a number.

Answer: 109. · Key from source paper

Q126 JEE Main 2021 · 27 Jul · Shift 1 Numerical

The conductivity of a weak acid HA of concentration $0.001\ \mathrm{mol\ L^{-1}}$ is $2.0 \times 10^{-5}\ \mathrm{S\ cm^{-1}}$. If $\Lambda^0_{\mathrm{m}}(\mathrm{HA})$ = $190\ \mathrm{S\ cm^2\ mol^{-1}}$, the ionization constant ($\mathrm{K_a}$) of HA is equal to _____ $\times 10^{-6}$
(Round off to the Nearest Integer)

Numerical value type: the answer is a number.

Answer: 12. · Key from source paper

Q127 JEE Main 2021 · 27 Jul · Shift 2 Numerical

For the cell $Cu(s)|Cu^{2+}(aq)(0.1M)||Ag^{+}(aq)(0.01M)|Ag(s)$ the cell potential $E_1 = 0.3095\ V$. For the cell $Cu(s)|Cu^{2+}(aq)(0.01M)||Ag^{+}(aq)(0.001M)|Ag(s)$ the cell potential $= x \times 10^{-2}\ V$. Find value of x (Round off to the Nearest Integer).
[Use : $\frac{2.303RT}{F} = 0.059\ J$]

Numerical value type: the answer is a number.

Answer: 28. · Key from source paper

Q128 JEE Main 2021 · 25 Jul · Shift 1 Numerical

Consider the cell at $25^{\circ}C$
$ZnZn^{2+}\ aq,\ 1\ M||Fe^{3+}\ (aq), Fe^{2+}\ aqPts$
The fraction of total iron present as Fe^{3+} ion at the cell potential of $1.500\ V$ is $x \times 10^{-2}$. The value of x is _____. (Nearest integer)
Given: $E^{\circ}_{Fe^{3+}|Fe^{2+}} = 0.77V$, $E^{\circ}_{Zn^{2+}|Zn} = -0.76V$

Numerical value type: the answer is a number.

Answer: 24. · Key from source paper

Q129 JEE Main 2021 · 22 Jul · Shift 1 Numerical

Assume a cell with the following reaction $Cu_{(s)} + 2\,Ag^{+}\,(1 \times 10^{-3}M) \rightarrow Cu^{2+}\,(0.250M) + 2\,Ag_{(s)}$
$E^{\circ}_{cell} = 2.97\ V$
E_{cell} for the above reaction is _____ V.
(Nearest integer)
[Given : $\log 2.5 = 0.3979$, $T = 298\ K$]

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q130 JEE Main 2021 · 20 Jul · Shift 2 Numerical

Potassium chlorate is prepared by electrolysis of KCl in basic solution as shown by following equation.
$6\,OH^{-} + Cl^{-} \rightarrow ClO_3^{-} + 3H_2O + 6e^{-}$
A current of xA has to be passed for $10\ h$ to produce $10.0\ g$ of potassium chlorate. the value of x is _____ . (Nearest integer)
(Molar mass of $KClO_3 = 122.6\ g\ mol^{-1}$ $F = 96500\ C$)

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q131 JEE Main 2021 · 18 Mar · Shift 1 Numerical

For the reaction
$2\,Fe^{3+}(aq) + 2I^{-}(aq) \rightarrow 2\,Fe^{2+}(aq) + I_2(s)$
the magnitude of the standard molar free energy change, $\Delta_r G^{\circ}_m = -$_____ kJ (Round off to the Nearest Integer).
$\left[E^{\circ}_{Fe^{2+}/Fe(s)} = -0.440V;\ E^{0}_{Fe^{3+}/Fe(s)} = -0.036V\right.$
$\left.E^{\circ}_{I_2/2I^{-}} = 0.539V;\ \ F = 96500C\right]$

Numerical value type: the answer is a number.

Answer: 45. · Key from source paper

Q132 JEE Main 2021 · 18 Mar · Shift 2 Numerical

The molar conductivity at infinite dilution of barium chloride, sulphuric arid and hydrochloric acid are 280, 860 426 $Scm^2\ mol^{-1}$ respectively. The molar conductivity at infinite dilution of barium sulphate is _____ $Scm^2\ mol^{-1}$ (Round off to the Nearest Integer).

Numerical value type: the answer is a number.

Answer: 288. · Key from source paper

Q133 JEE Main 2021 · 17 Mar · Shift 2 Numerical

A KCl solution of conductivity $0.14\ S\ m^{-1}$ shows a resistance of 4.19Ω in a conductivity cell. If the same cell is filled with an HCl solution, the resistance drops to 1.03Ω. The conductivity of the HCl solution is _____ $\times 10^{-2}\ S\ m^{-1}$. (Round off to the Nearest Integer).

Numerical value type: the answer is a number.

Answer: 57. · Key from source paper

Q134 JEE Main 2021 · 16 Mar · Shift 2 Numerical

A $5.0\ m\ mol\ dm^{-3}$ aqueous solution of KCl has a conductance of $0.55\ mS$ when measured in a cell constant $1.3\ cm^{-1}$. The molar conductivity of this solution is _____ $mSm^2\ mol^{-1}$. (Round off to the Nearest Integer)

Numerical value type: the answer is a number.

Answer: 14. · Key from source paper

Q135 JEE Main 2021 · 26 Feb · Shift 1 Numerical

Consider the following reaction
$MnO_4^{-} + 8H^{+} + 5e^{-} \rightarrow Mn^{+2} + 4H_2O\ ,\ E^{\circ} = 1.51\ V$
The quantity of electricity required in Faraday to reduce five moles of MnO_4^{-} is _____

Numerical value type: the answer is a number.

Answer: 25. · Key from source paper

Q136 JEE Main 2021 · 26 Feb · Shift 2 Numerical

Emf of the following cell at 298 K in V is x $\times 10^{-2}$

$Zn|Zn^{2+}(0.1M)||Ag^{+}(0.01M)|Ag$

The value of x is _____ (Rounded off to the nearest integer)

[Given : $E^{\theta}_{Zn^{2+}/Zn} = -0.76$ V; $E^{\theta}_{Ag^{+}/Ag} = +0.80$ V; $\frac{2.303\,RT}{F} = 0.059$]

Numerical value type: the answer is a number.

Answer: 147. · Key from source paper

Q137 JEE Main 2021 · 25 Feb · Shift 2 Numerical

Copper reduces NO_3^- into NO and NO_2 depending upon the concentration of HNO_3 in solution. (Assuming fixed $[Cu^{2+}]$ and $P_{NO} = P_{NO_2}$), the HNO_3 concentration at which the thermodynamic tendency for reduction of NO_3^- into NO and NO_2 by copper is same is 10^x M. The value of $2x$ is _____. (Rounded-off to the nearest integer)

[Given, $E^{\circ}_{Cu^{2+}/Cu} = 0.34$ V, $E^{\circ}_{NO_3^-/NO} = 0.96$ V, $E^{\circ}_{NO_3^-/NO_2} = 0.79$ V and at 298 K, $\frac{RT}{F}(2.303) = 0.059$]

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q138 JEE Main 2021 · 24 Feb · Shift 2 Numerical

The magnitude of the change in oxidising power of the MnO_4^-/Mn^{2+} couple is $x \times 10^{-4}$ V if the H^+ concentration is decreased from 1 M to 10^{-4} M at 25°C. (Assume concentration of MnO_4^- and Mn^{2+} to be same on change in H^+ concentration). The value of x is _____.

(Rounded off to the nearest integer)

[Given: $\frac{2.303\,RT}{F} = 0.059$]

Numerical value type: the answer is a number.

Answer: 3776. · Key from source paper

Q139 JEE Main 2020 · 6 Sep · Shift 1 Numerical

Potassium chlorate is prepared by the electrolysis of KCl in basic solution

$6\,OH^- + Cl^- \rightarrow ClO_3^- + 3H_2O + 6e^-$. If only 60% of the current is utilized in the reaction, the time (rounded to the nearest hour) required to produce10g of $KClO_3$ using a current of 2A is _____ (Given : F = 96, 500Cmol; molar mass of $KClO_3$ = 122 g mol^{-1})

Numerical value type: the answer is a number.

Answer: 11. · Key from source paper

Q140 JEE Main 2020 · 6 Sep · Shift 2 MCQ

For the given cell; $Cu(s)|Cu^{2+}(C_1M)||Cu^{2+}(C_2M)|Cu(s)$
change in Gibbs energy (ΔG) is negative, it :

(A) $C_1 = C_2$
(B) $C_2 = \frac{C_1}{\sqrt{2}}$
(C) $C_1 = 2C_2$
(D) $C_2 = \sqrt{2}\,C_1$

Answer: (D) $C_2 = \sqrt{2}\,C_1$ · Key from source paper

Q141 JEE Main 2020 · 5 Sep · Shift 1 Numerical

An oxidation-reduction reaction in which 3 electrons are transferred has a ΔG^0 of 17. 37 kJ mol^{-1} at 25°C. The value of E°_{cell} (in V) is _____$\times 10^{-2}$.
(1F = 96500 C mol^{-1})

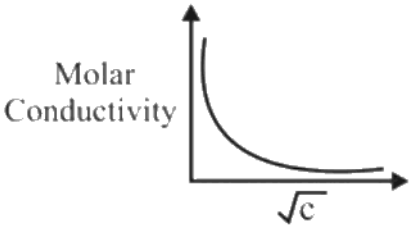
Numerical value type: the answer is a number.

Answer: -6. · Key from source paper

Q142 JEE Main 2020 · 5 Sep · Shift 2 MCQ

The variation of molar conductively (sic) with concentration of an electrolyte (X) in aqueous solution is shown in the given figure.
(see the figure above)
The electrolyte X is :

Q37. The variation of molar conductively with concentration of an electrolyte (X) in aqueous solution is shown in the given figure.



The electrolyte X is :
(1) HCl
(2) $NaCl$
(3) KNO_3
(4) CH_3COOH

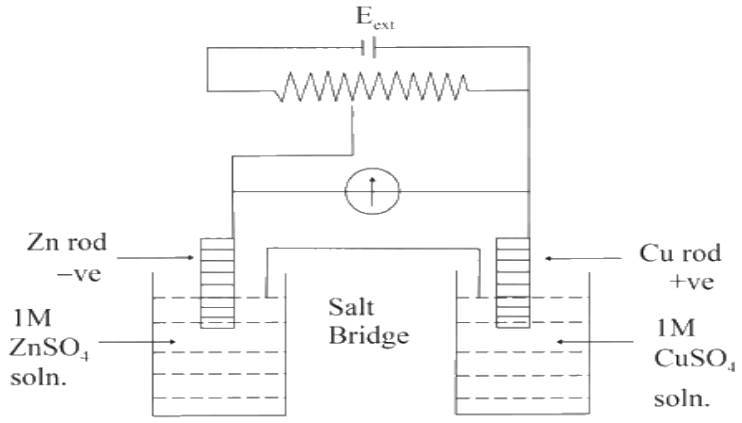
(A) HCl
(B) $NaCl$
(C) KNO_3
(D) CH_3COOH

Answer: (D) CH_3COOH · Key from source paper

Q143 JEE Main 2020 · 4 Sep · Shift 1 MCQ

see figure

Q35.



$E^0_{Cu^{2+}|Cu} = +0.34\ V$
$E^0_{Zn^{2+}|Zn} = -0.76\ V$
Identify the incorrect statement from the options below for the above cell:
(1) If $E_{ext} > 1.1\ V$, e^- flow from Cu to Zn
(2) If $E_{ext} > 1.1\ V$, Zn dissolves at Zn electrode and Cu deposits at Cu electrode
(3) If $E_{ext} < 1.1\ V$, Zn dissolves at anode and Cu deposits at cathode
(4) If $E_{ext} = 1.1\ V$, no flow of e^- or current occurs

(A) If $E_{ext} > 1.1$ V, e^- flow from Cu to Zn
(B) If $E_{ext} > 1.1$ V, Zn dissolves at Zn electrode and Cu deposits at Cu electrode
(C) If $E_{ext} < 1.1$ V, Zn dissolves at anode and Cu deposits at cathode
(D) If $E_{ext} = 1.1$ V, no flow of e^- or current occurs

Answer: (B) If $E_{ext} > 1.1$ V, Zn dissolves at Zn electrode and Cu deposits at Cu electrode · Key from source paper

Q144 JEE Main 2020 · 4 Sep · Shift 2 MCQ

250 mL of a waste solution obtained from the workshop of a goldsmith contains $0.1\ M\ AgNO_3$ and $0.1M\ AuCl$. The solution was electrolyzed at 2 V by passing a current of 1 A for 15 minutes. The metal/metals electrodeposited will be : $\left(E^0_{Ag^+/Ag} = 0.80V, E^0_{Au^+/Au} = 1.69V\right)$

(A) only gold
(B) silver and gold in proportion to their atomic weights
(C) only silver
(D) silver and gold in equal mass proportion

Answer: (A) only gold · Key from source paper

Q145 JEE Main 2020 · 3 Sep · Shift 1 Numerical

The photoelectric current from Na (work function, $w_0 = 2.3$ eV) is stopped by the output voltage of the cell $Pt(s)||H_2(g, 1\ bar)|HCl(aq., pH = 1)|\ AgCl(s)\ |\ Ag(s)$ the pH of aq. HCl required to stop the

photoelectric current from $K(w_0 = 2.25\ eV)$, all other conditions remaining the same, is _____ $\times 10^{-2}$ (to the nearest integer). Given $2.303\frac{RT}{F} = 0.06V;\ E^0{}_{AgCl/Ag/Cl} = 0.22V$

Numerical value type: the answer is a number.

Answer: 142. · Key from source paper

Q146 JEE Main 2020 · 3 Sep · Shift 2 Numerical

An acidic solution of dichromate is electrolyzed for 8 minutes using 2 A current. As per the following equation $Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2\ Cr^{3+} + 7H_2O$ The amount of Cr^{3+}. obtained was 0.104g. The efficiency of the process (in %) is (Take : F = 960000C, At. mass of chromium = 52)

Numerical value type: the answer is a number.

Answer: 60. · Key from source paper

Q147 JEE Main 2020 · 2 Sep · Shift 1 Numerical

The Gibbs energy change (in J) for the given reaction at $[Cu^{2+}] = [Sn^2+] = 1\ M$ and 298 K is :
$Cu(s) + Sn^{2+}(aq.) \rightarrow Cu^{2+}(aq.) + Sn(s);$
$\left(E^0_{Sn^{2+}|Sn} = -0.16\ V,\ E^0_{Cu^{2+}|Cu} = 0.34\ V, Take\ F = 96500\ C\ mol^{-1}\right)$

Numerical value type: the answer is a number.

Answer: 96500. · Key from source paper

Q148 JEE Main 2020 · 2 Sep · Shift 2 Numerical

For the disproportionation reaction $2Cu^+(aq) \rightleftharpoons Cu(s) + Cu^{2+}(aq)$ at 298K,ln K (where K is the equilibrium constant) is _____ $\times 10^{-1}$
Given : $\left(E^\circ_{Cu^{2+}/Cu^+} = 0.16\ V\ E^\circ_{Cu^+/Cu} = 0.52V\ \frac{RT}{F} = 0.025\right)$

Numerical value type: the answer is a number.

Answer: 144. · Key from source paper

Q149 JEE Main 2020 · 9 Jan · Shift 1 Numerical

108 g of silver (molar mass 108 $gmol^{-1}$) is deposited at cathode from $AgNO_3$(aq) solution by a certain quantity of electricity. The volume (in L) of oxygen gas produced at 273 K and 1 bar pressure from water by the same quantity of electricity is _____.

Numerical value type: the answer is a number.

Answer: 5.66. · Key from source paper

Q150 JEE Main 2020 · 9 Jan · Shift 2 MCQ

Amongst the following, the form of water with the lowest ionic conductance at 298K is:

(A) distilled water
(B) saline water used for intravenous injection
(C) water from a well
(D) sea water

Answer: (A) distilled water · Key from source paper

Q151 JEE Main 2020 · 8 Jan · Shift 1 Numerical

What would be the electrode potential for the given half-cell reaction at pH = 5? _____.
$2H_2O \rightarrow O_2 + 4H^+ + 4e^-; E^0_{red} = 1.23V$
($R = 8.314 Jmol^{-1}K^{-1}$; Temp = 298K; oxygen under standard atm. pressure of 1 bar)

Numerical value type: the answer is a number.

Answer: 0.93. · Key from source paper

Q152 JEE Main 2020 · 8 Jan · Shift 2 Numerical

For an electrochemical cell $Sn(s)|Sn^{2+}(aq,\ 1M)||Pb^{2+}(aq,\ 1M)|Pb(s)$ the ratio $\frac{[Sn^{2+}]}{[Pb^{2+}]}$ when this cell attains equilibrium is _____
(Given: $E^0_{Sn^{2+}|Sn} = -0.14\ V, E^0_{Pb^{2+}|Pb} = -0.13\ V, \frac{2.303RT}{F} = 0.06$)

Numerical value type: the answer is a number.

Answer: 2.15. · Key from source paper

Q153 JEE Main 2020 · 7 Jan · Shift 1 MCQ

Given that the standard potentials (E^o) of Cu^{2+} / Cu and Cu^+ / Cu are 0.34V and 0.522V respectively, the E^o of Cu^{2+} / Cu^+ is:

(A) 0.182V
(B) +0.158V
(C) −0.182V
(D) −0.158V

Answer: (B) +0.158V · Key from source paper

Q154 JEE Main 2020 · 7 Jan · Shift 2 MCQ

The equation that is incorrect is:

(A) $(\Lambda^0_m)_{KBr} - (\Lambda^0_m)_{NaCl} = (\Lambda^0_m)_{KBr} - (\Lambda^0_m)_{KCl}$
(B) $(\Lambda^0_m)_{KG} - (\Lambda^0_m)_{KQ} = (\Lambda^0_m)_{NaG} - (\Lambda^0_m)_{NaQ}$
(C) $(\Lambda^0_m)_{H_2O} = (\Lambda^0_m)_{HCl} + (\Lambda^0_m)_{NaOH} - (\Lambda^0_m)_{NaCl}$
(D) $(\Lambda^0_m)_{NaBr} - (\Lambda^0_m)_{NaI} = (\Lambda^0_m)_{KBr} - (\Lambda^0_m)_{KI}$

Answer: (A) $(\Lambda^0_m)_{KBr} - (\Lambda^0_m)_{NaCl} = (\Lambda^0_m)_{KBr} - (\Lambda^0_m)_{KCl}$ · Key from source paper

Q155 JEE Main 2019 · 12 Apr · Shift 1 MCQ

Given:

$Co^{3+} + e^- \rightarrow Co^{2+}\,; E^o = +1.81V$

$Pb^{3+} + 2e^- \rightarrow Pb^{2+}\,; E^o = +1.67V$

$Ce^{4+} + e^- \rightarrow Ce^{3+}\,; E^o = +1.61V$

$Bi^{3+} + 3e^- \rightarrow Bi\,; E^o = +0.20V$

Oxidizing power of the species will increase in the order:

(A) $Co^{3+} < Ce^{4+} < Bi^{3+} < Pb^{4+}$

(B) $Bi^{3+} < Ce^{4+} < Pb^{4+} < Co^{3+}$

(C) $Co^{3+} < Pb^{4+} < Ce^{3+} < Bi^{4+}$

(D) $Ce^{4} < Pb^{4+} < Bi^{3+} < Co^{3+}$

Answer: (B) $Bi^{3+} < Ce^{4+} < Pb^{4+} < Co^{3+}$ · Key from source paper

Q156 JEE Main 2019 · 10 Apr · Shift 1 MCQ

Consider the statements S1 and S2 :

S1 : Conductivity always increases with decreases in the concentration of electrolyte.

S2 : Molar conductivity always increases with decreases in the concentration of electrolyte.

The correct option among the following

(A) S1 is wrong and S2 is correct

(B) S1 is correct and S2 is wrong

(C) Both S1 and S2 are correct

(D) Both S1 and S2 are wrong

Answer: (A) S1 is wrong and S2 is correct · Key from source paper

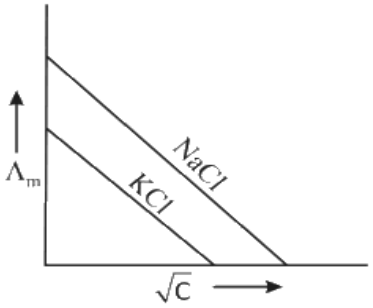
Q157 JEE Main 2019 · 10 Apr · Shift 2 MCQ

Which one of the following graphs between molar conductivity Λ_m versus $\sqrt{C}$ is correct?

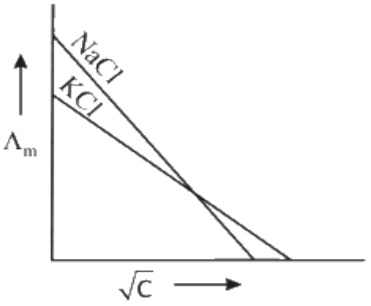
(see the figure above)

Q48. Which one of the following graphs between molar conductivity Λ_m versus $\sqrt{C}$ is correct?

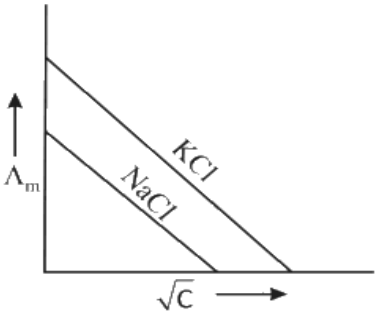
(1)



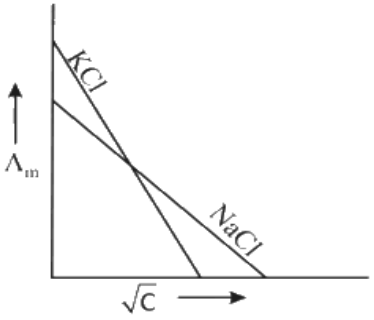
(2)



(3)



(4)



(A) *see figure*

(B) *see figure*

(C) *see figure*

(D) *see figure*

Answer: (C) · Key from source paper

Q158 JEE Main 2019 · 9 Apr · Shift 1 MCQ

The standard Gibbs energy for the given cell reaction in kJ mol^{-1} at 298 K is:
$Zn(s) + Cu^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Cu(s)$, E^0 = 2 V at 298 K (Faraday's constant , F = 96000 C mol^{-1})

(A) -192

(B) 192

(C) 384

(D) -384

Answer: (D) -384 · Key from source paper

Q159 JEE Main 2019 · 9 Apr · Shift 2 MCQ

A solution of $Ni(NO_3)_2$ is electrolyzed between platinum electrode 0.1 Faraday electricity. How many mole of Ni will be deposited at the cathode?

(A) 0.10
(B) 0.15
(C) 0.05
(D) 0.20

Answer: (C) 0.05 · Key from source paper

Q160 JEE Main 2019 · 8 Apr · Shift 1 MCQ

Given that,
$E^{\circ}_{O_2/H_2O} = +1.23$ V;
$E^{\circ}_{S_2O_8^{2-}/SO_4^{2-}} = 2.05$ V
$E^{\circ}_{Br_2/Br^-} = +1.09$ V;
$E^{\circ}_{Au^{3+}/Au} = 1.4$ V
The strongest oxidizing agent is

(A) O_2
(B) $S_2O_8^{2-}$
(C) Br_2
(D) Au^{3+}

Answer: (B) $S_2O_8^{2-}$ · Key from source paper

Q161 JEE Main 2019 · 8 Apr · Shift 2 MCQ

Calculate the standard cell potential (in V) of the cell in which the following reaction takes place:
$Fe^{2+}\ aq + Ag^{+}aq \rightarrow Fe^{3+}\ aq + Ag(s)$
Given that
$E^{o}_{Ag^{+}/Ag}$ = x V
$E^{o}_{Fe^{2+}/Fe}$ = y V
$E^{o}_{Fe^{3+}/Fe}$ = z V

(A) x + 2y - 3z
(B) x - y
(C) x - z
(D) x + y - z

Answer: (A) x + 2y - 3z · Key from source paper

Q162 JEE Main 2019 · 12 Jan · Shift 1 MCQ

The standard electrode potential E^{o} and its temperature coefficient $\left(\frac{dE}{dT}\right)$ for a cell are 2 V and -5×10^{-4} V K^{-1} at 300 K, respectively. The reaction is $Zn\ (s) + Cu^{2+}\ (aq) \rightarrow Zn^{2+}\ (aq) + Cu\ (s)$. The standard reaction enthalpy ($\Delta_r H^{-}$) at 300 K in mol^{-1} is
[Use R = 8 J K^{-1} mol^{-1} and F =96,500 C mol^{-1}]

(A) -412.8
(B) 206.4
(C) -384.0
(D) 192.0

Answer: (A) -412.8 · Key from source paper

Q163 JEE Main 2019 · 12 Jan · Shift 2 MCQ

Λ_m^o for NaCl, HCl and NaA are 126.4, 425.9 and 100 .5 S cm^2 mol^{-1} respectively. If the conductivity of 0 .001 M HA is 5×10^{-5}S cm^{-1}, degree of dissociation of HA is

(A) 0.125
(B) 0.75
(C) 0.25
(D) 0.50

Answer: (A) 0.125 · Key from source paper

Q164 JEE Main 2019 · 11 Jan · Shift 1 MCQ

For the cell Zn(s) $|Zn^{2+}(aq)||M^{x+}(aq)|M(s)$, different half cells and their standard electrode potentials are given below:

(see the figure above)

If $E^{\circ}_{Zn^{2+}/Zn}$ = -0.76 V, which cathode will give a maximum value of E^0_{cell} per electron transferred?

Q47. For the cell $Zn(s)\,|Zn^{2+}(aq)||M^{x+}(aq)|M(s)$, different half cells and their standard electrode potentials are given below:

$M^{x+}(aq)/$	$Au^{3+}(aq)/$	$Ag^{+}(aq)/$	$Fe^{3+}(aq)/$	$Fe^{2+}(aq)/$
M(s)	Au(s)	Ag(s)	$Fe^{2+}(aq)$	Fe(s)
$E^{\circ}_{M^{x+}/M}$/(V)	1.40	0.80	0.77	–0.44

If $E^{\circ}_{Zn^{2+}/Zn} = -0.76$ V, which cathode will give a maximum value of E^0_{cell} per electron transferred?

(1) Ag^{+}/Ag
(2) Fe^{3+}/Fe^{2+}
(3) Au^{3+}/Au
(4) Fe^{2+}/Fe

(A) Ag^{+}/Ag
(B) Fe^{3+}/Fe^{2+}
(C) Au^{3+}/Au
(D) Fe^{2+}/Fe

Answer: (A) Ag^{+}/Ag · Key from source paper

Q165 JEE Main 2019 · 11 Jan · Shift 2 MCQ

Given the equilibrium constant: K_C of the reaction: Cu(s) + $2Ag^{+}(aq) \rightarrow Cu^{2+}(aq)$ + 2Ag(s) is 10×10^{15} calculate the E^0_{cell} of this reaction at 298 K $\left[2.303\frac{RT}{F} \text{ at } 298\text{ K} = 0.059\text{ V}\right]$

(A) 0.04736mV
(B) 0.4736mV
(C) 0.4736 V
(D) 0.04736 V

Answer: (C) 0.4736 V · Key from source paper

Q166 JEE Main 2019 · 10 Jan · Shift 1 MCQ

Consider the following reduction processes:
$Zn^{2+} + 2e^- \rightarrow Zn(s); E^o = -0.76$ V
$Ca^{2+} + 2e^- \rightarrow Ca(s); E^o = -2.87$ V
$Mg^{2+} + 2e^- \rightarrow Mg(s); E^o = -2.36$ V
$Ni^{2+} + 2e^- \rightarrow Ni(s); E^o = -0.25$ V
The reducing power of the metals increases in the order:

(A) Ca < Mg < Zn < Ni
(B) Zn < Mg < Ni < Ca
(C) Ni < Zn < Mg < Ca
(D) Ca < Zn < Ni < Mg

Answer: (C) Ni < Zn < Mg < Ca · Key from source paper

Q167 JEE Main 2019 · 10 Jan · Shift 2 MCQ

In the cell, $\mathrm{Pt(s)|H_2(g,\ 1\ bar)|\ HCl\ (aq)|AgCl(s)|\ Ag(s)|Pt(s)}$,the cell potential is 0.92 V when a 10^{-6} molar HCl solution is used. The standard electrode potential of $\mathrm{Ag\,|\,AgCl\,|\,Cl^-}$ electrode is:
(Given, $\frac{2.303\mathrm{RT}}{\mathrm{F}} = 0.06$ V at 298 K)

(A) 0.76 V
(B) 0.20 V
(C) 0.40 V
(D) 0.94 V

Answer: (B) 0.20 V · Key from source paper

Q168 JEE Main 2019 · 10 Jan · Shift 2 MCQ

The electrolytes usually used in the electroplating of gold and silver, respectively, are:

(A) $[\mathrm{Au(NH_3)_2}]^+$ and $[\mathrm{Ag(CN)_2}]^-$
(B) $[\mathrm{Au(CN)_2}]^-$ and $[\mathrm{AgCl_2}]^-$
(C) $[\mathrm{Au(OH)_4}]^-$ and $[\mathrm{Ag(OH)_2}]^-$
(D) $[\mathrm{Au(CN)_2}]^-$ and $[\mathrm{Ag(CN)_2}]^-$

Answer: (D) $[\mathrm{Au(CN)_2}]^-$ and $[\mathrm{Ag(CN)_2}]^-$ · Key from source paper

Q169 JEE Main 2019 · 9 Jan · Shift 1 MCQ

The anodic half-cell of lead-acid battery is recharged using electricity of 0.05 Faraday. The amount of $PbSO_4$ electrolyzed in g during the process is: (Molar mass of $PbSO_4 = 303 g\ mol^{-1}$)

(A) 22.8
(B) 15.2
(C) 11.4
(D) 7.6

Answer: (D) 7.6 · Key from source paper

Q170 JEE Main 2019 · 9 Jan · Shift 2 MCQ

If the standard electrode potential for a cell is $2\ V$ at $300\ K$, the equilibrium constant (K) for the reaction.
$Zn(s) + Cu^{2+}(aq) \rightleftharpoons Zn^{2+}(aq) + Cu(s)$
at $300\ K$ is approximately:
$(R = 8\ JK^{-1}mol^{-1}, F = 96000\ C\ mol^{-1})$

(A) e^{-160}
(B) e^{-80}
(C) e^{160}
(D) e^{320}

Answer: (C) e^{160} · Key from source paper

Q171 JEE Main 2018 · 16 Apr · Online MCQ

When 9.65 ampere current was passed for 1.0 hour into nitrobenzene in acidic medium, the amount of p-aminophenol produced is:

(A) 109.0 g
(B) 98.1 g
(C) 9.81 g
(D) 10.9 g

Answer: (C) 9.81 g · Key from source paper

Q172 JEE Main 2018 · 15 Apr · Shift 1 MCQ

When an electric current is passes (sic) through acidified water, 112 mL of hydrogen gas at N.T.P. was collected at the cathode in 965 seconds. The current passed, in ampere, is :

(A) 2.0
(B) 0.1
(C) 0.5
(D) 1.0

Answer: (D) 1.0 · Key from source paper

Q173 JEE Main 2018 · 8 Apr · Offline MCQ

How long (approximate) should water be electrolysed by passing through 100 amperes current so that the oxygen released can completely burn $27.66\ \mathrm{g}$ of diborane? (Atomic weight of $\mathrm{B} = 10.8\ \mathrm{u}$)

(A) 1.6 hours
(B) 6.4 hours
(C) 0.8 hours
(D) 3.2 hours

Answer: (D) 3.2 hours · Key from source paper

Q174 JEE Main 2017 · 9 Apr · Online MCQ

To find the standard potential of $\mathrm{M^{3+}/M}$ electrode, the following cell is constituted:
$\mathrm{Pt\ /M/M^{3+}\ (0.001\ mol\ L^{-1})/Ag^{+}\ (0.01\ mol\ L^{-1})/Ag}$
The emf of the cell is found to be 0.421 volt at 298 K. The standard potential of half-reaction $\mathrm{M^{3+} + 3e^{-} \rightarrow M}$ at 298 K will be:
(Given: $E^{\ominus}_{\mathrm{Ag^{+}/Ag}}$ at 298 K = 0.80 volt)

(A) 0.38 volt
(B) 1.28 volt
(C) 0.32 volt
(D) 0.66 volt

Answer: (C) 0.32 volt · Key from source paper

Q175 JEE Main 2017 · 8 Apr · Online MCQ

What is the standard reduction potential ($\mathrm{E^{o}}$) for $\mathrm{Fe^{3+} \rightarrow Fe}$?
Given that:
$\mathrm{Fe^{2+} + 2e^{-} \rightarrow Fe;\ E^{o}_{Fe^{2+}/Fe} = -0.47\ V}$
$\mathrm{Fe^{3+} + e^{-} \rightarrow Fe^{2+};\ E^{o}_{Fe^{3+}/Fe^{2+}} = +0.77\ V}$

(A) -0.057 V
(B) $+0.30$ V
(C) -0.30 V
(D) $+0.057$ V

Answer: (A) -0.057 V · Key from source paper

Q176 JEE Main 2017 · 2 Apr · Offline MCQ

Given
$E^{o}_{Cl_2/Cl^-} = 1.36$ V, $E^{o}_{Cr^{3+}/Cr} = -0.74$ V
$E^{o}_{Cr_2O_7^{2-}/Cr^{3+}} = 1.33$ V, $E^{o}_{MnO_4^-/Mn^{2+}} = 1.51$ V.
Among the following, the strongest reducing agent is:

(A) Mn^{2+}
(B) Cr^{3+}
(C) Cl^-
(D) Cr

Answer: (D) Cr · Key from source paper

Q177 JEE Main 2016 · 10 Apr · Online MCQ

Oxidation of succinate ion produces ethylene and carbon dioxide gases. On passing 0.2 Faraday electricity through an aqueous solution of potassium succinate, what is the total volume of gases (at both cathode and anode) at STP (1 atm and 273 K)?

(A) 8.96 L
(B) 4.48 L
(C) 6.72 L
(D) 2.24 L

Answer: (A) 8.96 L · Key from source paper

Q178 JEE Main 2016 · 10 Apr · Online MCQ

Identify the correct statement:

(A) Corrosion of iron can be minimised by forming a contact with another metal with a higher reduction potential
(B) Iron corrodes in oxygen-free water
(C) Corrosion of iron can be minimised by forming an impermeable barrier at its surface
(D) Iron corrodes more rapidly in salt water because its electrochemical potential is higher

Answer: (C) Corrosion of iron can be minimised by forming an impermeable barrier at its surface · Key from source paper

Q179 JEE Main 2016 · 9 Apr · Online MCQ

What will happen when a block of copper metal is dropped into a beaker containing a solution of $1\,\mathrm{M}\ \mathrm{ZnSO_4}$?

(A) The copper metal will dissolve with evolution of oxygen gas.
(B) The copper metal will dissolve with evolution of hydrogen gas.
(C) No reaction will occur.
(D) The copper metal will dissolve and zinc metal will be deposited.

Answer: (C) No reaction will occur. · Key from source paper

Q180 JEE Main 2016 · 3 Apr · Offline MCQ

Galvanization is applying a coating of:

(A) Cu
(B) Zn
(C) Pb
(D) Cr

Answer: (B) Zn · Key from source paper

Q181 JEE Main 2015 · 11 Apr · Online MCQ

At 298 K, the standard reduction potentials are 1.51 V for $\mathrm{MnO_4^-}\,|\,\mathrm{Mn^{2+}}$, 1.36 V for $\mathrm{Cl_2|Cl^-}$, 1.07 V for $\mathrm{Br_2|Br^-}$, 0.54 V for $\mathrm{I_2|I^-}$. At pH $= 3$, permanganate is expected to oxidize: $\left(\frac{RT}{F} = 0.059\right)$

(A) $\mathrm{Cl^-}$ and $\mathrm{Br^-}$
(B) $\mathrm{Br^-}$ and $\mathrm{I^-}$
(C) $\mathrm{I^-}$ only
(D) $\mathrm{Cl^-}$, $\mathrm{Br^-}$ and $\mathrm{I^-}$

Answer: (B) $\mathrm{Br^-}$ **and** $\mathrm{I^-}$ · Key from source paper

Q182 JEE Main 2015 · 10 Apr · Online MCQ

A variable, the opposite external potential ($\mathrm{E_{ext}}$) is applied to the cell $\mathrm{Zn\,|\,Zn^{2+}\,(1M)\,||\,Cu^{2+}\,(1\,M)|Cu}$, of potential 1.1 V. When $\mathrm{E_{ext}}$ < 1.1 V and $\mathrm{E_{ext}}$ > 1.1 V, respectively electrons flow from

(A) anode to cathode in both the cases.
(B) anode to cathode and cathode to anode.
(C) cathode to anode and anode to cathode.
(D) cathode to anode in both cases.

Answer: (B) anode to cathode and cathode to anode. · Key from source paper

Q183 JEE Main 2015 · 4 Apr · Offline MCQ

Two Faraday of electricity is passed through a solution of $CuSO_4$. The mass of copper deposited at the cathode is: (Atomic mass of $Cu = 63.5$ amu)

(A) 127 g
(B) 0 g
(C) 63.5 g
(D) 2 g

Answer: (C) 63.5 g · Key from source paper

Q184 JEE Main 2014 · 12 Apr · Online MCQ

How many electrons would be required to deposit 6.35 g of copper at the cathode during the electrolysis of an aqueous solution of copper sulphate? (Atomic mass of copper $= 63.5$u, $N_A =$ Avogadro's constant):

(A) $\frac{N_A}{20}$
(B) $\frac{N_A}{10}$
(C) $\frac{N_A}{5}$
(D) $\frac{N_A}{2}$

Answer: (C) $\frac{N_A}{5}$ · Key from source paper

Q185 JEE Main 2014 · 12 Apr · Online MCQ

Copper becomes green when exposed to moist air for a long period. This is due to:

(A) the formation of a layer of cupric oxide on the surface of copper.
(B) the formation of a layer of basic carbonate of copper on the surface of copper.
(C) the formation of a layer of cupric hydroxide on the surface of copper.
(D) the formation of basic copper sulphate layer on the surface of the metal.

Answer: (B) the formation of a layer of basic carbonate of copper on the surface of copper. · Checked by our team

Q186 JEE Main 2014 · 11 Apr · Online MCQ

Given

$$Fe^{3+}(aq) + e^- \rightarrow Fe^{2+}(aq); E^0 = +0.77\ V$$

$$Al^{3+}(aq) + 3e^- \rightarrow Al(s); E^0 = -1.66\ V$$

$$Br_2(aq) + 2e^- \rightarrow 2Br^-; E^0 = +1.09\ V$$

Considering the electrode potentials, which of the following represents the correct order of reducing power?

(A) $Fe^{2+} < Al < Br^-$

(B) $Br^- < Fe^{2+} < Al$

(C) $Al < Br^- < Fe^{2+}$

(D) $Al < Fe^{2+} < Br^-$

Answer: (B) $Br^- < Fe^{2+} < Al$ · Checked by our team

Q187 JEE Main 2014 · 9 Apr · Online MCQ

A current of 10.0 A flows for 2.00 h through an electrolytic cell containing a molten salt of metal X. This results in the decomposition of 0.250 mol of metal X at the cathode. The oxidation state of X in the molten salt is: (F = 96, 500 C)

(A) 1+

(B) 4+

(C) 3+

(D) 2+

Answer: (C) 3+ · Key from source paper

Q188 JEE Main 2014 · 9 Apr · Online MCQ

The standard electrode potentials $\left(E^{\circ}_{M^+/M}\right)$ of four metals A, B, C and D are -1.2 V,0.6 V, 0.85 V and -0.76 V, respectively. The sequence of deposition of metals on applying potential is

(A) B > D > C > A

(B) A > C > B > D

(C) C > B > D > A

(D) D > A > B > C

Answer: (C) C > B > D > A · Key from source paper

Q189 JEE Main 2014 · 6 Apr · Offline MCQ

Resistance of 0.2 M solution of an electrolyte is 50 Ω. The specific conductance of the solution is 1.4 S m^{-1}. The resistance of 0.5 M solution of the same electrolyte is 280 Ω. The molar conductivity of 0.5 M solution of the electrolyte in S m^2 mol^{-1} is :

(A) 5×10^{-4}
(B) 5×10^{-3}
(C) 5×10^{3}
(D) 5×10^{2}

Answer: (A) 5×10^{-4} · Key from source paper

Q190 JEE Main 2014 · 6 Apr · Offline MCQ

The equivalent conductance of NaCl at concentration C and at infinite dilution are λ_C and λ_∞, respectively. The correct relationship between λ_C and λ_∞ is given as :
(where the constant B is positive)

(A) $\lambda_C = \lambda_\infty + (B)C$
(B) $\lambda_C = \lambda_\infty - (B)C$
(C) $\lambda_C = \lambda_\infty - (B)\sqrt{C}$
(D) $\lambda_C = \lambda_\infty + (B)\sqrt{C}$

Answer: (C) $\lambda_C = \lambda_\infty - (B)\sqrt{C}$ · Key from source paper

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Q191 JEE Main 2014 · 6 Apr · Offline MCQ

The metal that cannot be obtained by the electrolysis of an aqueous solution of its salt is

(A) Ag
(B) Ca
(C) Cu
(D) Cr

Answer: (B) Ca · Key from source paper

Q192 JEE Main 2014 · 6 Apr · Offline MCQ

Given below are the half - cell reactions :
$Mn^{2+} + 2e^- \rightarrow Mn$; $E^\circ = -1.18$ V
$2(Mn^{3+} + e^- \rightarrow Mn^{2+})$; $E^\circ = +1.51$ V
The E° for $3Mn^{2+} \rightarrow Mn + 2Mn^{3+}$ will be :

(A) -2.69 V ; the reaction will not occur
(B) -2.69 V ; the reaction will occur
(C) -0.33 V ; the reaction will not occur
(D) -0.33 V ; the reaction will occur

Answer: (A) -2.69 V ; the reaction will not occur · Key from source paper

Q193 JEE Main 2013 · 25 Apr · Online MCQ

The Gibbs energy for the decomposition of Al_2O_3 at 500 C is as follows : $\frac{2}{3}Al_2O_3 \rightarrow \frac{4}{3}Al + O_2$, $\Delta_r G$ = +940 kJ mol^{-1} The potential difference needed for the electrolytic reduction of aluminium oxide at $500^{\circ}C$ should be at least :

(A) 4.5 V
(B) 3.0 V
(C) 5.0 V
(D) 2.5 V

Answer: (D) 2.5 V · Checked by our team

Q194 JEE Main 2013 · 25 Apr · Online MCQ

A solution of copper sulphate ($CuSO_4$) is electrolysed for 10 minutes with a current of 1.5 amperes. The mass of copper deposited at the cathode (at. mass of Cu = 63u) is :

(A) 0.3892 g
(B) 0.2938 g
(C) 0.2398 g
(D) 0.3928 g

Answer: (B) 0.2938 g · Key from source paper

Q195 JEE Main 2013 · 23 Apr · Online MCQ

Given :
$E^{o}_{\frac{1}{2}Cl_2/Cl^-} = 1.36\ V, E^{o}_{Cr^{3+}/Cr} = -0.74\ V$
$E^{o}_{Cr_2O_7^{2-}/Cr^{3+}} = 1.33\ V, E^{o}_{MnO_4^-/Mn^{2+}} = 1.51\ V$
The correct order of reducing power of the species (Cr, Cr^{3+}, Mn^{2+} and Cl^-) will be:

(A) $Mn^{2+} < Cl^- < Cr^{3+} < Cr$
(B) $Mn^{2+} < Cr^{3+} < Cl^- < Cr$
(C) $Cr^{3+} < Cl^- < Mn^{2+} < Cr$
(D) $Cr^{3+} < Cl^- < Cr < Mn^{2+}$

Answer: (A) $Mn^{2+} < Cl^- < Cr^{3+} < Cr$ · Key from source paper

Q196 JEE Main 2013 · 9 Apr · Online MCQ

Electrode potentials (E°) are given below : $Cu^+/Cu = +0.52$ V, $Fe^{3+}/Fe^{2+} = +0.77$ V, $\frac{1}{2}I_2(s)/I^- = +0.54$ V, $Ag^+/Ag = +0.88$ V. Based on the above potentials, strongest oxidizing agent will be :

(A) Cu^{+}
(B) Fe^{3+}
(C) Ag^{+}
(D) I_2

Answer: (C) Ag^{+} · Key from source paper

Q197 JEE Main 2013 · 7 Apr · Offline MCQ

Given
$E^{o}_{Cr^{3+}/Cr} = -0.74$ V; $E^{o}_{MnO_4^-/Mn^{2+}} = 1.51$ V
$E^{o}_{Cr_2O_7^{2-}/Cr^{3+}} = 1.33$ V; $E^{o}_{Cl_2|Cl^-} = 1.36$ V
Based on the data given above, strongest oxidising agent will be:

(A) Mn^{2+}
(B) MnO_4^-
(C) Cl^-
(D) Cr^{3+}

Answer: (B) MnO_4^- · Key from source paper

Q198 AIEEE 2012 · 26 May · Online MCQ

Given
$E^{\circ}_{Cu^{2+}/Cu} = 0.34$ V, $E^{\circ}_{Cu^{2+}/Cu^{+}} = 0.15$ V
Standard electrode potential for the half cell Cu^{+}/Cu is

(A) 0.38 V
(B) 0.53 V
(C) 0.19 V
(D) 0.49 V

Answer: (B) 0.53 V · Key from source paper

Q199 AIEEE 2012 · 19 May · Online MCQ

The standard potentials of Ag^{+}/Ag, $Hg_2^{2+}/2Hg$, Cu^{2+}/Cu and Mg^{2+}/Mg electrodes are $0.80, 0.79, 0.34$ and -2.37 V, respectively. An aqueous solution which contains one mole per litre of the salts of each of the four metals is electrolyzed. With increasing voltage, the correct sequence of deposition of the metals at the cathode is

(A) Ag, Hg, Cu, Mg
(B) Cu, Hg, Ag only
(C) Ag, Hg, Cu only
(D) Mg, Cu, Hg, Ag

Answer: (C) Ag, Hg, Cu only · Key from source paper

Q200 AIEEE 2012 · 7 May · Online MCQ

A battery is constructed of Cr and $Na_2Cr_2O_7$. The unbalanced chemical equation when such a battery discharges is following:

$$Na_2Cr_2O_7 + Cr + H^+ \rightarrow Cr^{3+} + H_2O + Na^+$$

If one Faraday of electricity is passed through the battery during the charging, the number of moles of Cr^{3+} removed from the solution is

(A) $\frac{4}{3}$
(B) $\frac{1}{3}$
(C) $\frac{3}{3}$
(D) $\frac{2}{3}$

Answer: (D) $\frac{2}{3}$ · Checked by our team

Q201 AIEEE 2012 · Offline MCQ

The standard reduction potentials for Zn^{2+}/Zn, Ni^{2+}/Ni, and Fe^{2+}/Fe are -0.76, -0.23 and -0.44 V respectively. The reaction $X + Y^{2+} \rightarrow X^{2+} + Y$ will be spontaneous when:

(A) $X = Ni, Y = Fe$
(B) $X = Ni, Y = Zn$
(C) $X = Fe, Y = Zn$
(D) $X = Zn, Y = Ni$

Answer: (D) $X = Zn, Y = Ni$ · Key from source paper

Q202 AIEEE 2011 MCQ

The reduction potential of hydrogen half cell will be negative if :

(A) p (H_2) = 1 atm and $[H^+]$ = 1.0M
(B) p (H_2) = 2 atm and $[H^+]$ = 1.0M
(C) p (H_2) = 2 atm and $[H^+]$ = 2.0M
(D) p (H_2) = 1 atm and $[H^+]$ = 2.0M

Answer: (B) p (H_2) = 2 atm and $[H^+]$ = 1.0M · Key from source paper

Q203 AIEEE 2010 MCQ

The Gibbs energy for the decomposition of Al_2O_3 at $500^\circ C$ is as follows :
$\frac{2}{3}Al_2O_3 \rightarrow \frac{4}{3}Al + O_2$, $\Delta_r G = +966\ kJ\ mol^{-1}$
The potential difference needed for electrolytic reduction of Al_2O_3 at $500^\circ C$ is at least

(A) 4.5 V
(B) 3.0 V
(C) 2.5 V
(D) 5.0 V

Answer: (C) 2.5 V · Key from source paper

Q204 AIEEE 2009 MCQ

In a fuel cell methanol is used as fuel and oxygen gas is used as an oxidizer. The reaction is $CH_3OH(\ell) + \frac{3}{2}O_2(g) \rightarrow CO_2(g) + 2H_2O(\ell)$ At 298 K standard Gibb's energies of formation for $CH_3OH(\ell), H_2O(\ell)$ and $CO_2(g)$ are $-166.2, -237.2$ and -394.4 kJ mol^{-1} respectively. If standard enthalpy of combustion of methanol is -726 kJ mol^{-1}, efficiency of the fuel cell will be

(A) 80%
(B) 87%
(C) 90%
(D) 97%

Answer: (D) 97% · Key from source paper

Q205 AIEEE 2009 MCQ

Given : $E^\circ_{Fe^{3+}/Fe} = -0.036$ V, $E^\circ_{Fe^{2+}/Fe} = -0.439$ V. The value of standard electrode potential for the change, $Fe^{3+}_{(aq)} + e^- \rightarrow Fe^{2+}(aq)$ will be :

(A) -0.072 V
(B) 0.385 V
(C) 0.770 V
(D) -0.270

Answer: (C) 0.770 V · Key from source paper

Q206 AIEEE 2008 MCQ

Given $E^\circ_{Cr^{3+}/Cr} = -0.72$ V, $E^\circ_{Fe^{2+}//Fe} = -0.42$ V. The potential for the cell
$Cr\,|Cr^{3+}(0.1M)||\,Fe^{2+}(0.01M)|Fe$ is

(A) $0.26\ \text{V}$
(B) $0.399\ \text{V}$
(C) $-0.339\ \text{V}$
(D) $-0.26\ \text{V}$

Answer: (A) $0.26\ \text{V}$ · Key from source paper

Q207 AIEEE 2007 MCQ

The cell, $\text{Zn}\,|\text{Zn}^{2+}(1\text{M})||\text{Cu}^{2+}(1\text{M})|\text{Cu}$ (E^0_{cell} = 1.10 V), was allowed to be completely discharged at 298 K. The relative concentration of Zn^{2+} to Cu^{2+} $\left[\frac{[\text{Zn}^{2+}]}{[\text{Cu}^{2+}]}\right]$ is

(A) antilog (24.08)
(B) 37.3
(C) $10^{37.3}$
(D) 9.65×10^4

Answer: (C) $10^{37.3}$ · Key from source paper

Q208 AIEEE 2007 MCQ

The equivalent conductances of two strong electrolytes at infinite dilution in H_2O (where ions move freely through a solution) at 25°C are given below: $\Lambda^\circ_{\text{CH}_3\text{COONa}}$ = 91.0 S cm^2 /equiv $\Lambda^\circ_{\text{HCl}}$ = 426.2 S cm^2 / equiv What additional information/quantity one needs to calculate Λ° of an aqueous solution of acetic acid?

(A) Λ° of NaCl
(B) Λ° of CH_3COOK
(C) The limiting equivalent conductance of H^+ ($\Lambda^\circ_{\text{H}^+}$)
(D) Λ° of chloroacetic acid ($\text{C}/\text{CH}_2\text{COOH}$)

Answer: (A) Λ° of NaCl · Key from source paper

Q209 AIEEE 2006 MCQ

The molar conductivities $\Lambda^\circ_{\text{NaOAC}}$ and $\Lambda^\circ_{\text{HCl}}$ at infinite dilution in water at 25°C are 91.0 and 426.2 S cm^2/mol respectively. To calculate $\Lambda^\circ_{\text{HOAc}}$, the additional value required is

(A) $\Lambda^\circ_{\text{H}_2\text{O}}$
(B) $\Lambda^\circ_{\text{KCl}}$
(C) $\Lambda^\circ_{\text{NaOH}}$
(D) $\Lambda^\circ_{\text{NaCl}}$

Answer: (D) $\Lambda^\circ_{\text{NaCl}}$ · Key from source paper

Q210 AIEEE 2006 MCQ

Given the data at $25^{\circ}\mathrm{C}$,
$\mathrm{Ag} + \mathrm{I}^{-} \longrightarrow \mathrm{AgI} + \mathrm{e}^{-}$; $E^{\circ} = 0.152$ V
$\mathrm{Ag} \longrightarrow \mathrm{Ag}^{+} + \mathrm{e}^{-}$; $E^{\circ} = -0.800$ V
What is the value of $\log K_{\mathrm{sp}}$ for AgI ?
$\left(2.303 \frac{RT}{F} = 0.059 \text{ V}\right)$

(A) -8.12
(B) $+8.612$
(C) -37.83
(D) -16.13

Answer: (D) -16.13 · Key from source paper

Q211 AIEEE 2005 MCQ

For a spontaneous reaction the ΔG, equilibrium constant (K) and $\mathrm{E}^{\circ}_{\mathrm{cell}}$ will be respectively

(A) -ve, >1, +ve
(B) +ve, >1, -ve
(C) -ve, < 1, -ve
(D) -ve, >1, -ve

Answer: (A) -ve, >1, +ve · Key from source paper

Q212 AIEEE 2005 MCQ

Aluminium oxide may be electrolysed at $1000^{\circ}\mathrm{C}$ to furnish aluminium metal (Atomic mass = 27 amu; 1 Faraday = 96, 500 Coulombs). The cathode reaction is $\mathrm{Al}^{3+} + 3\mathrm{e}^{-} \longrightarrow \mathrm{Al}^{\circ}$ To prepare 5.12 kg of aluminium metal by this method would require

(A) $5.49 \times 10^{7}\mathrm{C}$ of electricity
(B) 1.83×10^{7} C of electricity
(C) $5.49 \times 10^{4}\mathrm{C}$ of electricity
(D) $5.49 \times 10^{1}\mathrm{C}$ of electricity

Answer: (A) $5.49 \times 10^{7}\mathrm{C}$ of electricity · Key from source paper

Q213 AIEEE 2005 MCQ

Electrolyte | KCl | KNO_3 | HCl | NaOAc | NaCl
Λ^{∞} (S cm^2 mol^{-1}) | 149.9 | 145.0 | 426.2 | 91.0 | 126.5
Calculate Λ^{∞}_{HOAc}. Using appropriate molar conductances of the electrolytes listed above at infinite dilution in $\mathrm{H_2O}$ at $25^{\circ}\mathrm{C}$

(A) 517.2
(B) 552.7
(C) 390.7
(D) 217.5

Answer: (C) 390.7 · Key from source paper

Q214 AIEEE 2004 MCQ

In hydrogen - oxygen fuel cell, combustion of hydrogen occurs to

(A) generate heat
(B) remove adsorbed oxygen from electrode surfaces
(C) produce high purity water
(D) create potential difference between the two electrodes

Answer: (D) create potential difference between the two electrodes · Key from source paper

Q215 AIEEE 2004 MCQ

Consider the following E° values
$\mathrm{E}^{\circ}_{\mathrm{Fe}^{3+}/\mathrm{Fe}^{2+}} = 0.77\ \mathrm{V}$
$\mathrm{E}^{\circ}_{\mathrm{Sn}^{2+}/\mathrm{Sn}} = -0.14\ \mathrm{V}$
Under standard conditions the potential for the reaction $\mathrm{Sn(s)} + 2\mathrm{Fe}^{3+}\mathrm{(aq)} \longrightarrow 2\mathrm{Fe}^{2+}\mathrm{(aq)} + \mathrm{Sn}^{2+}\mathrm{(aq)}$ is

(A) $1.68\ \mathrm{V}$
(B) $0.63\ \mathrm{V}$
(C) $0.91\ \mathrm{V}$
(D) $1.40\ \mathrm{V}$

Answer: (C) $0.91\ \mathrm{V}$ · Key from source paper

Q216 AIEEE 2004 MCQ

The standard e.m.f of a cell, involving one electron change is found to be 0.591 V at $25^{\circ}\mathrm{C}$. The equilibrium constant of the reaction is $(\mathrm{F} = 96,500\mathrm{C mol}^{-1} : \mathrm{R} = 8.314\mathrm{JK}^{-1}\ \mathrm{mol}^{-1})$

(A) 1.0×10^{1}
(B) 1.0×10^{30}
(C) 1.0×10^{10}
(D) 1.0×10^{5}

Answer: (C) 1.0×10^{10} · Key from source paper

Q217 AIEEE 2004 MCQ

The limiting molar conductivities Λ° for NaCl, KBr and KCl are 126,152 and 150 S $\mathrm{cm}^2\ \mathrm{mol}^{-1}$ respectively. The Λ° for NaBr is

(A) $128\ \mathrm{S\ cm^2\ mol^{-1}}$
(B) $302\ \mathrm{S\ cm^2\ mol^{-1}}$
(C) $278\ \mathrm{S\ cm^2\ mol^{-1}}$
(D) $176\ \mathrm{S\ cm^2\ mol^{-1}}$

Answer: (A) $128\ \mathrm{S\ cm^2\ mol^{-1}}$ · Key from source paper

Q218 AIEEE 2004 MCQ

In a cell that utilises the reaction $\mathrm{Zn(s) + 2H^+(aq) \longrightarrow Zn^{2+}(aq) + H_2(g)}$ addition of $\mathrm{H_2SO_4}$ to cathode compartment, will

(A) lower the E and shift equilibrium to the left
(B) increases the E and shift equilibrium to the left
(C) increase the E and shift equilibrium to the right
(D) Lower the E and shift equilibrium to the right

Answer: (C) increase the E and shift equilibrium to the right · Key from source paper

Q219 AIEEE 2003 MCQ

Several blocks of magnesium are fixed to the bottom of a ship to

(A) make the ship lighter
(B) prevent action of water and salt
(C) prevent puncturing by under-sea rocks
(D) keep away the sharks

Answer: (B) prevent action of water and salt · Key from source paper

Q220 AIEEE 2003 MCQ

For a cell reaction involving a two-electron change, the standard e.m.f. of the cell is found to be 0.295 V at 25°C. The equilibrium constant of the reaction at 25°C will be

(A) 29.5×10^{-2}
(B) 10
(C) 1×10^{10}
(D) 1×10^{-10}

Answer: (C) 1×10^{10} · Checked by our team

Q221 AIEEE 2003 MCQ

Standard reduction electrode potentials of three metals A,B&C are respectively $+0.5$ V, -3.0 V& -1.2 V. The reducing, powers of these metals are

(A) $A > B > C$
(B) $C > B > A$
(C) $A > C > B$
(D) $B > C > A$

Answer: (D) $B > C > A$ · Key from source paper

Q222 AIEEE 2003 MCQ

When during electrolysis of a solution of $AgNO_3$ 9650 coulombs of charge pass through the electroplating bath, the mass of silver deposited on the cathode will be

(A) 10.8 g
(B) 21.6 g
(C) 108 g
(D) 1.08 g

Answer: (A) 10.8 g · Key from source paper

Q223 AIEEE 2003 MCQ

For the redox reaction $Zn(s) + Cu^{2+}(0.1M) \rightarrow Zn^{2+}(1M) + Cu(s)$ taking place in a cell, E^0_{cell} is 1.10 volt. E° for the cell will be $\left(2.303\frac{RT}{F} = 0.0591\right)$

(A) 1.80 volt
(B) 1.07 volt
(C) 0.82 volt
(D) 2.14 volt

Answer: (B) 1.07 volt · Key from source paper

Q224 AIEEE 2002 MCQ

Conductivity (unit Siemen's S) is directly proportional to area of the vessel and the concentration of the solution in it and is inversely proportional to the length of the vessel then the unit of the constant of proportionality is

(A) $\mathrm{Sm\ mol^{-1}}$
(B) $\mathrm{Sm^2\ mol^{-1}}$
(C) $\mathrm{S^{-2}\ m^2\ mol}$
(D) $\mathrm{S^2\ m^2\ mol^{-2}}$

Answer: (B) $\mathrm{Sm^2\ mol^{-1}}$ · Key from source paper

Q225 AIEEE 2002 MCQ

EMF of a cell in terms of reduction potential of its left and right electrodes is

(A) $E = E_{\text{left}} - E_{\text{right}}$
(B) $E = E_{\text{left}} + E_{\text{right}}$
(C) $E = E_{\text{right}} - E_{\text{left}}$
(D) $E = -(E_{\text{right}} + E_{\text{left}})$

Answer: (C) $E = E_{\text{right}} - E_{\text{left}}$ · Key from source paper

Q226 AIEEE 2002 MCQ

If ϕ denotes reduction potential, then which is true ?

(A) $E^0_{\text{cell}} = \phi_{\text{right}} - \phi_{\text{left}}$
(B) $\mathrm{E^0_{cell}} = \phi_{\text{left}} + \phi_{\text{right}}$
(C) $\mathrm{E^0_{cell}} = \phi_{\text{left}} - \phi_{\text{right}}$
(D) $\mathrm{E^0_{cell}} = -(\phi_{\text{left}} + \phi_{\text{right}})$

Answer: (A) $E^0_{\text{cell}} = \phi_{\text{right}} - \phi_{\text{left}}$ · Key from source paper

Q227 AIEEE 2002 MCQ

What will be the emf for the given cell $Pt\,|\mathrm{H_2\,(P_1)}|\mathrm{H^+(aq)}||\mathrm{H_2\,(P_2)}\,|\,\mathrm{Pt}$

(A) $\frac{RT}{f}\log\frac{P_1}{P_2}$
(B) $\frac{RT}{2f}\log\frac{P_1}{P_2}$
(C) $\frac{RT}{f}\log\frac{P_2}{P_1}$
(D) none of these

Answer: (B) $\frac{RT}{2f}\log\frac{P_1}{P_2}$ · Checked by our team

Q228 AIEEE 2002 MCQ

Which of the following reaction is possible at anode?

(A) $2Cr^{3+} + 7H_2O \rightarrow Cr_2O_7^{2-} + 14H^+$

(B) $F_2 \rightarrow 2\ F^-$

(C) $(1/2)O_2 + 2H^+ \rightarrow H_2O$

(D) none of these

Answer: (A) $2Cr^{3+} + 7H_2O \rightarrow Cr_2O_7^{2-} + 14H^+$ · Key from source paper

EdLoop JEE