



Electrochemistry

Q.No.1: The metal that cannot be obtained by electrolysis of an aqueous solution of its salts is

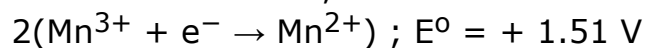
- A. Cu
- B. Cr
- C. Ag
- D. Ca

Q.No.2: Resistance of 0.2 M solution of an electrolyte is $50\ \Omega$. The specific conductance of the solution is $1.4\ \text{S m}^{-1}$. The resistance of 0.5 M solution of the same electrolyte is $280\ \Omega$. The molar conductivity of 0.5 M solution of the electrolyte in $\text{S m}^2 \text{mol}^{-1}$ is

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

Q.No.3:

Given below are half - cell reactions.



The E° for $3\text{Mn}^{2+} \rightarrow \text{Mn} + 2\text{Mn}^{3+}$ will be

- A. $-0.33\ \text{V}$; the reaction will not occur
- B. $-0.33\ \text{V}$; the reaction will occur
- C. $-2.69\ \text{V}$; the reaction will not occur
- D. $-2.69\ \text{V}$; the reaction will occur

Q.No.4: 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 (where the constant B is positive)

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

Q.No.5: How long (approximate) should water be electrolysed by passing through 100 amperes current so that the oxygen released can completely burn 27.66 g of diborane?

(Atomic weight of B = 10.8 u)

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- A. 3.2 hours
- B. 1.6 hours
- C. 6.4 hours
- D. 0.8 hours

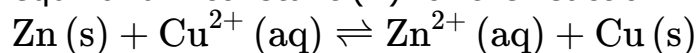
Q.No.6: The anodic half-cell of lead-acid battery is recharged using electricity of 0.05 Faraday. The amount of PbSO_4 electrolyzed in g during the process is:

(Molar mass of PbSO_4 = 303 g mol⁻¹)

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- A. 22.8
- B. 15.2
- C. 7.6
- D. 11.4

Q.No.7: If the standard electrode potential for a cell is 2 V at 300 K, the equilibrium constant (K) for the reaction



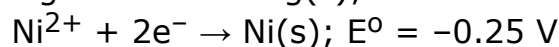
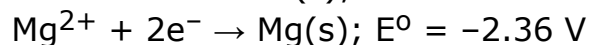
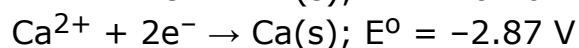
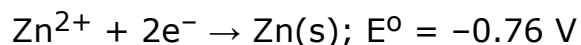
at 300 K is approximately

(R = 8 JK⁻¹mol⁻¹, F = 96000 C mol⁻¹)

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

Q.No.8: Consider the following reduction processes:



The reducing power of the metals increases in the order:

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A. $\text{Ca} < \text{Zn} < \text{Mg} < \text{Ni}$

B. $\text{Ni} < \text{Zn} < \text{Mg} < \text{Ca}$

C. $\text{Zn} < \text{Mg} < \text{Ni} < \text{Ca}$

D. $\text{Ca} < \text{Mg} < \text{Zn} < \text{Ni}$

Q.No.9: In the cell $\text{Pt(s)}|\text{H}_2(\text{g}, 1\text{bar})|\text{HCl(aq)}|\text{AgCl(s)}|\text{Ag(s)}|\text{Pt(s)}$ the cell potential is 0.92 V when a 10^{-6} molal HCl solution is used. The standard electrode potential of $(\text{AgCl/Ag}, \text{Cl}^{-})$ electrode is :

{ Given, $\frac{2.303RT}{F} = 0.06 \text{ V}$ at 298 K }

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A. 0.94 V

B. 0.76 V

C. 0.40 V

D. 0.20 V

Q.No.10: For the cell $\text{Zn(s)}|\text{Zn}^{2+}(\text{aq})||\text{M}^{x+}(\text{aq})|\text{M(s)}$, different half cells and their standard electrode potentials are given below:

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

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

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A. Ag^{+}/Ag

B. $\text{Fe}^{3+}/\text{Fe}^{2+}$

C. Au^{3+}/Au

D. Fe^{2+}/Fe