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

Q.No.3:
Given below are half - cell reactions.
$Mn^{2+} + 2e^- \rightarrow Mn$; $E^o = -1.18$ V
$2(Mn^{3+} + e^- \rightarrow Mn^{2+})$; $E^o = +1.51$ V
The E^o for $3Mn^{2+} \rightarrow Mn + 2Mn^{3+}$ will be

- **A.** −0.33 V ; the reaction will not occur
- **B.** −0.33 V ; the reaction will occur
- **C.** −2.69 V ; the reaction will not occur
- **D.** −2.69 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) **JEE 2018**

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}) **JEE 2019**

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

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

at 300 K is approximately
(R = 8 $JK^{-1}mol^{-1}$, F = 96000 C mol^{-1}) **JEE 2019**

A. e^{-80}

B. e^{-160}

C. e^{320}

D. e^{160}

Q.No.8: 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: **JEE 2019**

A. Ca < Zn < Mg < Ni
B. Ni < Zn < Mg < Ca
C. Zn < Mg < Ni < Ca
D. Ca < Mg < Zn < Ni

Q.No.9: In the cell Pt(s)|H_2(g, 1bar)|HCl(aq)| AgCl(s)|Ag(s)|Pt(s) the cell potential is 0.92 V when a 10^{-6} molal HCl solution is used. The standard electrode potential of (AgCl/Ag, Cl^-) electrode is :
$\left\{\text{Given, } \frac{2.303\,\text{RT}}{\text{F}} = 0.06 \text{ V at } 298 \text{ K}\right\}$ **JEE 2019**

A. 0.94 V
B. 0.76 V
C. 0.40 V
D. 0.20 V

Q.No.10: 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)/M(s)	Au^{3+}(aq)/Au(s)	Ag^+(aq)/Ag(s)	Fe^{3+}(aq)/Fe^{2+}(aq)	Fe^{2+}(aq)/Fe(s)
$E^\circ_{M^{x+}/M}/(\text{V})$	1.40	0.80	0.77	−0.44

If $E^\circ_{Zn^{2+}/Zn} = -0.76\text{V}$, which cathode will give a maximum value of E^o_{cell} per electron transferred? **JEE 2019**

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