



CHEMISTRY

BOOKS - NCERT FINGERTIPS CHEMISTRY (HINGLISH)

ELECTROCHEMISTRY

Electrochemical Cell

1. In a Daniel cell,

- A. the chemical energy liberated during the redox reaction is converted to electrical energy
- B. the electrical energy of the cell is converted to chemical energy
- C. the energy of the cell is utilised in conduction of the redox reaction
- D. the potential energy of the cell is converted into electrical energy.

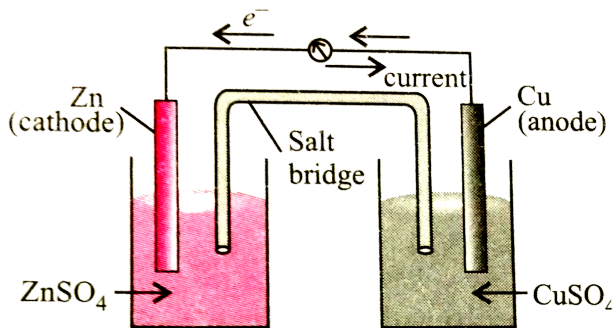
Answer: A



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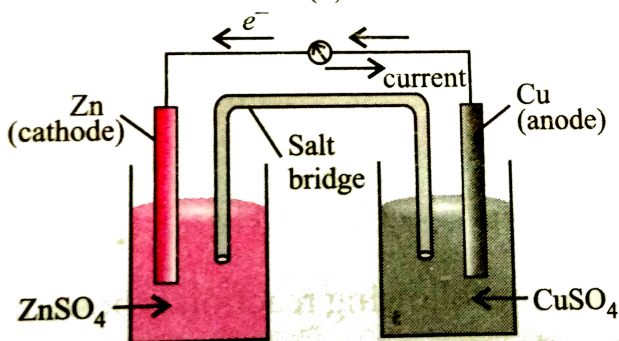
Mcqs

1. Given below are two figures of Daniell cell (X) and (y). Study the figures and mark the incorrect statement from the following.



$$E_{\text{ext}} > 1.1 \text{ V}$$

(Y)



$$E_{\text{ext}} > 1.1 \text{ V}$$

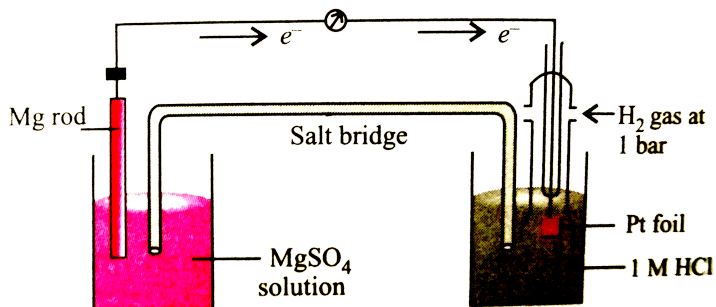
(Y)

- A. In fig (X), electrons flow from Zn rod to Cu rod hence current flows from Cu to Zn ($E_{\text{ext}} < 1.1\text{V}$)
- B. In fig (Y), electrons flow from Cu to Zn and current flows from Zn to Cu ($E_{\text{ext}} > 1.1\text{V}$)
- C. In fig (X), Zn dissolves at anode and Cu deposits at cathode.
- D. In fig (Y), Zn is deposited at Cu and Cu is deposited at Zn.

Answer: D

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2. A cell is set up as shown in the figure. It is observed that EMF of the cell comes out to be 2.36 V. Which of the given statements is not correct about the cell?



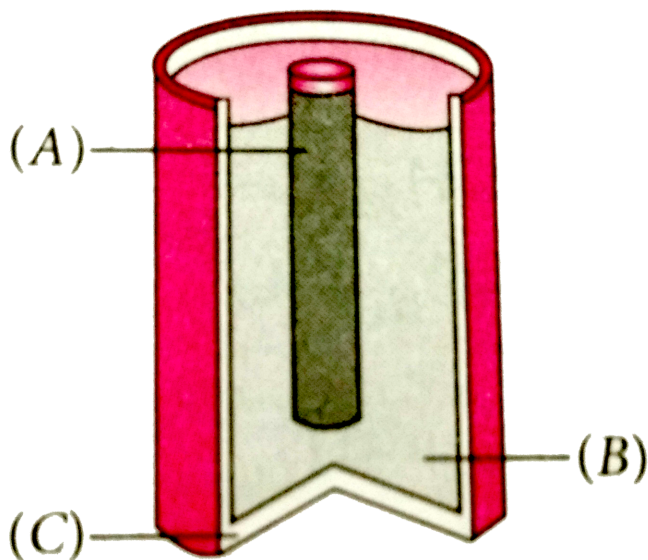
- A. Reduction takes place at magnesium electrode and oxidation at SHE.
- B. Oxidation takes place at magnesium electrode and reduction at SHE.
- C. Standard electrode potential for Mg^{2+} / Mg will be -2.36 V.

D. Electrons flow from magnesium electrode to hydrogen electrode.

Answer: A

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3. Label the parts represented by (A), (B) and C



A. A-Zinc rod , B- $NH_4Cl + MgCl_2$, C-Graphite rod

B. A-Carbon rod , B- $NH_4OH + carbon$, C-Zinc rod

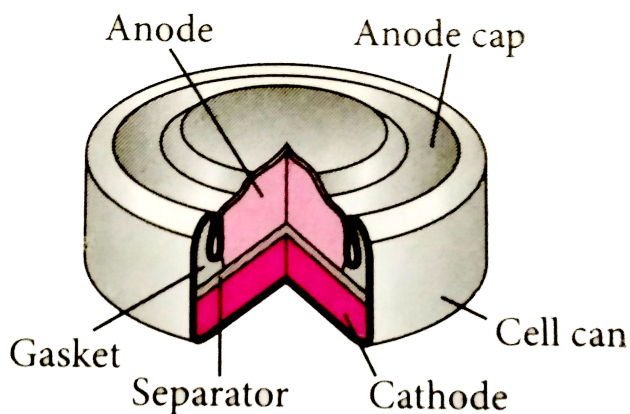
C. A-Carbon rod , B- $MnO_2 + C + NH_4Cl$,C-Zinc can

D. A-Zinc rod , B- $MnO_2 + NH_4Cl$, C-Carbon rod

Answer: C

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4. Which of the given statements for mercury cell are incorrect?

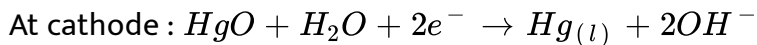
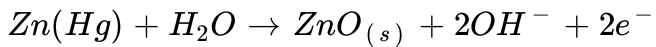


(i) Mercury cell is suitable for low current devices like hearing aids, watches, etc.

(ii) It consists of zinc-mercury amalgam as anode and a paste of HgO and carbon as the cathode.

(iii) The electrolyte is a paste of $Zn(OH)_2$ and KO_2 .

(iv) The electrolyte reactions for the cell are At anode :



A. (ii) and (iii) only

B. (i) and (ii) only

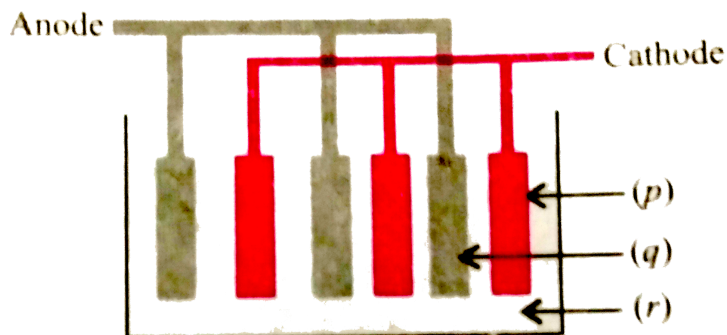
C. (i),(iii) and (iv) only

D. (iii) and (iv) only

Answer: D

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5. Label the given diagram showing lead storage battery :



A. $p - Pb, q - PbO_2, r - 5MH_2SO_4$

B. $p - PbO_2, q - Pb, r - conc. H_2SO_4$

C. $p - Pb_3O_4, q - PbO_2, 50\% H_2SO_4$

D. $p - PbO_2, q - Pb, r - dil. 38\% H_2SO_4$

Answer: D

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Galvanic Cell

1. A galvanic cell has electrical potential of 1.1 V . If an opposing potential of 1.1 V is applied to this cell, what will happen to the cell reaction and current flowing through the cell ?

A. The reaction stops and no current flows through the cell.

B. The reaction continuous but current flows in opposite direction.

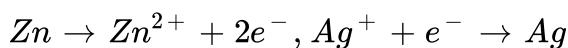
C. The concentration of reactants becomes unity and current flows from cathode to anode.

D. The cell does not function as a galvanic cell and zinc is deposited on zinc plate.

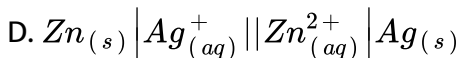
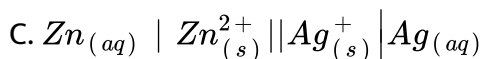
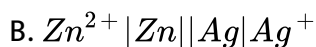
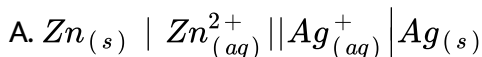
Answer: A

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2. Following reactions are taking place in a Galvanic cell ,



Which of the given representations is the correct method of depicting the cell ?

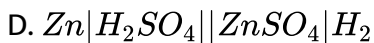
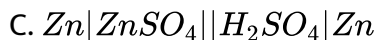
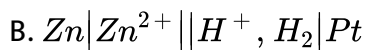
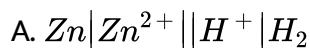
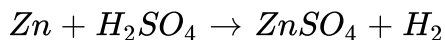


Answer: A



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3. Which of the following is the correct cell representation for the given cell reaction ?

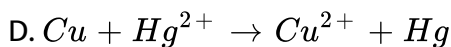
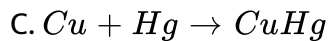
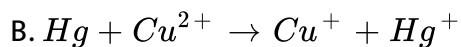
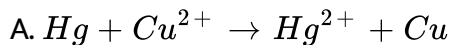


Answer: B



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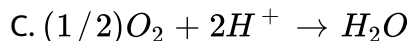
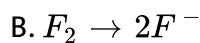
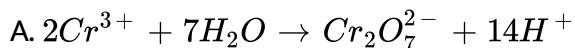
4. The cell reaction of the galvanic cell : $Cu_{(s)} | Cu^{2+}_{(aq)} || Hg^{2+}_{(aq)} | Hg_{(l)}$ is



Answer: D

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5. Which of the following reaction is possible at anode ?



D. None of these

Answer: A



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6. In the cell $Zn|Zn^{2+}||Cu^{2+}|Cu$, the negative terminal is

A. Cu

B. Cu^{2+}

C. Zn

D. Zn^{2+}

Answer: C



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7. For the galvanic cell, $Cu|Cu^{2+}||Ag^+|Ag$. Which of the following observations is not correct ?

A. Cu acts as anode and Ag acts as cathode.

B. Ag electrode loses mass and Cu electrode gains mass.

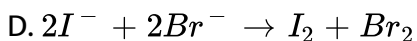
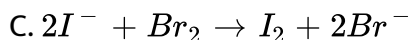
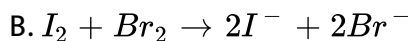
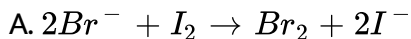
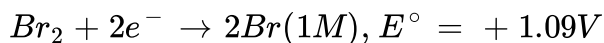
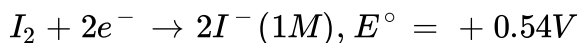
C. Reaction at anode, $Cu \rightarrow Cu^{2+} + 2e^{-}$

D. Copper is more reactive than silver .

Answer: B

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8. Which of the following is the cell reaction that occurs when the following half-cells are combined?

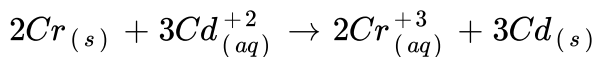


Answer: C



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9. Calculate the standard cell potential of galvanic cell in which the following reaction takes place



$$\text{Given } E_{Cr^{+3}/Cr} = -0.74(V) \quad E_{Cd^{+2}/Cd}^{\circ} = -0.04(V)$$

A. $0.70V$

B. $1.14V$

C. $0.34V$

D. $-0.34V$

Answer: A



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10. The standard reduction potential for the half-cell reaction,

$Cl_2 + 2e^- \rightarrow 2Cl^-$ will be

($Pt^{2+} + 2Cl^- \rightarrow Pt + Cl_2, E_{cell}^\circ = -0.15V, Pt^{2+} + 2e^- \rightarrow Pt, E^\circ = 1.30V$)

A. $-1.35V$

B. $+1.35V$

C. $1.05V$

D. $+1.05V$

Answer: B



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11. In a cell reaction, $Cu_{(s)} + 2Ag_{(aq)}^+ \rightarrow Cu_{(aq)}^{2+} + 2Ag_{(s)}$ $E_{cell}^\circ = +0.46V$

. If the concentration of Cu^{2+} ions is doubled then E_{cell}° will be

A. doubled

B. halved

C. increased by four times

D. unchanged.

Answer: D

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12. A standard hydrogen electrode has zero electrode potential because :

A. hydrogen can be most easily oxidised

B. hydrogen has only one electron

C. the electrode potential is assumed to be zero

D. hydrogen is the lightest element.

Answer: C

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13. Which of the following is the correct order in which metals displace each other from the salt solution of their salts?

A. Zn,Al,Mg,Fe,Cu

B. Cu,Fe,Mg,Al,Zn

C. Mg,Al,Zn,Fe,Cu

D. Al,Mg,Fe,Cu,Zn

Answer: C



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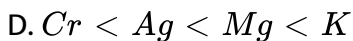
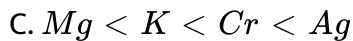
14. Given below are the standard electrode potentials of few half-cells.

The correct order of these metals in increasing reducing power will be

$K^+ / K = -2.93 \text{ V}$, $Ag^+ / Ag = 0.80 \text{ V}$, $Mg^{2+} / Mg = -2.37 \text{ V}$, $Cr^{3+} / Cr = -0.74 \text{ V}$

A. $K < Mg < Cr < Ag$

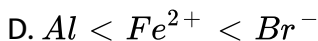
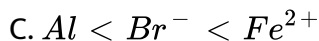
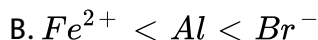
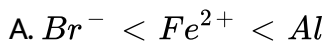
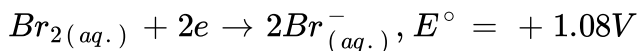
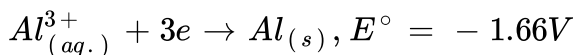
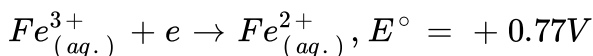
B. $Ag < Cr < Mg < K$



Answer: B

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15. Based on the data given below, the correct order of reducing power is:



Answer: A

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16. *Zn* gives H_2 gas with H_2SO_4 and HCl but not with HNO_3 because

- A. *Zn* Acts as oxidising agent when reacts with HNO_3
- B. HNO_3 is weaker acid than H_2SO_4 and HCl
- C. *Zn* is above the hydrogen in electrochemical series .
- D. NO_3^- is reduced in preference to H^+ ion.

Answer: D



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17. Fluorine is the best oxidising agent because it has

- A. highest electron affinity
- B. highest reduction potential
- C. highest oxidation potential

D. lowest electron affinity.

Answer: B

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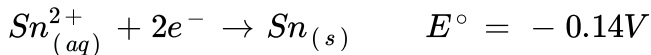
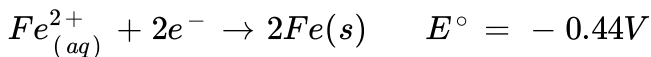
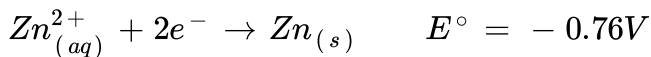
18. Which of the following is not an application of electrochemical series?

- A. To compare the relative oxidising and reducing power of substances.
- B. To predict evolution of hydrogen gas on reaction of metal with acid.
- C. To predict spontaneity of a redox reaction.
- D. To calculate the amount of metal deposited on cathode.

Answer: D

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19. E° values of three metals are listed below.



Which of the following statements are correct on the basis of the above information ?

(i) Zinc will be corroded in preference to iron if zinc coating is broken on the surface.

(ii) If iron is coated with tin and the coating is broken on the surface then iron will be corroded .

(iii) Zinc is more reactive than iron but tin is less reactive than iron.

A. (i) and (ii) only

B. (ii) and (iii) only

C. (i), (ii) and (iii)

D. (i) and (iii) only

Answer: C



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Nernst Equation

1. For a cell reaction : $M^{n+}(aq) + ne^- \rightarrow M(s)$, the Nernst equation for electrode potential at any concentration measured with respect to standard hydrogen electrode is represented as

$$\text{A. } E_{(M^{n+}/M)} = E_{(M^{n+}/M)}^\circ - \frac{RT}{nF} \ln \left(\frac{1}{[M^{n+}]} \right)$$

$$\text{B. } E_{(M/M^{n+})} = E_{(M/M^{n+})}^\circ - \frac{RT}{nF} \ln \left(\frac{[M^{n+}]}{[M]} \right)$$

$$\text{C. } E_{(M^{n+}/M)} = E_{(M^{n+}/M)}^\circ - \frac{RT}{nF} \log \frac{1}{[M]}$$

$$\text{D. } E_{(M^{n+}/M)} = E_{(M^{n+}/M^{n+})}^\circ - \frac{RT}{nF} \ln [M^{n+}]$$

Answer: A



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2. At $25^\circ C$, Nernst equation is

- A. $E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.0591}{n} \log \frac{[\text{ion}]_{\text{RHS}}}{[\text{ion}]_{\text{LHS}}}$
- B. $E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.0591}{n} \log \frac{[\text{M}]_{\text{RHS}}}{[\text{M}]_{\text{LHS}}}$
- C. $E_{\text{cell}} = E_{\text{cell}}^{\circ} + \frac{0.0591}{n} \log \frac{[\text{ion}]_{\text{RHS}}}{[\text{ion}]_{\text{LHS}}}$
- D. $E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.0591}{n} \log \frac{[\text{ion}]_{\text{LHS}}}{[\text{ion}]_{\text{RHS}}}$

Answer: A

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3. Mark the correct Nernst equation for the given cell.

$F_{(s)} | Fe^{2+} (0.001M) || H^{+} (1M) | H_{2(g)} (1^{-}) | Pt_{(s)}$ is

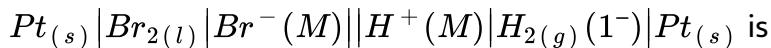
- A. $E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.591}{2} \log \frac{[Fe^{2+}][H^{+}]^2}{[Fe][H_2]}$
- B. $E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.591}{2} \log \frac{[Fe][H^{+}]^2}{[Fe^{2+}][H_2]}$
- C. $E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.0591}{2} \log \frac{[Fe^{2+}][H_2]}{[Fe][H^{+}]^2}$
- D. $E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.0591}{2} \log \frac{[Fe][H_2]}{[Fe^{2+}][H^{+}]^2}$

Answer: C



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4. The correct Nernst equation for the given cell



$$A. E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.0591}{2} \log \frac{[Br_{2(l)}][H_2]}{[H^{+}]^2 [Br^{-}]^2}$$

$$B. E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.0591}{2} \log \frac{[H^{+}]^2 [Br^{-}]^2}{[Br_{2(l)}][H_2]}$$

$$C. E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.0591}{2} \log \frac{[H^{+}]^2 [H_2]}{[Br_{2(l)}][Br^{-}]^2}$$

$$D. E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.0591}{2} \log \frac{[Br_{2(l)}][Br^{-}]^2}{[H^{+}]^2 [H_2]}$$

Answer: A



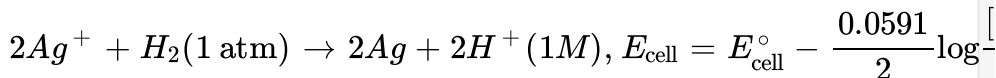
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5. Given below are few reactions with some expressions. Mark the expressions which is not correctly matched.

A. For concentration cell,

$$Ag|Ag^+(C_1)||Ag^+(C_2)|Ag, E_{\text{cell}} = -\frac{0.0591}{1} \log \frac{C_1}{C_2}$$

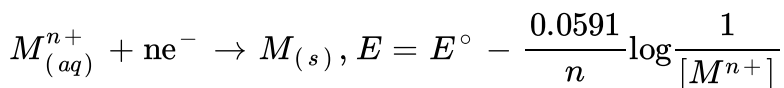
B. For the cell,



C. For an electrochemical reaction, at equilibrium

$$aA + bB \xrightleftharpoons{ne^-} cC + dD, E_{\text{cell}}^\circ = \frac{0.0591}{n} \log \frac{[C]^c [D]^d}{[A]^a [B]^b}$$

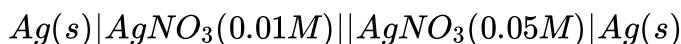
D. For the cell,



Answer: B

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6. Calculate the emf of the following concentration cell at 25°C :



A. 0.828V

B. 0.0413V

C. - 0.0413 V

D. - 0.828 V

Answer: B



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7. The standard reduction potential for Cu^{2+} / Cu is $+0.34V$. Calculate the reduction potential at $pH=14$ for the above couple. K_{SP} of $Cu(OH)_2$ is 1.0×10^{-19}

A. 2.2 V

B. 3.4 V

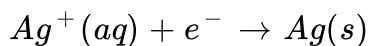
C. - 0.22 V

D. - 2.2 V

Answer: C

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8. Calculate the reduction potential for the following half cell reaction at 298 K.



Given that $[Ag^+] = 0.1M$ and $E^\circ = +0.80V$

A. 0.741 V

B. 0.80 V

C. $-0.80V$

D. $-0.741V$

Answer: A

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9. Mark the correct relationship from the following:

A. Equilibrium constant is related to emf as $\log K = \frac{nFE}{2.303RT}$

B. EMF of a cell $Zn|Zn^{2+}_{(a_1)}||Cu^{2+}_{(a_2)}|Cu$ is

$$E = E^\circ - \frac{0.591}{n} \log \frac{[a_2]}{[a_1]}$$

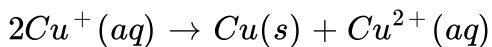
C. Nernst equations is $E_{\text{cell}} = E^\circ_{\text{cell}} - \frac{0.0591}{n} \log \frac{[\text{Products}]}{[\text{Reactants}]}$

D. For the electrode M^{n+} / M at 273 K $E = E^\circ + \frac{0.591}{n} \log [M^{n+}]$

Answer: C

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10. The standard emf for the cell reaction,



is $0.36V$ at $298K$. The equilibrium constant of the reaction is

A. 1.2×10^6

B. 7.4×10^{12}

C. 2.4×10^6

D. 5.5×10^8

Answer: A

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11. E_{cell}° for the reaction , $2\text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+ + \text{OH}^-$ at 25°C is -0.8277 V .

The equilibrium constant for the reaction is

A. 10^{-14}

B. 10^{-23}

C. 10^{-7}

D. 10^{-21}

Answer: A

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12. Cell reaction is spontaneous when

A. E_{red}° is negative

B. ΔG° is negative

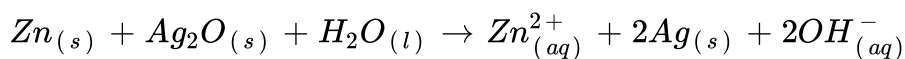
C. E_{oxide}° is positive

D. ΔG° is positive

Answer: B

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13. $\Delta_r G^{\circ}$ for the cell with the cell reaction :



$$\left[E_{\text{Ag}_2\text{O}/\text{Ag}}^{\circ} = 0.344\text{V}, E_{\text{Zn}^{2+}/\text{Zn}}^{\circ} = -0.76\text{V} \right]$$

A. $2.13 \times 10^5 \text{J mol}^{-1}$

B. $-2.13 \times 10^5 \text{J mol}^{-1}$

C. $1.06 \times 10^5 \text{J mol}^{-1}$

D. $-1.06 \times 10^5 \text{J mol}^{-1}$

Answer: B

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14. E° value of Ni^{2+} / Ni is -0.25 V and Ag^+ / Ag is $+0.80\text{ V}$. If a cell is made by taking the two electrodes what is the feasibility of the reaction?

A. Since E° value for the cell will be positive, redox reaction is feasible.

B. Since E° value for the cell will be negative, redox reaction is not feasible.

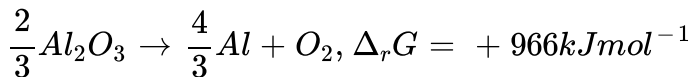
C. Ni cannot reduce Ag^+ to Ag hence reaction is not feasible.

D. Ag can reduce Ni^{2+} to Ni hence reaction is feasible.

Answer: A,B

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15. The Gibbs energy for the decomposition of Al_2O_3 at $500^\circ C$ is as follows:



The potential difference needed for electrolytic reduction of Al_2O_3 at $500^\circ C$ is at least:

A. -5.0 V

B. -4.5 V

C. -3.0 V

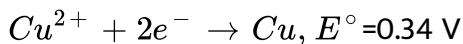
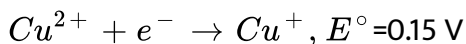
D. -2.5 V

Answer: D



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16. E° values for the half cell reactions are given below :



What will be the E° of the half-cell : $Cu^+ + e^- \rightarrow Cu$?

A. +0.49V

B. +0.19V

C. +0.53V

D. +0.30V

Answer: C

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17. Calculate ΔG° for the reaction :

$Cu^{2+}(aq) + Fe(s) \rightleftharpoons Fe^{2+}(aq) + Cu(s)$. Given that

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

$E^\circ_{Fe^{2+}/Fe} = -0.44V$

A. 11.44 kJ

B. 180.8 kJ

C. 150.5 kJ

D. 28.5 kJ

Answer: C

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Conductance Of Electrolytic Solutions

1. The specific conductivity of N/10 KCl solution at $20^{\circ}C$ is $0.0212\text{ohm}^{-1}\text{cm}^{-1}$ and the resistance of the cell containing this solution at $20^{\circ}C$ is 55 ohm. The cell constant is :

A. 3.324 cm^{-1}

B. 1.166 cm^{-1}

C. 2.372 cm^{-1}

D. 3.682 cm^{-1}

Answer: B

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2. Electrical conductance through metals is called metallic or electronic conductance and is due to the movement of electrons. The electronic conductance depends on

- A. the nature and structure of the metal
- B. the number of valence electrons per atom
- C. change in temperature
- D. all of these.

Answer: D



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3. Fill in the blanks with appropriate words.

The electrolytic solution is always neutral because the total charge on __ (i) __ is equal to __ (ii) __ on __ (iii) __. Unlike the metallic conductor, the electrolyte conducts the electric current by virtue of movement of its __ (iv) __. The property due to which a metal tends to go into solution in

term of positive ions is known as ___(v)___.

(i),(ii),(iii),(iv) and (v) respectively are

- A. cations, partial charge, anions, electrons, reduction
- B. cations, total charge, anions, ions, oxidation
- C. cations, ionic charge, anions, atoms, dissolution
- D. cations, partial charge, anions, molecules, electrolysis.

Answer: B



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4. What would be the equivalent conductivity of a cell in which 0.5 salt solution offers a resistance of 40 ohm whose electrodes are 2 cm apart and 5 cm^2 in area?

- A. $10 \text{ ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1}$
- B. $20 \text{ ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1}$
- C. $30 \text{ ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1}$

$$D. 25\text{ohm}^{-1}\text{cm}^2\text{eq}^{-1}$$

Answer: B

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5. Match the column I with column II and mark the appropriate choice.

	Column I		Column II
(A)	Λ_m	(i)	l/A
(B)	G^*	(ii)	$\rho l/A$
(C)	κ	(iii)	κ/C
(D)	R	(iv)	G^*/R

A. A - (i), B-(iii), C-(ii) ,D-(iv)

B. A-(iii) , B-(i), C-(iv),D-(ii)

C. A-(ii),B-(iv), C-(iii), D-(i)

D. A-(iv), B-(ii),C-(i), D-(iii)

Answer: B

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6. Units of the properties measured are given below. Which of the properties has not been matched correctly?

A. molar conductance = $S m^2 mol^{-1}$

B. Cell constant = m^{-1}

C. Specific conductance = $S m^2$

D. Equivalent conductance = $S m^2 (geq)^{-1}$

Answer: C



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7. Molar conductivity of 0.15 M solution of KCl at 298 K, if its conductivity is $0.0152 S cm^{-1}$ will be

A. $124 \Omega^{-1} cm^2 mol^{-1}$

B. $204 \Omega^{-1} cm^2 mol^{-1}$

C. $101\Omega^{-1}\text{cm}^2\text{mol}^{-1}$

D. $300\Omega^{-1}\text{cm}^2\text{mol}^{-1}$

Answer: C



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8. The molar conductivity is maximum for the solution of concentration _____.

A. 0.004 M

B. 0.002 M

C. 0.005 M

D. 0.001 M

Answer: D



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9. The specific conductance of a saturated solution of AgCl at $25^{\circ}C$ is $1.821 \times 10^{-5} \text{ mho cm}^{-1}$. What is the solubility of AgCl in water (in $g L^{-1}$), if limiting molar conductivity of AgCl is $130.26 \text{ mho cm}^2 \text{ mol}^{-1}$?

A. $1.89 \times 10^{-3} gL^{-1}$

B. $2.78 \times 10^{-2} gL^{-1}$

C. $2.004 \times 10^{-2} gL^{-1}$

D. $1.43 \times 10^{-3} gL^{-1}$

Answer: C



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10. Specific conductance of 0.1 M NaCl solution is $1.01 \times 10^{-2} \text{ ohm}^{-1} \text{ cm}^{-1}$. Its molar conductance in $\text{ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$ is

A. 1.01×10^2

B. 1.01×10^3

C. 1.01×10^4

D. 1.01

Answer: A



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11. The variation in Λ_m with concentration for a strong electrolyte can be represented by the equation, $\Lambda_m = \Lambda_m^\circ - AC^{1/2}$ The value of constant A for a given solvent and temperature depends upon the type of electrolyte i.e., cations and anions produced on dissociation of electrolyte in the solution .

NaCl, $MgCl_2$ and $CaSO_4$ are known as

A. 1-1,2-1, and 2-2 type electrolytes respectively

B. strong, weak and strong electrolytes respectively

C. electrolytes with different value of A

D. electrolytes with same molar conductivity .

Answer: A

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12. The variation in Λ_m with concentration for a strong electrolyte can be represented by the equation, $\Lambda_m = \Lambda_m^\circ - AC^{1/2}$ The value of constant A for a given solvent and temperature depends upon the type of electrolyte i.e., cations and anions produced on dissociation of electrolyte in the solution .

Which of the following statements is correct regarding variations of molar conductivity with concentration.

- A. Molar conductivity decrease with decrease in concentration
- B. Variation is molar conductivity of weak and strong electrolytes is same.
- C. Molar conductivity increases with decrease in concentration.

D. When concentration of the solution approaches zero, the molar conductivity is known as conductance.

Answer: C

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13. Two solutions of X and Y electrolytes are taken in two beakers and diluted by adding 500mL of water. Λ_m of X increases by 1.5 times while that of Y increases by 20 times, what could be the electrolytes X and Y?

A. X \rightarrow NaCl , Y \rightarrow KCl

B. X \rightarrow NaCl , Y \rightarrow CH_3COOH

C. X \rightarrow KOH, Y \rightarrow NaOH

D. X \rightarrow CH_3COOH , Y \rightarrow NaCl

Answer: B

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14. When water is added to an aqueous solution of an electrolyte, what is the change in specific conductivity of the electrolyte?

- A. Conductivity decreases
- B. Conductivity increases
- C. Conductivity remains same
- D. Conductivity does not depend on number of ions.

Answer: A



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15. Molar conductivity of NH_4OH can be calculated by the equation.

$$A. \Lambda_{NH_4OH}^{\circ} = \Lambda_{Ba(OH)_2}^{\circ} + \Lambda_{NH_4Cl}^{\circ} - \Lambda_{BaCl_2}^{\circ}$$

$$B. \Lambda_{NH_4OH}^{\circ} = \Lambda_{BaCl_2}^{\circ} + \Lambda_{NH_4Cl}^{\circ} - \Lambda_{Ba(OH)_2}^{\circ}$$

$$C. \Lambda_{NH_4OH}^{\circ} = \frac{\Lambda_{Ba(OH)_2}^{\circ} + 2\Lambda_{NH_4Cl}^{\circ} - \Lambda_{BaCl_2}^{\circ}}{2}$$

$$D. \Lambda_{NH_4OH}^{\circ} = \frac{\Lambda_{NH_4Cl}^{\circ} + \Lambda_{Ba(OH)_2}^{\circ}}{2}$$

Answer: C

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16. Limiting molar conductivity of NaBr is

A. $\Lambda_m^{\circ}NaBr = \Lambda_m^{\circ}NaCl + \Lambda_m^{\circ}KBr$

B. $\Lambda_m^{\circ}NaBr = \Lambda_m^{\circ}NaCl + \Lambda_m^{\circ}KBr - \Lambda_m^{\circ}KCl$

C. $\Lambda_m^{\circ}NaBr = \Lambda_m^{\circ}NaOH + \Lambda_m^{\circ}NaBr - \Lambda_m^{\circ}NaCl$

D. $\Lambda_m^{\circ}NaBr = \Lambda_m^{\circ}NaCl - \Lambda_m^{\circ}NaBr$

Answer: B

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17. What will be the molar conductivity of Al^{3+} ions at infinite dilution if molar conductivity of $Al^2(SO_4)_3$ is $858 \text{ S cm}^2 \text{ mol}^{-1}$ and ionic conductance of SO_4^{2-} is $160 \text{ S cm}^2 \text{ mol}^{-1}$ at infinite dilution ?

A. $189 \text{ S cm}^2 \text{ mol}^{-1}$

B. $698 \text{ S cm}^2 \text{ mol}^{-1}$

C. $1018 \text{ S cm}^2 \text{ mol}^{-1}$

D. $429 \text{ S cm}^2 \text{ mol}^{-1}$

Answer: A



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18. Limiting molar conductivity for some ions is given below (in $\text{S cm}^2 \text{ mol}^{-1}$):

$$Na^+ - 50.1, Cl^- - 76.3, H^+ - 349.6, CH_3COO^- - 40.9, Ca^{2+} - 119.0$$

What will be the limiting molar conductivities (Λ_m°) of $CaCl_2$, CH_3COONa and $NaCl$ respectively ?

A. 97.65 , 111.0 and 242.8 S cm²mol⁻¹

B. 195.3, 182.0 and 26.2 S cm²mol⁻¹

C. 271.6, 91.0 and 126.4 S cm²mol⁻¹

D. 119.0, 1024.5 and 9.2 S cm²mol⁻¹

Answer: C

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19. Match the column I with column II and mark the appropriate choice.

	Column I		Column II
(A)	Kohlrausch's law	(i)	$\Lambda_{eq}^{\circ} = \Lambda_c^{\circ} + \Lambda_a^{\circ}$
(B)	Molar conductivity	(ii)	$\Lambda_m = \frac{\kappa}{C}$
(C)	Degree of dissociation	(iii)	$\alpha = \frac{\Lambda_m}{\Lambda_m^{\circ}}$
(D)	Dissociation constant	(iv)	$K_a = \frac{C\alpha^2}{1-\alpha}$

A. A-(iii),B-(iv),C-(i),D-(ii)

B. A-(i),B-(ii),C-(iii),D-(iv)

C. A-(iv), B-(i),C-(ii),D-(iii)

D. A-(iv),B-(i),C-(ii),D-(iii)

Answer: B

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20. The equivalent conductivity of N/10 solution of acetic acid at $25^{\circ}C$ is $14.3\text{ohm}^{-1}\text{cm}^2\text{eq}^{-1}$. Calculate the degree of dissociation of CH_3COOH if $\Lambda_{\infty CH_3COOH}$ is 390.71.

A. 3.66 %

B. 3.9 %

C. 2.12 %

D. 0.008 %

Answer: A

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21. The molar conductance of Ba^{2+} and Cl^{-} are 127 and $76\text{ohm}^{-1}\text{cm}^{-1}\text{mol}^{-1}$ respectively at infinite dilution. The equivalent conductance of $BaCl_2$ at infinite dilution will be

A. $139.5\text{ohm}^{-1}\text{cm}^2\text{eq}^{-1}$

B. $203\text{ohm}^{-1}\text{cm}^2\text{eq}^{-1}$

C. $279\text{ohm}^{-1}\text{cm}^2\text{eq}^{-1}$

D. $101.5\text{ohm}^{-1}\text{cm}^2\text{eq}^{-1}$

Answer: A

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22. The molar conductivity of 0.025molL^{-1} methanoic acid is $46.1\text{Scm}^2\text{mol}^{-1}$. Its degree of dissociation (α) and dissociation constant. Given $\lambda^{\circ}(H^{+}) = 349.6\text{Scm}^{-1}$ and

$\lambda^{\circ}(HCOO^{-}) = 54.6\text{Scm}^2\text{mol}^{-1}$.

A. 11.4%, $3.67 \times 10^{-4} \text{ mol L}^{-1}$

B. 22.8%, $1.83 \times 10^{-4} \text{ mol L}^{-1}$

C. 52.2%, $4.25 \times 10^{-4} \text{ mol L}^{-1}$

D. 1.14%, $3.67 \times 10^{-6} \text{ mol L}^{-1}$

Answer: A

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23. A weak monobasic acid is 5% dissociated in 0.01 mol dm^{-3} solution.

The limiting molar conductivity at infinite dilution is $4.00 \times 10^{-2} \text{ ohm}^{-1} \text{ m}^2 \text{ mol}^{-1}$. Calculate the conductivity of a 0.05 mol dm^{-3} solution of the acid.

A. $8.94 \times 10^{-6} \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$

B. $8.92 \times 10^{-4} \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$

C. $4.46 \times 10^{-6} \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$

D. $2.23 \times 10^{-5} \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$

Answer: B

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Electrolytic Cells And Electrolysis

1. In an electrolytic cell, the flow of electrons is form

- A. from cathode to anode in the solution
- B. from cathode to anode through external supply
- C. from cathode to anode through internal supply
- D. from anode to cathode through internal supply

Answer: C

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2. How long does it take to deposit 100 g of Al from an electrolytic cell containing Al_2O_3 using a current of 125 ampere ?

- A. 1.54 h
- B. 1.42 h
- C. 1.32 h
- D. 2.15 h

Answer: B



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3. The charge required for reducing 1 mole of MnO_4^- to Mn^{2+} is

- A. 1.93×10^5 C
- B. 2.895×10^5 C
- C. 4.28×10^5 C
- D. 4.825×10^5 C

Answer: D

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4. How much electricity in terms of Faraday is required to produce 100 g of Ca from molten $CaCl_2$?

A. 1 F

B. 2 F

C. 3 F

D. 5 F

Answer: D

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5. If a current of 1.5 ampere flows through a metallic wire for 3 hours, then how many electrons would flow through the wire?

A. 2.25×10^{22} electrons

B. 1.13×10^{23} electrons

C. 1.01×10^{23} electrons

D. 4.5×10^{23} electrons

Answer: C

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6. How many coulombs of electricity is required to reduce 1 mole of $Cr_2O_7^{2-}$ in acidic medium?

A. 4×96500 C

B. 6×96500 C

C. 2×96500 C

D. 1×96500 C

Answer: B

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7. An electric charge of 5 Faradays is passed through three electrolytes $AgNO_3$, $CuSO_4$ and $FeCl_3$ solution. The grams of each metal liberated at cathode will be

- A. Ag = 10.8 g, Cu = 12.7g, Fe = 1.11g
- B. Ag = 540 g, Cu = 367.5 g, Fe = 325 g
- C. Ag=108 g , Cu=63.5 g , Fe=56 g
- D. Ag=540 g , Cu=158.8 g , Fe = 93.3 g

Answer: D

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8. A current of 1.40 ampere is passed through 500 mL of 0.180 M solution of zinc sulphate for 200 seconds. What will be the molarity of Zn^{2+} ions after deposition of zinc?

A. 0.154 M

B. 0.177 M

C. 2 M

D. 0.180 M

Answer: B



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9. How much time is required to deposit 1×10^{-3} cm thick layer of silver (density is 1.05 g cm^{-3}) on a surface of area 100 cm^2 by passing a current of 5 A through AgNO_3 solution?

A. 125 s

B. 115 s

C. 18.7 s

D. 27.25 s

Answer: C

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10. How much metal will be deposited when a current of 12 ampere with 75% efficiency is passed through the cell for 3 h? (Given: $Z = 4 \times 10^{-4}$)

A. 32.4 g

B. 38.8 g

C. 36.0 g

D. 22.4 g

Answer: B

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11. Same amount of electric current is passed through the solutions of $AgNO_3$ and HCl. If 1.08 g of silver is obtained from $AgNO_3$ solution. The

amount of hydrogen liberated at STP will be

A. 1.008 g

B. 11.2 g

C. 0.01 g

D. 1.1 g

Answer: C



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12. 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. 108 g

B. 10.8 g

C. 1.08 g

D. 216 g

Answer: B



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13. The amount of chlorine evolved by passing 2 A of current in an aqueous solution of NaCl for 30 minutes is

A. 2.64 g

B. 1.32 g

C. 3.62 g

D. 4.22 g

Answer: B



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14. How many moles of Pr may be deposited on the cathode when 0.80F of electricity is passed through 1.0M solution of Pt^{4+} ?

- A. 0.1 mol
- B. 0.2 mol
- C. 0.4 mol
- D. 0.6 mol

Answer: B



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15. An electric current is passed through silver nitrate solution using silver electrodes. 15.28 g of silver was found to be deposited on catode. What will be the weight of copper deposited on cathode if same amount of electricity is passed through copper sulphate solution using copper electrodes?

A. 4.49 g

B. 6.4 g

C. 12.8 g

D. 3.2 g

Answer: A



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16. If 54 g of silver is deposited during an electrolysis reaction, how much aluminium will be deposited by the same amount of electric current?

A. 2.7 g

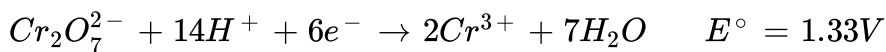
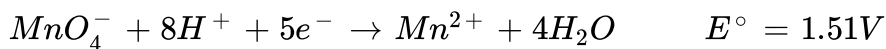
B. 4.5 g

C. 27 g

D. 5.4 g

Answer: B

17. Standard electrode potentials of few half-cell reactions are given below :



Based on the above information match the column I with column II and mark the appropriate choice.

	Column I		Column II
(A)	1 mol of MnO_4^- to Mn^{2+}	(i)	579000 C
(B)	1 mol of $\text{Cr}_2\text{O}_7^{2-}$ to 2Cr^{3+}	(ii)	193000 C
(C)	1 mol of Fe^{3+} to Fe^{2+}	(iii)	482500 C
(D)	1 mol of Cl_2 to 2Cl^-	(iv)	96500 C

A. A-(i),B-(ii),C-(iii),D-(iv)

B. A-(ii),B-(iii),C-(i),D-(iv)

C. A-(iii),B-(i),C-(iv),D-(ii)

D. A-(iv),B-(ii),C-(iii),D-(i)

Answer: C

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18. An acidic solution of Cu^{2+} ions containing 0.4 g of Cu^{2+} ions is electrolysed until all the copper is deposited. Calculate the volume of oxygen evolved at N.T.P.

A. 141 cc

B. 31.75 cc

C. 64 cc

D. 32 cc

Answer: A

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19. Choose the option with correct words to fill in the blanks.

According to preferential discharge theory, out of number of ions the one which requires ___ energy will be liberated ___ at a given electrode.

A. least, first

B. least, last

C. highest, first

D. highest, last

Answer: A



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20. Which of the following statement is true?

A. When an aqueous solution of NaCl is electrolysed, sodium metal is deposited at cathode.

B. There is no difference between specific conductivity and molar conductivity.

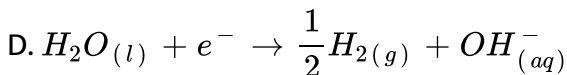
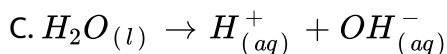
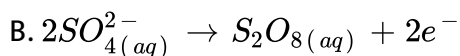
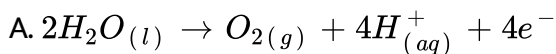
C. Silver nitrate solution can be stored in a copper container.

D. The addition of liquid bromine acid, the following process is possible at anode.

Answer: D

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21. During the electrolysis of dilute sulphuric acid, the following process is possible at anode.



Answer: A



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22. In electrolysis of dilute H_2SO_4 what is liberated at anode?

A. H_2

B. SO_4^{2-}

C. SO_2

D. O_2

Answer: D



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23. When an aqueous solution of $AgNO_3$ is electrolysed between platinum electrodes, the substances liberated at anode and cathode are

A. silver is deposited at cathode and O_2 is liberated at anode

B. silver is deposited at cathode and H_2 is liberated at anode

C. hydrogen is liberated at cathode and O_2 is liberated at anode.

D. silver is deposited at cathode and Pt is dissolved in electrolyte.

Answer: A

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24. Electrolysis of an aqueous solution of $AgNO_3$ with silver electrodes produce __ (i) __ at cathode while __ (ii) __ ions are dissolved from anode.

When Pt electrodes are used ___ (iii) ___ is produced at anode ___ (iv) ___ at cathode.

A. (i) (ii) (iii) (iv)
 H_2 NO_3^- OH^- H_2

B. (i) (ii) (iii) (iv)
 Ag H^+ O_2 H_2

C. (i) (ii) (iii) (iv)
 Ag H^+ O_2 Ag

D. (i) (ii) (iii) (iv)
 Ag H^+ Ag^+ O_2

Answer: C



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Batteries

1. When a lead storage battery is discharged

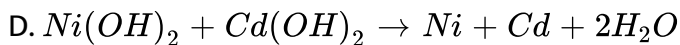
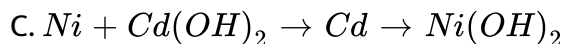
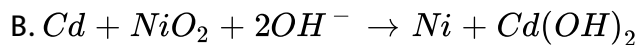
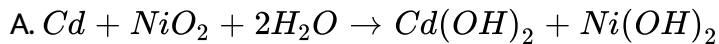
- A. lead sulphate is consumed
- B. oxygen gas is evolved.
- C. lead sulphate is formed
- D. lead sulphide is formed.

Answer: C



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2. The reaction which is taking place in nickel cadmium battery can be represented by which of the following equations?

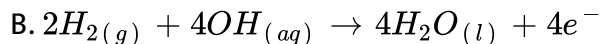
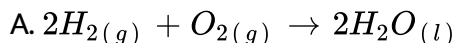


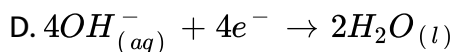
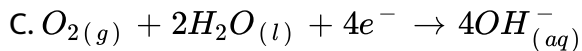
Answer: A

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Fuel Cells

1. The overall reactions of a hydrogen -oxygen fuel cell is



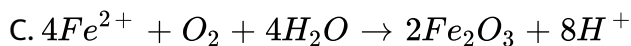
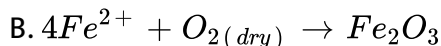
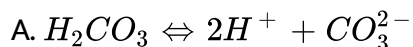


Answer: A

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Corrosion

1. Which of the following reactions does not take place during rusting?

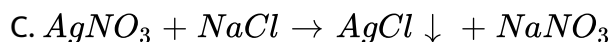
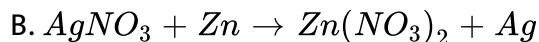
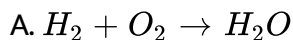


Answer: B

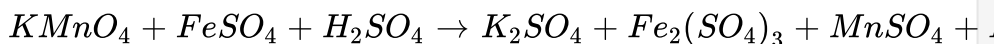
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Higher Order Thinking Skills

1. Which of the following reactions cannot be a base for electrochemical cell?



D.



Answer: D



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2. In a galvanic cell, the salt bridge

(i) does not participate chemically in the cell reaction

(ii) stops the diffusion of ions from one electrolytes to another

(ii) is necessary for the occurrence of the cell reaction

(iv) ensures mixing of the two electrolytic solutions

A. (i) and (iii) only

B. (i) and (ii) only

C. (iii) and (iv) only

D. all of these.

Answer: B



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3. The position of some metals in the electrochemical series in decreasing electropositive character is given as $Mg > Al > Zn > Cu > Ag$. What will happen if a copper spoon is used to stir a solution of aluminium nitrate ?

A. The spoon will get coated with aluminium.

- B. An alloy of copper and aluminium is formed.
- C. The solution becomes blue.
- D. There is no reaction.

Answer: D

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4. A gas X at 1 atm is bubbled through a solution containing a mixture of $1M Y^-$ and $1M Z^-$ at $25^\circ C$. If the reduction potential of $Z > Y > X$, then

- A. Y will oxidise X and not Z
- B. Y will oxidise Z and not X
- C. Y will oxidise both X and Z.
- D. Y will reduce both X and Z.

Answer: A



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5. For the cell prepared from electrodes A and B,

Electrode A : $Cr_2O_7^{2-} / Cr^{3+}$, $E_{red}^{\circ} = 1.33V$ and Electrode B:

Fe^{3+} / Fe^{2+} , $E_{red}^{\circ} = 0.77V$

Which of the following statements is correct?

- A. The electrons will flow from B to A when connections are made.
- B. The standard EMF of the cell will be 0.56 V.
- C. A will be a positive electrode.
- D. All of these.

Answer: D



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6. The formal potential of Fe^{3+} / Fe^{2+} in a sulphuric acid and phosphoric acid mixture ($E^{\circ} = +0.61V$) is much lower than the

standard potential ($E^\circ = +0.77\text{ V}$). This is due to

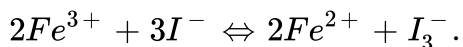
- (i) formation of the species $[FeHPO_4]^+$
- (ii) lowering of potential upon complexation
- (iii) formation of the species $[FeSO_4]^+$
- (iv) high acidity of the medium.

- A. (i) and (ii) only
- B. (i), (ii) and (iv) only
- C. (iii) only
- D. all of these.

Answer: A

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7. Calculate the equilibrium constant for the reaction,



The standard reduction potential in acidic conditions are $0.77V$ and $0.54V$ respectively for Fe^{3+} / Fe^{2+} and I_3^- / I^- couples.

A. 4.25×10^7

B. 7.05×10^5

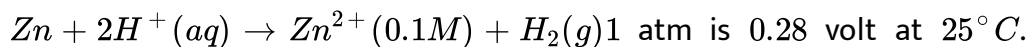
C. 6.25×10^5

D. 6.25×10^7

Answer: D

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8. The emf of a cell corresponding to the reaction



Calculate the pH of the solution at the hydrogen electrode.

$$E_{\text{Zn}^{2+}/\text{Zn}}^\circ = -0.76 \text{ volt and } E_{\text{H}^+/\text{H}_2}^\circ = 0$$

A. 7.05

B. 8.62

C. 8.75

D. 9.57

Answer: B

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9. How long will it take for a uniform current of 6.0 ampere to deposit 78.0 g gold from a solution of $AuCl_4^-$? What mass of chlorine gas will be formed simultaneously at the anode in the electrolytic cell ?

A. $t = 3010 \text{ sec}$, $w = 35.50 \text{ g}$

B. $t = 20306 \text{ sec}$, $w = 45.54 \text{ g}$

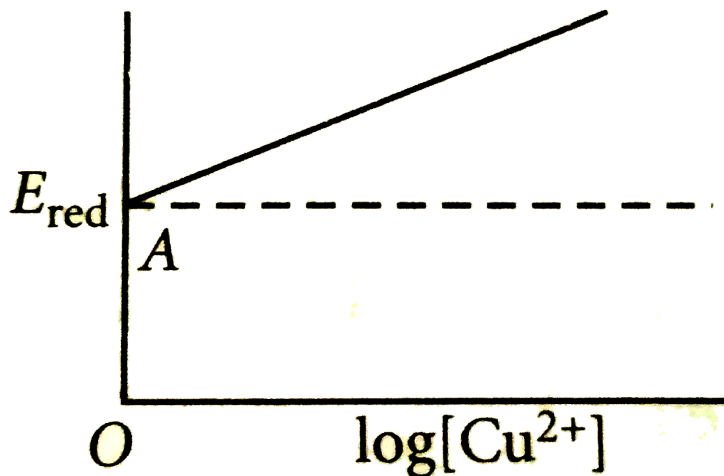
C. $t = 19500 \text{ sec}$, $w = 54.5 \text{ g}$

D. $t = 19139 \text{ sec}$, $w = 42.24 \text{ g}$

Answer: D

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1. For the reaction, $\text{Cu}^{2+} + 2e^- \rightarrow \text{Cu}$, $\log[\text{Cu}^{2+}]$ vs E graph is of type as shown in figure where $OA = 0.34$ V, the electrode potential of the half-cell of $\text{Cu} | \text{Cu}^{2+} (0.1M)$ will be



A. $-0.34 + \frac{0.0591}{2} V$

B. $0.34 + 0.0591 V$

C. $0.34 V$

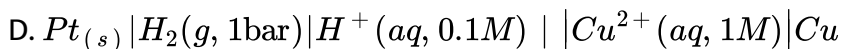
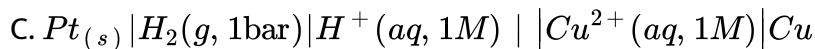
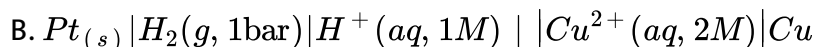
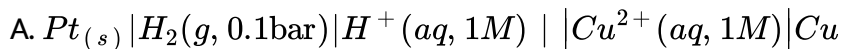
D. None of these

Answer: A



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1. Which cell will measure standard electrode potential of copper electrode?



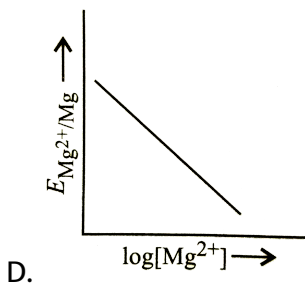
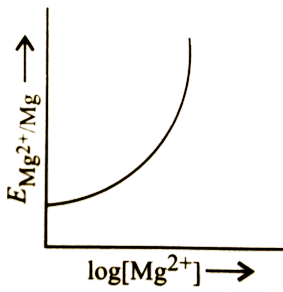
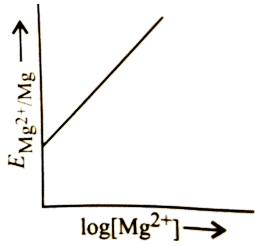
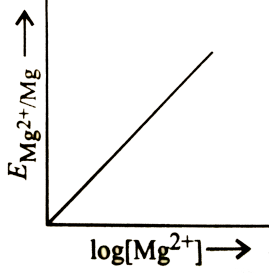
Answer: C

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2. Electrode potential for Mg electrode varies according to the equation

$$E_{Mg^{2+} | Mg} = E_{Mg^{2+} | Mg}^{\ominus} - \frac{0.059}{2} \log \frac{1}{[Mg^{2+}]}$$

The graph of $E_{Mg^{2+} | Mg}$ vs $\log [Mg^{2+}]$ is



Answer: B



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3. Which of the following statement is correct?

- A. E_{cell} and $\Delta_r G$ of cell reaction both are extensive properties.
- B. E_{cell} and $\Delta_r G$ of cell reaction both are intensive properties.
- C. E_{cell} is an intensive property while $\Delta_r G$ of cell reaction is an extensive property.
- D. E_{cell} is an intensive property while $\Delta_r G$ of cell reaction is an intensive property.

Answer: C



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4. The difference between the electrode potentials of two electrodes when no current is drawn through the cell is called:

- A. cell potential
- B. cell emf

C. potential difference

D. cell voltage

Answer: B

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5. Which of the following statement is not correct about an inert electrode in a cell?

A. It does not participate in the cell reaction.

B. It provides surface either for oxidation or for reduction reaction.

C. It provides surface for conduction of electrons.

D. It provide surface for redox reaction

Answer: D

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6. An electrochemical cell can behave like an electrolytic cell when

A. $E_{\text{cell}} = 0$

B. $E_{\text{cell}} > E_{\text{ext}}$

C. $E_{\text{ext}} > E_{\text{cell}}$

D. $E_{\text{cell}} = E_{\text{ext}}$

Answer: C



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7. Which of the statements about solution of electrolytes is not correct?

A. Conductivity of solution depends upon size of ions.

B. Conductivity depends upon viscosity of solution.

C. Conductivity does not depend upon solvation of ions present in solution.

D. Conductivity of solution increases with temperature.

Answer: C



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8. Using the data given below:

$$E_{Cr_2O_7^{2-} | Cr^{3+}}^{\circ} = 1.33V \quad E_{Cl_2 | Cl^{-}}^{\circ} = 1.36V$$

$$E_{MnO_4^{-} | Mn^{2+}}^{\circ} = 1.51V \quad E_{Cr^{3+} | Cr} = -0.74V$$

Mark the strongest reducing agent.



Answer: B



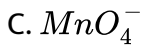
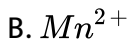
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9. Using the data given below is reducing potential.

$$E_{Cr_2O_7^{2-} / Cr^{3+}}^{\circ} = 1.33 \text{ V}, E_{Cl_2 / Cl^{-}}^{\circ} = 1.36 \text{ V}$$

$$E_{MnO_4^{-} / Mn^{2+}}^{\circ} = 1.51 \text{ V}, E_{Cr^{3+} / Cr}^{\circ} = -0.74 \text{ V}$$

find out which of the following is the strongest oxidising agent.



Answer: C



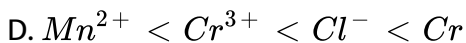
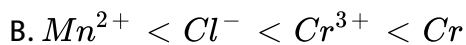
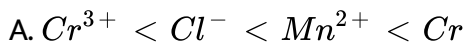
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10. Using the data given below:

$$E_{Cr_2O_7^{2-} | Cr^{3+}}^{\circ} = 1.33V \quad E_{Cl_2 | Cl^{-}}^{\circ} = 1.36V$$

$$E_{MnO_4^{-} | Mn^{2+}}^{\circ} = 1.51V \quad E_{Cr^{3+} | Cr}^{\circ} = -0.74V$$

In which option the order of reducing power is correct?



Answer: B

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11. Using the data given below:

$$E_{Cr_2O_7^{2-} | Cr^{3+}}^{\circ} = 1.33V \quad E_{Cl_2 | Cl^{-}}^{\circ} = 1.36V$$

$$E_{MnO_4^{-} | Mn^{2+}}^{\circ} = 1.51V \quad E_{Cr^{3+} | Cr} = -0.74V$$

Find the most stable ion in its reduced forms



Answer: D

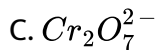
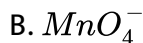
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12. Using the data given below:

$$E_{Cr_2O_7^{2-} | Cr^{3+}}^{\circ} = 1.33V \quad E_{Cl_2 | Cl^{-}}^{\circ} = 1.36V$$

$$E_{MnO_4^{-} | Mn^{2+}}^{\circ} = 1.51V \quad E_{Cr^{3+} | Cr} = -0.74V$$

Find the most stable oxidised species.



Answer: A

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13. The quantity of charge required to obtain one mole of aluminium from Al_2O_3 is

- A. 1 F
- B. 6 F
- C. 3 F
- D. 2 F

Answer: C



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14. The cell constant of a conductivity cell

- A. change with change of electrolyte
- B. changes with change of concentration of electrolyte
- C. changes with temperature of electrolyte
- D. remains constant for a cell

Answer: D

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15. While charging the lead storage battery:

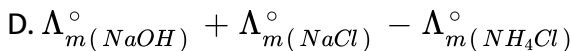
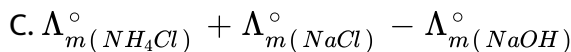
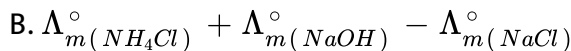
- A. $PbSO_4$ anode is reduced to Pb
- B. $PbSO_4$ cathode is reduced to Pb
- C. $PbSO_4$ cathode is oxidised to Pb
- D. $PbSO_4$ anode is oxidised to PbO_2

Answer: A

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16. $\Lambda_{(m)}^{\circ}(NH_4OH)$ is equal to

A. $\Lambda_{(m)}^{\circ}(NH_4OH) + \Lambda_{(m)}^{\circ}(NH_4Cl) - \Lambda_{(m)}^{\circ}(HCl)$

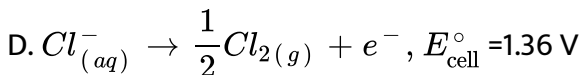
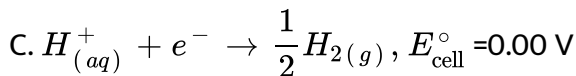
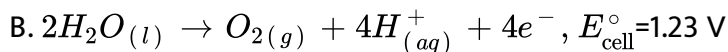
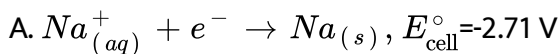


Answer: B



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17. In the electrolysis of aqueous sodium chloride solution which of the half cell reaction will occur at anode?



Answer: D



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Assertion And Reason

1. Assertion: Electrolytic cell uses electrical energy to carry non-spontaneous chemical reactions.

Reason : Chemical energy of a spontaneous redox reaction can be converted into electrical energy.

- A. If both assertion and reason are true and reason is the correct explanation of assertion .
- B. If both assertion and reason are true but reason is not the correct explanation of assertion .
- C. If assertion is true but reason is false .
- D. If both assertion and reason are false .

Answer: B



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2. Assertion :EMF of the cell is the potential difference between the electrode potentials of the cathode and anode when no current is drawn through the cell.

Reason: Anode is kept on the right side and cathode on the left side while representing the galvanic cell.

- A. If both assertion and reason are true and reason is the correct explanation of assertion .
- B. If both assertion and reason are true but reason is not the correct explanation of assertion .
- C. If assertion is true but reason is false .
- D. If both assertion and reason are false .

Answer: C



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3. Assertion: A standard hydrogen electrode is also called reversible electrode.

Reason : Standard hydrogen electrode can act both as anode as well as cathode in an electrochemical cell.

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: A



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4. Assertion: Cu^{2+} ions get reduced more easily than H^+ ions.

Reason: Standard electrode potential of copper is 0.34 V.

- A. If both assertion and reason are true and reason is the correct explanation of assertion .
- B. If both assertion and reason are true but reason is not the correct explanation of assertion .
- C. If assertion is true but reason is false .
- D. If both assertion and reason are false .

Answer: A



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5. Assertion: Lithium has the lowest electrode potential.

Reason: Lithium ion is the strongest oxidising agent.

- A. If both assertion and reason are true and reason is the correct explanation of assertion .
- B. If both assertion and reason are true but reason is not the correct explanation of assertion .
- C. If assertion is true but reason is false .
- D. If both assertion and reason are false .

Answer: C

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6. Assertion : Current stops flowing when $E_{cell} = 0$.

Reason : Equilibrium of the cell reaction is attained.

- A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: A

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7. Assertion : To obtain maximum work from a galvanic cell charge has to be passed reversibly.

Reason: The reversible work done by a galvanic cell is equal to decrease in its Gibbs energy.

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: A



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8. Assertion:The electrical resistance of any object decrease with increase in its length.

Reason: Electrical resistance of any object increases with increase in its area of cross-section.

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: D

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9. Assertion: The conductivity of electrolytic solutions increase with increase of temperature.

Reason: Electronic conductance decrease with increase of temperature.

- A. If both assertion and reason are true and reason is the correct explanation of assertion .
- B. If both assertion and reason are true but reason is not the correct explanation of assertion .
- C. If assertion is true but reason is false .
- D. If both assertion and reason are false .

Answer: B

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10. Assertion: Molar conductivity increases with decrease in concentration.

Reason: Conductivity always decrease with decrease in concentration.

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: B

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11. Assertion: Kohlrausch law helps to find the molar conductivity of weak electrolyte at infinite dilution.

Reason: Molar conductivity of a weak electrolyte at infinite dilution cannot be determined experimentally.

- A. If both assertion and reason are true and reason is the correct explanation of assertion .
- B. If both assertion and reason are true but reason is not the correct explanation of assertion .
- C. If assertion is true but reason is false .
- D. If both assertion and reason are false .

Answer: A



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12. Assertion: When a copper wire is dipped in silver nitrate solution, there is no change in the colour of the solution.

Reason : Copper cannot displace silver from its salt solution.

- A. If both assertion and reason are true and reason is the correct explanation of assertion .
- B. If both assertion and reason are true but reason is not the correct explanation of assertion .
- C. If assertion is true but reason is false .
- D. If both assertion and reason are false .

Answer: D



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13. Assertion : In electrolysis, the quantity of electricity needed for depositing 1 mole silver is different from that required for 1 mole of copper.

Reason : The molecular weights of silver and copper are different.

- A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: B

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14. Assertion: In electrolysis of aqueous NaCl the product obtained is H_2 gas.

Reason: Gases are liberated faster than the metals.

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

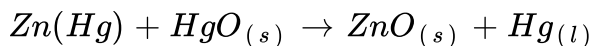
D. If both assertion and reason are false .

Answer: C

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15. Assertion: In mercury cell, the cell potential is approximately 1.35 V
Which cell will measure standard electrode and remains constant during its life.

Reason : The overall reaction in mercury cell is represented as



- A. If both assertion and reason are true and reason is the correct explanation of assertion .
- B. If both assertion and reason are true but reason is not the correct explanation of assertion .
- C. If assertion is true but reason is false .
- D. If both assertion and reason are false .

Answer: A



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