Parishram (2025)

Physical Chemistry

Electrochemistry

DPP : 6

Q1 A gas X at 1 atm is bubbled through a solution P containing a mixture of $1\mathrm{M}\mathrm{Y}^{-}$ and $1\mathrm{M}\mathrm{Z}^{-}$ at $25^{\circ}\mathrm{C}$. If the reduction potential of $Z > Y > X$, then:
(A) Y will oxidize X and not Z
(B) Y will oxidize Z and not X
(C) Y will oxidize both X and Z
(D) Y will reduce both X and Z

Q2 Which one of the following metals cannot evolve H_2 from acids or $\mathrm{H}_2\mathrm{O}$ or from its compounds?
(A) Hg
(B) Al
(C) Pb
(D) Fe

Q3 For a cell reaction involving a two-electron change, the standard EMF of the cell is found to be $0.295\ \mathrm{V}$ at $25^{\circ}\mathrm{C}$. The equilibrium constant of the reaction at $25^{\circ}\mathrm{C}$ will be
(A) 1×10^{10}
(B) 1×10^{-10}
(C) 29.5×10^{-2}
(D) 2×10^{10}

Q4 Electrode potential of the half-cell $\mathrm{Pt(s)|Hg}(l)|\mathrm{Hg_2Cl_2(\ s)}\ |\ \mathrm{Cl}^{-}\mathrm{(aq)}$ can be increased by:
(A) Increasing $\left[\mathrm{Cl}^{-}\right]$
(B) Decreasing $\left[\mathrm{Cl}^{-}\right]$
(C) Increasing $\mathrm{Hg_2Cl_2}$ (s)
(D) Decreasing $\mathrm{Hg}(l)$

Q5 A solution containing $\mathrm{H}^{+}$and D^{+}ions is in equilibrium with a mixture of H_2 and D_2 gases at $25^{\circ}\mathrm{C}$. If the partial pressures of both gases are 1.0 atm, find the ratio of $\left[\mathrm{D}^{+}\right] / \left[\mathrm{H}^{+}\right]$. (Given: $E^{\circ}_{D^{+}/D_2} = -0.003\ \mathrm{V}$)
(A) 1.23 (B) 1.12
(C) 0.11 (D) 1.0

Q6 In a concentration cell the same metal electrodes are present in both the anode and the cathode compartments, but at different concentrations. Calculate the emf of a cell containing $0.040\mathrm{M} \cdot \mathrm{Cr}^{3+}$ in one compartment and $1.0\mathrm{M}\mathrm{Cr}^{3+}$ in the other if Cr electrodes are used in both.
(A) $0.028\ \mathrm{V}$
(B) $0.249\ \mathrm{V}$
(C) $0.083\ \mathrm{V}$
(D) $0.125\ \mathrm{V}$

Answer Key

Q1	(A)	Q4	(A)
Q2	(A)	Q5	(B)
Q3	(A)	Q6	(A)

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Video Solution:

Q2 Video Solution:

Q3 Video Solution:

Q4 Video Solution:

Q5 Video Solution:

Q6 Video Solution: