YAKEEN NEET 2.0

2026

Electrochemistry

Physical Chemistry | Lecture -5

By- Amit Mahajan Sir

Topics to be covered

1. Medics Test, Revision of Last Class
2. NERNST EQUATION
3. Concentration cells
4. MPQ
   Home work from modules

Rule to Attend Class

1. Always sit in a peaceful environment with headphone and be ready with your copy and pen.
2. Never ever attend a class from in between or don't join a live class in the middle of the chapter.
3. Make sure to revise the last class before attending the next class & always complete your home work along with DPP.
4. Never ever engage in chat whether live or recorded on the topic which is not being discussed in current class as by doing so u can be blocked by the admin team or your subscription can be cancelled.

Rule to Attend Class

5. Try to make maximum notes during the class if something is left then u can use the notes pdf after the class to complete the remaining class.
6. Always ask your doubts in doubt section to get answer from faculty. Before asking any doubt please check whether same doubt has been asked by someone or not.
7. Don’t watch the videos in high speed if you want to understand better.


There is one big flaw in your Preparation that's name is Backlog ? What do we say to Backlog ?
NOT TODAY !!!

MEDICS

Mastery
Checks your grasp over NEET-level concepts

Evaluation
Judging both knowledge and test-smartness

Decision Making
Testing your speed + accuracy under pressure

Intuition
Some answers need gut + logic – can you spot the trick?

Concepts
It's all about strong basics – no shortcuts here

Strategy
The MEDICS test – built for those who heal, hustle, and hope.

Question

H → anode
Cu → cathode

Which of the following statements is true for an electrochemical cell of Cu-H_2?

A H_2 is anode and Cu is cathode

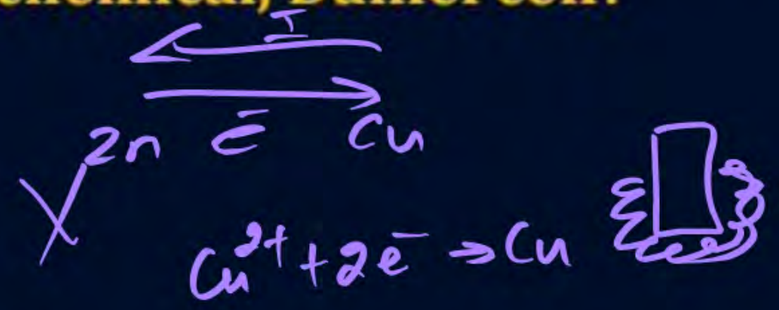
B H_2 is cathode and Cu is anode

C Reduction occurs at H_2 electrode

D Oxidation occurs at Cu electrode

Question

Which of the following statements is true for the electrochemical, Daniel cell?



A. Electrons flow from copper electrode to zinc electrode ✗

B. Current flows from zinc electrode to copper electrode ✗

C. Cations move toward copper electrode ✓

D. Cations move toward zinc electrode

Question

pH when equal volume of 0.1 M HA ($K_{a_1} = 10^{-5}$) and 1 M HB ($K_{a_2} = 10^{-6}$) are mixed?

$C_1 = 0.05$ $\quad$ $C_2 = 0.5$

$$[H^+] = \sqrt{K_{a_1} C_1 + K_{a_2} C_2}$$

$$= \sqrt{10^{-5} \times 5 \times 10^{-2} + 10^{-6} \times 5 \times 10^{-1}}$$

$$= \sqrt{10^{-6}(0.5 + 0.5)}$$

$$= \sqrt{10^{-6} \times 1} \quad = 10^{-3}$$

$$pH = 3$$

A. $3 + \log(2)$

B. $3 - \frac{1}{2}\log(2)$

C. $3 + \frac{1}{2}\log(2)$

D. 3 ✓

Question

The ratio of dissociation constant of two weak acids HA and HB is 4. At what molar concentration ratio, the two acids will have same pH in separate solutions?

A. 2

B. 0.5

C. 4

D. 0.25

$$\frac{K_{a_1}(HA)}{K_{a_2}(HB)} = \frac{4}{1}$$

C_1 = ?

C_2

$$\frac{[H^+]_{HA}}{[H^+]_{HB}} = \sqrt{\frac{K_{a_1} \times C_1}{C_2 \times K_{a_2}}}$$

Sq. both sides.

$$K_{a_2} C_2 = K_{a_1} C_1$$

$$\frac{C_1}{C_2} = \frac{K_{a_2}}{K_{a_1}} = \frac{1}{4} = 0.25$$

Question

Fear or excitement, generally cause one to breathe rapidly and it results in the decrease of concentration of CO_2 in blood. In what way it will change pH of blood?

$[CO_2] \downarrow\downarrow$

Buffer

$H_2CO_3 + HCO_3^-$

A. pH will increase

B. pH will decrease

C. No change

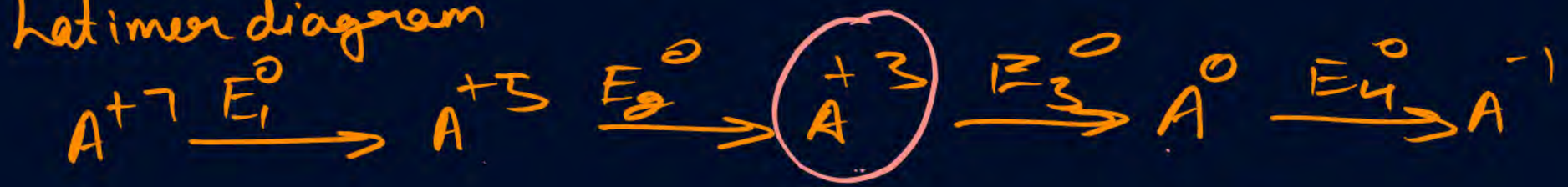
D. pH will be 7

3-4 out of 5

MEDICS Test ⇒ lec-1 to lec-4 ⇒ Electrochemistry

Revision of Last Class

Latimer diagram



↓ disproportionation.

if $E_2^\circ < E_3^\circ \Rightarrow$ n^ spon.

Salt bridge

$\Delta G^\circ = -nFE^\circ$

$\Delta G^\circ = -RT \ln K$ ✓

$nFE^\circ = RT \ln K$

$E^\circ = \frac{RT}{nF} \ln K$

Nernst Equation

(Effect of temperature and concentration on electrode potential or e.m.f. of cell)

Relation between E and E°_{cell} (Nernst eqn.)

$E \rightarrow$ E.P. or E_{cell}

$E_{M/M^{n+}} \rightarrow$ O.P. $\quad E_{M^{n+}/M} \rightarrow$ R.P.

$E^\circ \rightarrow$ S.E.P. or E°_{cell}

$E^\circ_{M/M^{n+}}$ → S.O.P. $\quad E^\circ_{M^{n+}/M}$ → S.R.P.

Std. Cond. $\Rightarrow$ C = 1M, T = 298K

effect of Temp. or/& Conc. on O.P. or R.P. or E_{cell}.

Relation b/w ΔG & ΔG° $\quad Q$ = on quotient.

$$\Delta G = \Delta G^\circ + RT \ln Q \quad | \quad \ln = 2.303 \log_{10}$$

$$+nFE = +nFE^\circ - RT \ln Q$$

$$E = E^\circ - \frac{2.303RT}{nF} \log_{10} Q$$

MIT

Nernst eqn.

Reduction :- Cathode

$M^{n+}_{C_2} + ne^- \rightarrow M(s)$

$T = 298\,K$

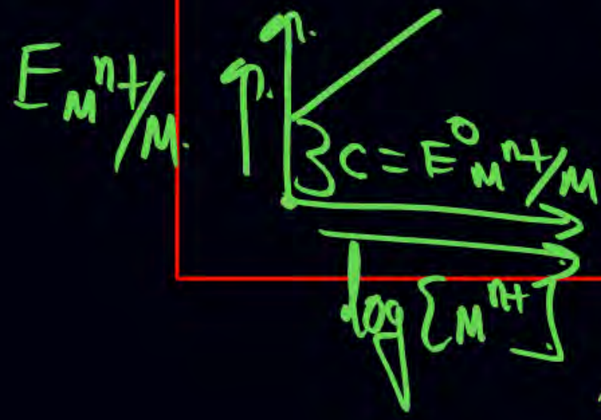
$\frac{2.303RT}{F} = 0.059 \simeq 0.06$

$$E_{M^{n+}/M} = E^{o}_{M^{n+}/M} - \frac{2.303RT}{nF} \log \frac{1}{[M^{n+}]}$$

$$E_{M^{n+}/M} = E^{o}_{M^{n+}/M} + \frac{0.059}{n} \log [M^{n+}]$$

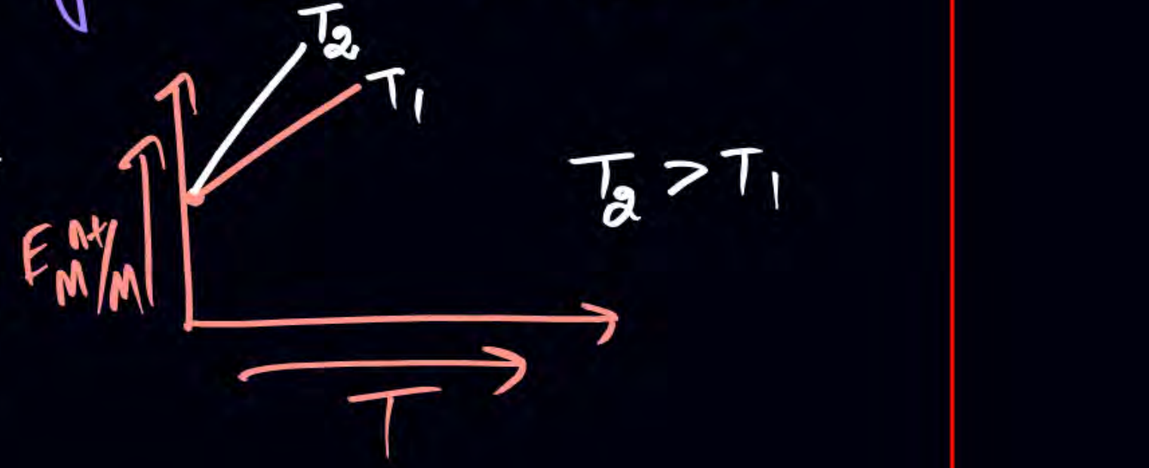
$$y = c + m x$$

$$m = \frac{2.303RT}{nF} = \frac{0.059}{n}$$



$$E_{M^{n+}/M} = E^{o}_{M^{n+}/M} + \frac{2.303RT}{nF} \log [M^{n+}]$$

$$y = c + m x$$



MIT

Nernst eqn :-

Oxidation :- Anode

$M(s) \longrightarrow \underset{\downarrow C_1}{M^{n+}} + ne^-$

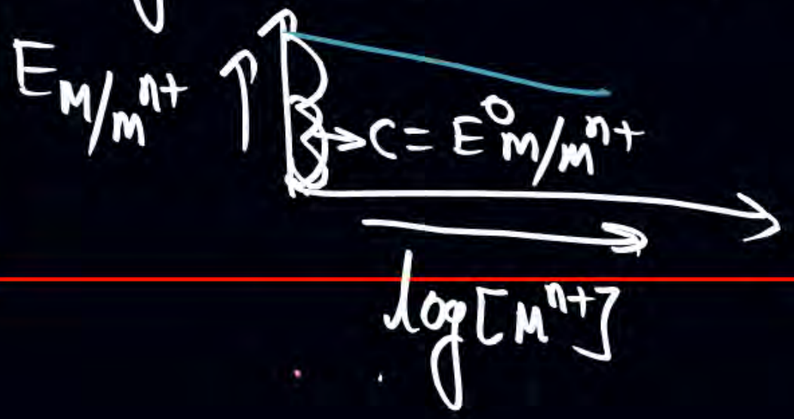
$E_{M/M^{n+}} = E^0_{M/M^{n+}} - \frac{2.303RT}{nF} \log [M^{n+}]$

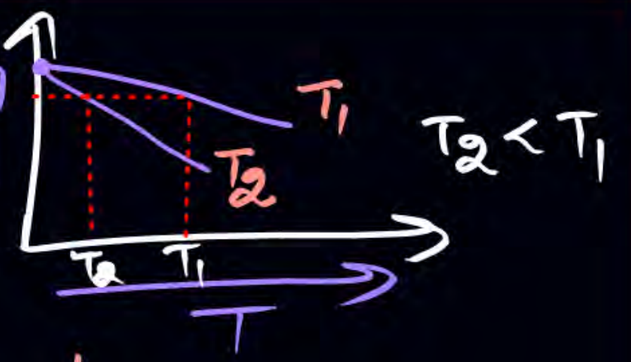
$y = C + m x$

$T = 298\,K \Rightarrow \frac{2.303RT}{F} = 0.059 \approx 0.06$

$E_{M/M^{n+}} = E^0_{M/M^{n+}} - \frac{0.059}{n} \log [M^{n+}]$

$y = C + m x$





MIT

Nernst eqⁿ :- Electrochemical Cell

$M(s)/M^{n+}(C_1)\,||\,M'^{n+}(C_2)/M'(s)$ (anode)

Anode :- $M(s) \rightarrow \underset{C_1}{M^{n+}} + n e^-$

Cathode :- $\underset{\downarrow C_2}{M'^{n+}} + n e^- \rightarrow M'(s)$

$$|M'^{n+}_{C_2} + M(s) \longrightarrow |M^{n+}_{C_1} + M'(s)$$

$$E_{Cell} = E^{\circ}_{Cell} - \frac{2.303RT}{nF} \log \frac{[M^{n+}]^{x}}{[M'^{n+}]^{y}}$$

$T = 298K$

$$E_{Cell} = E^{\circ}_{Cell} - \frac{0.059}{n} \log \frac{[C_1]^{x}}{[C_2]^{y}}$$

always write Cell rxn :-

↓

you will never forget n, x & y

$Zn(s)/Zn^{2+}(0.1M)\,||\,Cu^{2+}(0.01M)/Cu(s)$

$Zn \rightarrow \underset{(10^{-1}M)}{Zn^{2+}} + 2e^-$ $\quad E^\circ_{cell} = 1.1V$

$\underset{(10^{-2}M)}{Cu^{2+}} + 2e^- \rightarrow Cu(s)$ $\quad n = 2$

$Zn + \underset{(10^{-2}M)}{Cu^{2+}} \rightarrow \underset{(10^{-1}M)}{Zn^{2+}} + Cu$

$$E_{cell} = E^\circ_{cell} - \frac{0.06}{2}\log\frac{[Zn^{2+}]}{[Cu^{2+}]}$$

$$= E^\circ_{cell} - 0.03\log\frac{10^{-1}}{10^{-2}}$$

$$= 1.10 - 0.03 = 1.07V$$

$Mg/Mg^{2+}(0.01M)\,||\,Cu^{2+}(0.01M)/Cu(s)$

$E^\circ_{cell} = 2.71V$ $\quad \log 1 = 0$

$n = 2$

$$E_{cell} = E^\circ_{cell} - \frac{0.06}{2}\log\frac{10^{-2}}{10^{-2}}$$

$$E_{cell} = E^\circ_{cell}$$

$Mg/Mg^{2+}(10^{-2}M) \,||\, Al^{3+}(10^{-2}M)/Al(s)$ $\quad n=6$

$E_{cell}=?$ $\quad E^{\circ}_{cell}=0.99V$

$n=6$

$$E_{cell}=E^{\circ}_{cell}-\frac{0.06}{6}\log\frac{[Mg^{2+}]^3}{[Al^{3+}]^2}$$

$$=0.99-0.01\log\frac{(10^{-2})^3}{(10^{-2})^2}$$

10^{-2}

$$=0.99+0.02$$

$$=1.01V$$

$Mg \rightarrow Mg^{2+}+2e^-\,]\times 3$

$Al^{3+}+3e^- \rightarrow Al(s)\,]\times 2$

$3Mg+2Al^{3+} \rightarrow 3Mg^{2+}+2Al$

$Pt, (H_2)_{P_1} / H^+(C_1) \,||\, Pt, Cl_2(g)_{P_2} / Cl^-_{C_2}$

$n = 2$

anode :- $H_2(g)_{P_1} \rightarrow 2H^+_{C_1} + 2e^-$

Cathode :- $Cl_2(g)_{P_2} + 2e^- \rightarrow 2Cl^-_{C_2}$

$$H_2(g)_{P_1} + Cl_2(g)_{P_2} \rightarrow 2H^+_{C_1} + 2Cl^-_{C_2}$$

$$E_{cell} = E^\circ_{cell} - \frac{0.06}{n} \log \frac{[H^+]^2 [Cl^-]^2}{(P_{H_2})^1 (P_{Cl_2})^1}$$

$$= E^\circ_{cell} - \frac{0.06}{2} \log \frac{(C_1)^2 (C_2)^2}{(P_1)^1 (P_2)^1}$$

$$\frac{2.303RT}{F} = \frac{2.303 \times 8.314 \times 298.}{96500} = 0.059$$

$$-\log \frac{1}{2}$$

$$-[\log 1 - \log 2]$$

$$-[0 - \log 2]$$

$$+\log 2$$

QUESTION

Find electrode potential (Reduction) of following:

Cu/Cu^{2+} (0.1 M) ; $E^{o}_{Cu^{2+}/Cu} = +0.34$ V

$\log m^n = n \log m$

$n = 2$

Ans $E_{Cu^{2+}/Cu} = E^{\circ}_{Cu^{2+}/Cu} + \frac{0.06}{2} \log [Cu^{2+}]^{-1}$

$= 0.34 + 0.03 \log 10$

$= 0.34 - 0.03 = 0.31$ V

QUESTION

Oxidn

Find ~~electrode~~ potential of following:

$Zn^{2+}\ (10^{-2}\ M)/Zn\ (s);\ E^{o}_{Zn^{2+}/Zn} = -0.76\ V$

$n = 2$

$$E_{Zn/Zn^{2+}} = E^{o}_{Zn/Zn^{2+}} - \frac{0.06}{2} \log [Zn^{2+}]^{1}$$

-2

$$= 0.76 - 0.03 \log 10^{-2}$$

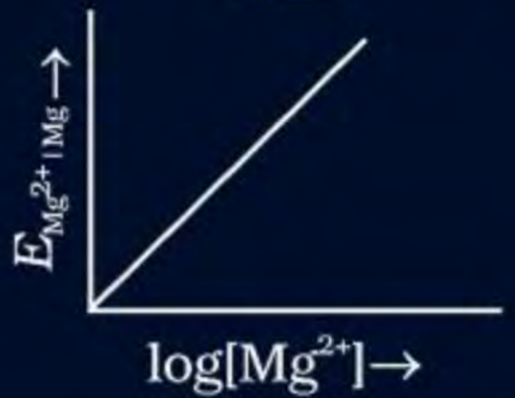
$$= +0.76 + 0.06 = 0.82\ V$$

QUESTION – (NCERT Exemplar)

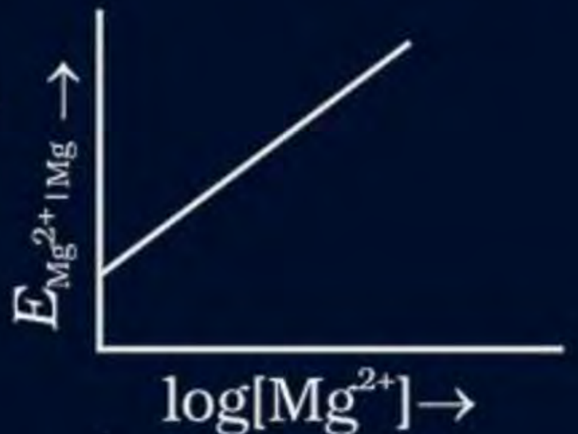
Electrode potential for Mg electrode varies according to the equation

$$E_{Mg^{2+}|Mg} = E^{\Theta}_{Mg^{2+}|Mg} - \frac{0.059}{2}\log\frac{1}{[Mg^{2+}]}.$$ **The graph of** $E_{Mg^{2+}|Mg}$ **vs** $\log[Mg^{2+}]$ **is:**

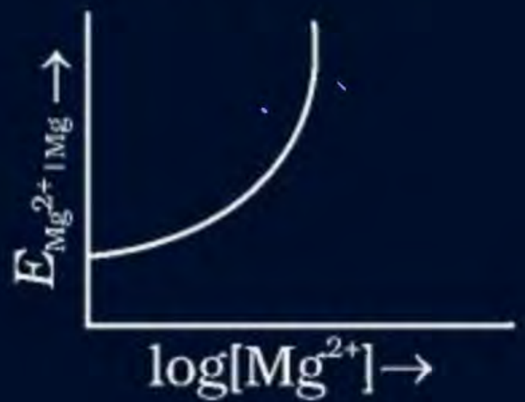
A



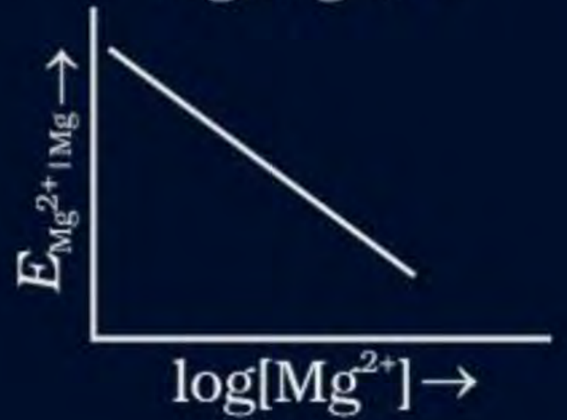
B



C



D



QUESTION

Find Oxidation potential of the following:

Pt, H_2 (1 atm)/H^+ (10^{-3} M) 0.09V

$H_2(g) \rightarrow 2H^+ + 2e^-$

$$E_{H_2/H^+} = -\frac{0.06}{2}\log\frac{[H^+]^2}{(P_{H_2})^1}$$

$$= -0.03\log\frac{10^{-6}}{1}$$

$$= 0.03 \times 6 = 0.18V$$

QUESTION

Find Reduction potential of the following:

Pt, H_2 (1 atm)/H^+ (10^{-2} M)

$$E_{H^+/H_2} = -\frac{0.06}{2} \log \frac{1}{(10^{-2})^2}$$

$$= -0.03 \log 10^4$$

$$= -0.12\ V$$

QUESTION (NEET 2016, Phase-I)

The pressure of H_2 required to make potential of H_2 electrode. Zero in pure water at 298 K.

(A) 10^{-10} atm

(B) 10^{-4} atm

(C) 10^{-14} atm

(D) 10^{-12} atm

$P_{H_2} = ?$

$E_{H^+/H_2} = 0$ V

$[H^+] = 10^{-7}$ M

$2H^+ + 2e^- \rightarrow H_2(g)$

$E_{H^+/H_2} = -\frac{0.06}{2} \log \frac{P_{H_2}}{[H^+]^2}$

$0 = -0.03 \log \frac{P_{H_2}}{(10^{-7})^2}$

$0 = -[\log P_{H_2} - \log 10^{-14}]$

$\log 10^{-14} = \log P_{H_2}$

$P_{H_2} = 10^{-14}$ atm.

Q. Calculate potential of Hydrogen electrode in Contact with solution whose pH is 10?

$$2H^+ + 2e^- \rightarrow H_2(g)$$

10^{-10} 1 atm.

$pH = 10 \Rightarrow [H^+] = 10^{-10}\ M$

Ans $E_{H^+/H_2} = -\frac{0.06}{2} \log \frac{P_{H_2}}{[H^+]^2}$

$= -0.03 \log \frac{1}{10^{-20}}$

$= -0.03 \log 10^{20}$

$= -0.60\ V$

QUESTION (AIIMS-2019)

At 298 K temperature, a hydrogen gas electrode is made by dipping platinum wire in a solution of HCl of pH = 10 and by passing hydrogen gas around the platinum wire at one atm pressure. The potential of electrode would be

(A) 0.59 V

(B) 0.118 V

(C) 1.18 V

(D) 0.059 V

Question

Based on the data given for half cell

	$M^{(x+n)+}$,	M^{x+} |Pt
% of reduced form	50	20
Potential (V)	0.1	0.112

The value of n is:

$M^{(x+n)+} + ne^- \longrightarrow M^{x+}$

80 → 20 (Reduced form)

(A) 2

(B) 3 ✓

(C) 4

(D) 5

$E_1 = E^\circ - \frac{0.06}{n} \log \frac{50}{50} \cdot 1$

$E_2 = E^\circ - \frac{0.06}{n} \log \frac{20}{80} \cdot 4$

$E_2 = E_1 + \frac{0.06}{n} \log 4$

$0.112 - 0.1 = \frac{0.06}{n} \times 0.6$

$\frac{0.012}{0.06 \times 0.6} = \frac{1}{n}$

$3 \quad n = 3$

QUESTION

log 12 = 1.08
log 13 = 1.1
log 14 = 1.15

Represent the cell in which the following reaction takes place
$Mg(s) + 2Ag^{+}(0.0001M) \longrightarrow Mg^{2+}(0.130M) + 2Ag(s)$
Calculate its $E_{(cell)}$ if $E^{\ominus}_{(cell)} = 3.17$ V.

$Mg/Mg^{2+}(0.13) \,||\, Ag^{+}(10^{-4}M)/Ag$

$$E_{cell} = 3.17 - \frac{0.06}{2}\log\frac{(0.13)^{1}}{(10^{-4})^{2}}$$

$$= 3.17 - 0.03\log\frac{13\times10^{6}}{1}$$

$$= 3.17 - 0.03[\log 13 + \log 10^{6}]$$

$$= 3.17 - 0.03[1.1+6]$$

$$= 3.17 - 0.03\times7.1$$

$$= 3.17 - 0.213$$

log 7 = 0.85
log 2 = 0.3

QUESTION (NEET 2017)

$Zn \mid ZnSO_4$ (0.01 M) || $CuSO_4$(1 M) | Cu; E.M.F. of this cell is E_1.
If conc. Of $ZnSO_4$ is changed to 1 M and that of $CuSO_4$ changed to 0.01 M.
Now E.M.F. is E_2:

(A) $E_1 < E_2$

(B) $E_1 > E_2$

(C) $E_2 = 0 \neq E_1$

(D) $E_1 = E_2$

$E_2 < E_1$

$E = E^\circ - \frac{0.06}{n} \log \frac{[Zn^{2+}]}{[Cu^{2+}]}$

QUESTION

$E^\circ_{Mg^{2+}/Mg} = -2.37V$, $E^\circ_{Cu^{2+}/Cu} = 0.34V$, $E^\circ_{Fe^{2+}/Fe} = -0.44V$

Write the Nernst equation and emf of the following cell at 298 K:

(i) Mg(s) | Mg^{2+} (0.0001M) || Cu^{2+} (0.0001 M) | Cu(s) → $E_{cell} = 2.71V$

(ii) Fe(s) | Fe^{2+} (0.0001M) || H^+ (1M) | H_2 (g) (1 bar) | Pt(s)

(iii) Sn(s) | Sn^{2+} (0.050 M) || H^+ (0.020 M) | H_2(g) (1 bar) | Pt(s)

$E^\circ_{Sn^{2+}/Sn} = -0.14V$

$n = 2$

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

$2H^+ + 2e^- \rightarrow 1H_2(g)$

$Sn + 2H^+ \rightarrow Sn^{2+} + H_2(g)$

$E^\circ_{cell} = 0.14V$

$$E_{cell} = 0.14 - \frac{0.06}{2}\log\frac{5\times10^{-2}}{(2\times10^{-2})^2}$$

$$= 0.14 - 0.03\log\frac{5\times10^{-2}\times10^{2}}{4\times10^{-4}}$$

$$= 0.14 - 0.03\log(5)^3$$

$$= 0.14 - 0.09\times0.7$$

$$= 0.14 - 0.063$$

QUESTION

The E.M.F. of the following galvanic cells:

(1) $Zn \mid Zn^{2+}(1\ M) \parallel Cu^{2+}(1\ M) \mid Cu \longrightarrow E_1 = E^\circ_{cell}$

(2) $Zn \mid Zn^{2+}(0.1\ M) \parallel Cu^{2+}(1\ M) \mid Cu \longrightarrow E_2 > E^\circ_{cell}$

(3) $Zn \mid Zn^{2+}(1\ M) \parallel Cu^{2+}(0.1\ M) \mid Cu \longrightarrow E_3 < E^\circ_{cell}$

(4) $Zn \mid Zn^{2+}(0.1\ M) \parallel Cu^{2+}(0.1\ M) \mid Cu \longrightarrow E_4 = E^\circ_{cell}$

$E_2 > E_1 = E_4 > E_3$

QUESTION – (AIIMS 2018 (E), 27 May)

The standard EMF for the cell reaction, $Zn + Cu^{2+} \rightarrow Cu + Zn^{2+}$ is 1.1 volt at 25°C. The EMF for the cell reaction, when 0.1 M Cu^{2+} and 0.1 M Zn^{2+} solutions are used, at 25°C is:

A. 1.10 V

B. 0.10 V

C. –1.10 V

D. –0.110 V

QUESTION – (AIIMS 2017)

Consider the following cell reaction:

$2Fe(s) + O_2(g) + 4H^+(aq) \rightarrow 2Fe^{2+}(aq) + 2H_2O(l); \quad E^\circ = 1.67\ V$

At $[Fe^{2+}] = 10^{-3}$ M, $p(O_2) = 0.1$ atm and pH = 3, the cell potential at 25°C is:

(A) 1.47 V

(B) 1.77 V

(C) 1.87 V

(D) 1.57 V

$n = 4$

$[H^+] = 10^{-3}\ M$

$$E = 1.67 - \frac{0.06}{4}\log\frac{[Fe^{2+}]^2}{[H^+]^4 (P_{O_2})}$$

$$= 1.67 - \frac{0.03}{2}\log\frac{10^{-6}}{10^{-12} \times 10^{-1}}$$

$$= 1.67 - \frac{0.03 \times 7}{2}$$

$$= 1.67 - 0.105 \approx 1.57\ V$$

QUESTION

$E^\circ_{cell} = -0.42 - (-0.74)$

$= +0.32$

Given, $E^o_{Cr^{3+}/Cr} = -0.74$ V, $E^o_{Fe^{2+}/Fe} = -0.42$ V. The potential for the cell

$Cr \mid Cr^{3+}$ (0.1 M) $\| Fe^{2+}$ (0.01 M) $\mid Fe$ is:

A 0.26 V

B 0.399 V

C −0.339 V

D −0.26 V

$E_{cell} = 0.32 - \frac{0.06}{6} \log \frac{(10^{-1})^2}{(10^{-2})^3}$ (4)

$= 0.32 - 0.01 \log \frac{10^{-2}}{10^{-6}}$ 10

$= 0.32 - 0.04 = 0.28$ V.

Magarmach Practice Questions

QUESTION

What is the standard electrode potential for the reduction of HClO?

$HClO(aq) + H^+(aq) + 2e^- \longrightarrow Cl^-(aq) + H_2O(l)$ $E^\circ_{ClO^-/Cl^-} = ?$

Given: $Cr^{2+}(aq) \longrightarrow Cr^{3+}(aq) + e^-$, $E^\circ = 0.41\ V$

$HClO(aq) + H^+(aq) + 2Cr^{2+}(aq) \longrightarrow 2Cr^{3+}(aq) + Cl^-(aq) + H_2O(l)$, $E^\circ_{cell} = 1.80$

A 1.39

B 1.54

C 1.22

D 0.90

QUESTION

Based on the following information arrange four metals A, B, C and D in order of decreasing ability to act as reducing agents:

(I) Only A, B and C react with 1 M HCl to given $H_2(g)$

(II) When C is added to solution of the other metal ions, metallic B and D are formed

(III) Metal C does not reduce A^{n+}.

A) C > A > B > D

B) C > A > D > B

C) A > C > D > B

D) A > C > B > D

QUESTION – (AIIMS 2018 (M), 27 May)

In following cell reaction

$Mg(s) + 2Ag^{+}\ (0.001\ M) \rightarrow Mg^{2+}\ (0.20\ M) + 2Ag(s)$

Calculate E_{cell} for the reaction. [$E^{\circ} = 3.17$ V]

(A) 2.63 V

(B) 3.04 V

(C) 3.33 V

(D) 3.51 V

QUESTION – (AIIMS 2018 (M), 26 May)

Cell equation:

$A + 2B^{2+} \rightarrow A^{2+} + 2B$

$A^{2+} + 2e^- \rightarrow A \qquad E^\circ = +0.34\ V$

And $\log_{10} K = 15.6$ at 300 K for cell reactions. Find E° for $B^+ + e^- \rightarrow B$

$$Given \left[\frac{2.303\ RT}{F} = 0.059\right] at\ 300\ K$$

(A) 0.80

(B) 1.26

(C) –0.54

(D) +0.94

QUESTION – (AIIMS 2010)

For a cell reaction involving two electron change, the standard EMF of the cell is 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 2.95×10^{-10}

QUESTION-(NEET 2023)

Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:
Assertion A: In equation $\Delta_r G = -nFE_{cell}$ value of $\Delta_r G$ depends on n.
Reasons R: E_{cell} is an intensive property and $\Delta_r G$ is an extensive property.
In the light of the above statements, choose the correct answer from the options given below:

(A) A is false but R is true.

(B) Both A and R are true and R is the correct explanation of A.

(C) Both A and R are true but R is NOT the correct explanation of A.

(D) A is true but R is false.

QUESTION-(NEET 2022)

Find the emf of the cell in which the following reaction takes place at 298 K

$Ni(s) + 2Ag^{+}\ (0.001\ M) \rightarrow Ni^{2+}\ (0.001\ M) + 2Ag(s)$

(Given that $E^{0}_{cell} = 10.5\ V, \frac{2.303\ RT}{F} = 0.059$ at 298 K)

A 1.05 V

B 1.0385 V

C 1.385 V

D 10.4115 V

QUESTION-(NEET 2022)

Given below are half cell reaction:

$MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$

$E^0_{Mn^{2+}/MnO_4^-} = -1.510\ V$

$1/2\ O_2 + 2H^+ + 2e^- \rightarrow H_2O$

$E_{O_2/H_2O} = +1.223\ V$

Will the permanganate ion MnO_4^- liberate O_2 from water in the presence of an acid?

(A) No, because $E^0_{cell} = -2.733$ V

(B) Yes, because $E^0_{cell} = +0.287$ V

(C) No, because $E^0_{cell} = -0.287$ V

(D) Yes, because $E^0_{cell} = +2.733$ V

QUESTION-(NEET 2019)

For a cell involving one electron E°_{cell} = 0.59 V at 298 K, the equilibrium constant for the cell reaction is:
[Give that $2.303RT/F$ = 0.059 V at T = 298 K]

(A) 1.0×10^{2}

(B) 1.0×10^{5}

(C) 1.0×10^{10}

(D) 1.0×10^{30}

QUESTION – (JEE Advance 2020)

The reduction potential (E°, in V) of MnO_4^- (aq)/Mn(s) is _____.

[Given: $E^o_{(MnO_4^-\ (aq)/MnO_2\ (s)}$ = 1.68 V; $E^o_{(MnO_2\ (s)/Mn^{2+}_{(aq)}}$ = 1.21 V; $E^o_{(Mn^{2+}_{(aq)}/Mn_{(s)}}$ = – 1.03 V]

QUESTION – (JEE Main 2014)

Given below are the half-cell reactions:

$Mn^{2+} + 2e^- \longrightarrow Mn$; **$E^\circ = -1.18$ V**

$2(Mn^{3+} + e^- \longrightarrow Mn^{2+})$; **$E^\circ = +1.51$ V**

The E° for $3Mn^{2+} \longrightarrow Mn + 2Mn^{3+}$ will be:

A. –0.33 V; the reaction will occur

B. –2.69 V; the reaction will not occur

C. –2.69 V; the reaction will occur

D. –0.33 V; the reaction will not occur

QUESTION –

What is the standard electrode potential for the reduction of HClO?

$HClO(aq) + H^+(aq) + 2e^- \longrightarrow Cl^-(aq) + H_2O(l)$ $E^\circ_{ClO^-/Cl^-} = ?$

Given: $Cr^{2+}(aq) \longrightarrow Cr^{3+}(aq) + e^-$, $E^\circ = 0.41\ V$

$HClO(aq) + H^+(aq) + 2Cr^{2+}(aq) \longrightarrow 2Cr^{3+}(aq) + Cl^-(aq) + H_2O(l)$, $E^\circ_{cell} = 1.80$

A 1.39

B 1.54

C 1.22

D 0.90

Home work from modules

Prarambh → Q 23 to Q 36

Prabal → Q 2, 5, 6

PYQ → Q 3, 5, 6, 11, 13, 14, 15, 16, 22

THANK YOU