DPP
DAILY PRACTICE PROBLEMS

Class : XIIth
Date :

Solutions

Subject : CHEMISTRY
DPP No. : 2

Topic :- Electro Chemistry

1 **(a)**

In the process of electro decomposition for purification of metal, impure metal acts as anode.

2 **(b)**

Specific conductivity (κ)

$= \frac{1}{R} \times$ cell constant

Cell constant $= \kappa \times R$

$= 0.0129 \times 100 = 1.29$

3 **(b)**

According to Nernst equation.

$$E_{cell} = E^{\circ}_{Cell} + \frac{0.0591}{2} \log \frac{[Cu^{2+}]}{[Zn^{2+}]}$$

$$E_{cell} = E^{\circ}_{Cell} - \frac{0.0591}{2} \log \frac{[Zn^{2+}]}{[Cu^{2+}]}$$

Or $y = c + (-m)x$

Thus, the slope is negative.

4 **(a)**

In MnO_4^- the oxidation number of Mn is + 7.

$\overset{+7}{Mn} + 5e^- \longrightarrow \overset{+2}{Mn}$

In the reaction, 5 electrons are involved hence 5 Faraday will be needed for the reduction of 1 mole of MnO_4^-.

Therefore, for 0.5 mole of MnO_4^-, number of Faradays required = 2.5 F

5 **(a)**

Anode is electrode at which oxidation occurs.

6 **(b)**

MnO_2 in Lechlanche cell.

7 **(d)**

As Cr has maximum oxidation potential value, therefore its oxidation should be easiest

8 **(d)**

More is reduction potential, more is the power to get itself reduced or greater is oxidising power.

9 **(d)**

$F = N \times e$

10 **(c)**

NaCl gives Na^+ and Cl^- ions;

At anode : $Cl^- \longrightarrow (1/2)Cl_2 + e$

At cathode : $H^+ \longrightarrow (1/2)H_2 + e$

11 **(b)**

Electrons flow from Zn to Cu in outside circuit and current from Cu to Zn.

12 **(d)**

$E^\circ_{cell} = E^\circ_{cathode} - E^\circ_{anode}$

Ni / Ni^{2+} [1.0 M] || Au^{3+} [1.0 M] | Au

$E_{cell}\,(Au^{3+} / Au) = 0.150$ V

$E_{cell}\,(Ni^{2+} / Ni) = -0.25$ V

$E^\circ_{cell} = E^\circ_{cathode} - E^\circ_{anode}$

$= 0.150 - (-0.25)$

$= 0.15 + 0.25$

$= +0.4$ V

13 **(b)**

50 % H_2SO_4aqueous solution can be electrolysed by using Pt electrodes as

$$2H_2SO_4 \rightarrow 2HSO_4^- + 2H^+$$

$2HSO_4^- \rightarrow H_2S_2O_8 + 2e^-$ (at anode)

14 **(d)**

It is fact.

15 **(d)**

For the given cell,

$E_{cell} = E^\circ_{cell} - \frac{0.0591}{2}\log\frac{[Zn^{2+}]}{[Cu^{2+}]}$

1. $E_1 = E^\circ_{cell} - \frac{0.0591}{2}\log\frac{1}{0.1}$

$= E^\circ_{cell} - \frac{0.0591}{2}$

2. $E_2 = E^\circ_{cell} - \frac{0.0591}{2}\log\frac{1}{1}$

$= E^\circ_{cell} - \frac{0.0591}{2} \times 0$

$= E^\circ_{cell}$

3. $E_2 = E^\circ_{cell} - \frac{0.0591}{2}\log\frac{0.1}{1}$

$$= E^{\circ}_{\text{cell}} + \frac{0.0591}{2}$$

$\therefore E_3 > E_2 > E_1$

16 **(a)**

Transport number of an ion

$$= \frac{\text{current carried by that ion}}{\text{total current carried by both the ions}}$$

17 **(c)**

Reduction is always carried out at cathode.

18 **(a)**

Reactions

(i) $Fe(s) \rightarrow Fe^{2+} + 2e^-, \quad E^{\circ} = +0.44\ V$

and $\Delta G_1^{\circ} = -nE^{\circ}F = -2 \times 0.44 \times F$

(ii) $2H^+ + 2e^- + \frac{1}{2}O_2 \longrightarrow H_2O(l); \quad E^{\circ} = +1.23\ V$

and $\Delta G_2^{\circ} = -2 \times (+1.23) \times F$

Net reaction,

$$Fe(s) + 2H^+ + \frac{1}{2}O_2 \rightarrow Fe^{2+} + H_2O(l)$$

$$\Delta G_3^{\circ} = \Delta G_1^{\circ} + \Delta G_2^{\circ}$$

$= -2 \times (+0.44)\ F + (-2 \times 1.23 \times F)$

$= -0.88\ F \times -2.46\ F = -3.34\ F$

$= -3.34 \times 96500\ J$

$= -322.31\ kJ = -322\ kJ$

19 **(b)**

2 faraday will deposit 2 eq. or 1 mole of Cu.

20 **(a)**

Cl_2 is placed above F_2 in electrochemical series, halogen placed below replaces the other from its solution.

ANSWER-KEY										
Q.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
A.	**A**	**B**	**B**	**A**	**A**	**B**	**D**	**D**	**D**	**C**
Q.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
A.	**B**	**D**	**B**	**D**	**D**	**A**	**C**	**A**	**B**	**A**