DPP

DAILY PRACTICE PROBLEMS

Class : XIIth
Date :

Solutions

Subject : CHEMISTRY
DPP No. : 7

Topic :- Electro Chemistry

2 **(b)**

In Galvanic cell (Daniel cell) the electrical energy is produced from chemical reactions.

At anode $Zn \rightarrow Zn^{2+} + 2e^-$ (oxidation)

At cathode $Cu^{2+} + 2e^- \longrightarrow Cu$ (reduction)

Cell reaction $Zn + Cu^{2+} \longrightarrow Zn^{2+} + Cu$

Or $Zn(s) + CuSO_4(aq) \rightarrow Cu(s) + ZnSO_4(aq)$

3 **(b)**

$\Lambda^{\infty}_{AcOH} = \Lambda^{\infty}_{AcONa} + \Lambda^{\infty}_{HCl} - \Lambda^{\infty}_{NaCl}$

$= 91.0 + 426.2 - 126.5$

$= 390.7$

4 **(b)**

The metal with more E°_{OP} is oxidised.

5 **(d)**

$$E_{cell} = E^{\circ}_{cell} - \frac{0.05915}{n} \log Q$$

For standard hydrogen electrode,

$E^{\circ}_{cell} = 0.00V$

$\therefore\ E_{cell} = -\frac{0.05915}{n} \log Q$

Given, pH = 1.0

$\therefore\ [H^+] = 1 \times 10^{-1}$

$$E_{cell} = -\frac{0.05915}{n} \log \frac{1}{[H^+]}$$

[$\because$ The reaction occurring is $2H^+ + 2e^- \rightarrow H_2$]

$$= +\frac{0.05915}{1} \log(H^+)$$

$= 0.05915\ \log(10^{-1})$

$= -\ 0.05915$ V

$= -\ 59.15$ mV

6 **(c)**

$$\Lambda^{\circ}_{eq} = \kappa \times \frac{1000}{\text{normality}}$$

$$= \frac{0.005 \times 1000}{0.01} = 500\ \text{ohm}^{-1}\ \text{cm}^2\ \text{equiv}^{-1}$$

7 **(a)**

E°_{OP} of Mg > E°_{OP} of Al.

8 **(a)**

For the given cell, reaction is

$Zn + Fe^{2+} \rightarrow Zn^{2+} + Fe$

$$E = E^\circ - \frac{0.0591}{n} \log \frac{C_1}{C_2}$$

or, $E^\circ = E + \frac{0.0591}{n} \log \frac{C_1}{C_2}$

$$= 0.2905 + \frac{0.0591}{2} \log \frac{10^{-2}}{10^{-3}} = 0.32\ \text{V}$$

$$E^\circ = \frac{0.0591}{2} \log K_c$$

$$\therefore \log K_c = \frac{0.32 \times 2}{0.0591} = \frac{0.32}{0.0295}$$

$$K_c = 10^{\frac{0.32}{0.295}}$$

9 **(d)**

When Alead storage battery is discharged, the following cell reactions take place.

At anode

$Pb + H_2SO_4 \longrightarrow PbSO_4 + 2H^+ + 2e^-$

At cathode

$PbO_2 + 4H^+ + SO_4^{2-} + 2e^- \longrightarrow PbSO_4 + 2H_2O$

10 **(d)**

$2H^+ + 2e^- \rightarrow H_2$

According to Nernst equation,

$$E = E^\circ + \frac{0.0591}{n} \log \frac{1}{[H^+]^2}$$

$$E = 0 - \frac{0.0591}{2} \log [H^+]^2$$

$= -0.0591$ pH

11 **(a)**

$E^\circ_{Fe^{2+}/Fe} = -0.441\ \text{V}$

$E^\circ_{Fe^{3+}/Fe} = -0.771\ \text{V}$

$E^\circ_{cell} = E^\circ_{OP_{Fe/Fe^{2+}}} + E^\circ_{RP_{Fe^{3+}/Fe^{2+}}}$ (See redox change)

$= +0.441 + 0.771 = 1.212\ \text{V}$

12 **(b)**

$E^\circ_{OP_{\mathrm{Zn}}} > E^\circ_{OP_{\mathrm{Cu}}}$ *or* $E^\circ_{RP_{\mathrm{Zn}}} < E^\circ_{RP_{\mathrm{Cu}}}$

13 **(b)**

H_2SO_4 is strong electrolyte.

14 **(c)**

$$\Lambda_v = \frac{\Lambda^0}{100}$$

$$\therefore\ \alpha = \frac{\Lambda_v}{\Lambda^0} = \frac{\Lambda^0}{100\Lambda^0} = 0.01$$

15 **(b)**

$$\frac{1}{2}H_2 |\ H^+\ ||\ Ag^+\ |\ Ag$$

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

$$= E^\circ_{Ag^+/Ag} - E^\circ_{H^+/\frac{1}{2}H_2}$$

$$= (0.80) - (0.0) = 0.80\ \mathrm{V}$$

16 **(a)**

Ions move towards opposite electrodes due to coulombic forces of attraction.

17 **(c)**

More is E°_{RP}, more is the tendency to get reduced.

E°_{RP} for Ag is maximum.

18 **(d)**

E°_{OP} for Li/Li^+ is maximum in these.

19 **(b)**

250mL of 1 M $AgNO_3$ contain $= \frac{250}{1000}$

$= 0.25$ mole $AgNO_3$

$\because$ Electricity required to liberate 1 g equivalent of metal

$= 96500$ C

$\therefore$ Electricity required to liberate 0.25 g equivalent of metal

$= \frac{96500 \times 0.25}{1}$

$= 24125$ C

20 **(b)**

1 faraday = 1 eq. of Cu = 1/2 mole Cu

$= N/2$ atoms of Cu.

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