(CHEMISTRY) **ELECTROCHEMISTRY**

DPP – 04

CLASS – 12th

TOPIC – NCERT QUESTIONS

Q.1 Can you store copper sulphate solutions in a zinc pot ?

Q.2 Consult the table on standard electrode potentials and suggest three substances that can oxidise Fe2+ ions under suitable conditions.

Q.3 Higher the oxidation potential more easily it is oxidized and hence greater is the reducing power.

Thus, increasing order of reducing power will be

Ag<Hg<Cr<Mg<K.

SOLUTION

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Sol.1 : Zn being more reactive than Cu, displaces Cu

from $CuSO_4$ solution as follows: Zn (s) + $CuSO_4$ (aq) - > $ZnSO_4$(ag)+Cu (s)

In terms of EMF, we have

$Zn \mid Zn^{2+} \mid\mid Cu^{2}+ \mid Cu$

$E^\circ_{cell} = E^\circ_{Cu^{2}+ / Cu} - E^\circ_{Zn2+/Zn}$

$= 0.34\ V - (-0.76\ V)$

$= 1.10V$

As E°_{cell} is positive, reaction takes place, i.e., Zn reacts with copper and hence, we cannot store $CuSO_4$, solution in zinc pot.

Sol.2 The oxidation of Fe2+ ions to Fe3+ ions proceeds as follows:

$Fe^{2+} \rightarrow {}^{3+} + e^{-}$; $E^\circ ox = -0.77\ V$

Only those substances can oxidise $Fe^{2}+$ ions to $Fe^{3}+$ ions which can accept electrons released during oxidation or are placed above iron in electrochemical series. These are: $Cl_2(g)$, $Br_2(g)$ and $Cr_2O_7^{2-}$ ons (in the acidic medium).

Sol.3 Given the standard electrode potentials, K^{+}/K=-2. 93 V, Ag^{+}/Ag = 0.80 V, Hg^{2+}/Hg =0.79V, $Mg2^{+}/Mg$=-2.37V, Cr^{3+}/Cr=0.74V.

Arrange these metals in their increasing order of reducing power.