

- 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  $\text{Fe}^{2+}$  ions under suitable conditions.
- Q.3** Higher the oxidation potential more easily it is oxidized and hence greater is the reducing power.

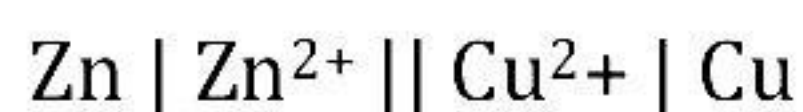
Thus, increasing order of reducing power will be

$\text{Ag} < \text{Hg} < \text{Cr} < \text{Mg} < \text{K}$ .

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

from CuSO<sub>4</sub> solution as follows:  $\text{Zn (s)} + \text{CuSO}_4 \text{ (aq)} \rightarrow \text{ZnSO}_4 \text{ (aq)} + \text{Cu (s)}$

In terms of EMF, we have



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

$$= 0.34 \text{ V} - (-0.76 \text{ V})$$

$$= 1.10 \text{ V}$$

As  $E^\circ_{\text{cell}}$  is positive, reaction takes place, i.e., Zn reacts with copper and hence, we cannot store CuSO<sub>4</sub> solution in zinc pot.

**Sol.2** The oxidation of Fe<sup>2+</sup> ions to Fe<sup>3+</sup> ions proceeds as follows:



Only those substances can oxidise Fe<sup>2+</sup> ions to Fe<sup>3+</sup> ions which can accept electrons released during oxidation or are placed above iron in electrochemical series. These are: Cl<sub>2</sub>(g), Br<sub>2</sub>(g)

and Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> ions (in the acidic medium).

**Sol.3** Given the standard electrode potentials, K<sup>+</sup>/K = -2.93 V, Ag<sup>+</sup>/Ag = 0.80 V, Hg<sup>2+</sup>/Hg = 0.79 V,

Mg<sup>2+</sup>/Mg = -2.37 V, Cr<sup>3+</sup>/Cr = 0.74 V.

Arrange these metals in their increasing order of reducing power.