only The (✓) mark questions

Exercises

3.1 Arrange the following metals in the order in which they displace each other from the solution of their salts.
Al, Cu, Fe, Mg and Zn.

3.2 Given the standard electrode potentials,
K^+/K = –2.93V, Ag^+/Ag = 0.80V,
Hg^{2+}/Hg = 0.79V
Mg^{2+}/Mg = –2.37 V, Cr^{3+}/Cr = – 0.74V
Arrange these metals in their increasing order of reducing power.

3.3 Depict the galvanic cell in which the reaction
$Zn(s)+2Ag^+(aq) \rightarrow Zn^{2+}(aq)+2Ag(s)$ takes place. Further show:
(i) Which of the electrode is negatively charged?
(ii) The carriers of the current in the cell.
(iii) Individual reaction at each electrode.

3.4 Calculate the standard cell potentials of galvanic cell in which the followin reactions take place:
(i) $2Cr(s) + 3Cd^{2+}(aq) \rightarrow 2Cr^{3+}(aq) + 3Cd$
(ii) $Fe^{2+}(aq) + Ag^+(aq) \rightarrow Fe^{3+}(aq) + Ag(s)$
Calculate the $\Delta_r G^\ominus$ and equilibrium constant of the reactions.

3.5 Write the Nernst equation and emf of the following cells at 298 K:
(i) $Mg(s)\,|\,Mg^{2+}(0.001M)\,||\,Cu^{2+}(0.0001\ M)\,|\,Cu(s)$
(ii) $Fe(s)\,|\,Fe^{2+}(0.001M)\,||\,H^+(1M)\,|\,H_2(g)(1bar)\,|\,Pt(s)$
(iii) $Sn(s)\,|\,Sn^{2+}(0.050\ M)\,||\,H^+(0.020\ M)\,|\,H_2(g)\ (1\ bar)\,|\,Pt(s)$
(iv) $Pt(s)\,|\,Br^-(0.010\ M)\,|\,Br_2(l)\,||\,H^+(0.030\ M)\,|\,H_2(g)\ (1\ bar)\,|\,Pt(s)$.

3.6 In the button cells widely used in watches and other devices the followi reaction takes place:
$Zn(s) + Ag_2O(s) + H_2O(l) \rightarrow Zn^{2+}(aq) + 2Ag(s) + 2OH^-(aq)$
Determine $\Delta_r G^\ominus$ and $E^\ominus$ for the reaction.

3.7 Define conductivity and molar conductivity for the solution of an electroly Discuss their variation with concentration.

3.8 The conductivity of 0.20 M solution of KCl at 298 K is 0.0248 S cm^{-1}. Calcul its molar conductivity.

3.9 The resistance of a conductivity cell containing 0.001M KCl solution at K is 1500 Ω. What is the cell constant if conductivity of 0.001M KCl solut at 298 K is 0.146×10^{-3} S cm^{-1}.