



14	Write overall cell reaction for lead storage battery when the battery is being charged.	2
15	Determine the values of equilibrium constant ( $K_c$ ) and $G^0$ for the following reaction: $Ni(s) + 2Ag^+(aq) \rightleftharpoons Ni^{2+}(aq) + 2 Ag(s)$ , $E^0_{cell} = 1.05V$ , ( $F = 96500C$ ) ( Ans: $G^0_{cell} = -202,650J$ , $K_c = 3.917 \times 10^{35}$ .)	2
16	Write the reaction taking place at cathode anode when the lead –acid storage battery is in use.	2
17	What is the difference between an electro-chemical cell and an electrolytic cell?	2
18	Calculate the standard cell potential of the galvanic cell in which the following reaction takes place: $2Cr(s) + 3Cd^{2+}(aq) \rightleftharpoons 2Cr^{3+}(aq) + 3Cd(s)$ Given $E^0_{Cr^{3+}/Cr} = -0.74V$ , $E^0_{Cd^{2+}/Cd} = -0.40V$ , $F = 96500C mol^{-1}$ Also calculate the $rG^0$ value of the reaction. (Ans: $E^0_{cell} = 0.34V$ , $rG^0 = -196.86 kJ mol^{-1}$ )	2
19	For what concentration of $Ag^+(aq)$ will the emf of the given cell be zero at 298 K, if concentration of $Cu^{2+}(aq)$ is 0.01M? $Cu(s) / Cu^{2+}(0.01M) // Ag^+(aq) / Ag(s)$ . Given $E^0_{Ag^+/Ag} = +0.80V$ , $E^0_{Cu^{2+}/Cu} = +0.34 V$ . (Ans: $[Ag^+] = 1.48 \times 10^{-9} M$ )	2
20	The chemistry of corrosion is essentially an electrochemical phenomenon. Explain the reactions occurring during the corrosion of iron in the atmosphere.	2
21	Write the anode and cathode reactions occurring in a commonly used mercury cell. How is the overall reaction represented?	2
22	Define the molar conductivity and Explain the variation in molar conductivity with change in concentration of a weak electrolyte and a strong electrolyte in its solution.	2
23	A copper-silver cell is set up. The copper ion concentration is 0.10M. The concentration of silver ions is not known. The cell potential was found to be 0.422V. Determine the concentration of silver ions in the cell. (Given: $E^0_{Cu^{2+}/Cu} = +0.34V$ , $E^0_{Ag^+/Ag} = +0.80V$ ) (Ans: $7.1 \times 10^{-2} M$ )	3
24	What are primary cells and secondary cells? Give one example for each.	3
25	i) A current of 1.5 ampere was passed through an electrolytic cell containing $AgNO_3$ solution with inert electrodes. The weight of Ag deposited was 1.50g. How long did the current flow? (Ans: 893.51 sec)  ii) Write the reactions taking place at the anode and cathode in the above cell? iii) Give reactions taking place at the two electrodes if these are made up of Ag.	3



34	<p>a) Two electrolytic cells containing silver nitrate solution and dilute sulphuric acid solution were connected in series. A steady current of 2.5 amp was passed through them till 1.078g of silver was deposited. [<math>\text{Ag} = 107.8 \text{ g mol}^{-1}</math>, <math>1\text{F} = 96,500\text{C}</math>]</p> <p>i) How much electricity was consumed? (Ans: 0.01 F or 965C)</p> <p>ii) What was the weight of oxygen gas liberated? (Ans: 0.16g)</p> <p>b) Give reason:</p> <p>i) Rusting of iron pipe can be prevented by joining it with a piece of magnesium.</p> <p>ii) Conductivity of an electrolyte solution decreases with the decrease in concentration.</p>	5
35.	<p>a) What is a fuel cell? What is its main advantage?</p> <p>b) What are the reactions occurring at the cathode and anode of a Leclanche cell?</p> <p>c) In the button cell widely used for watches and other devices, the following reaction takes place:</p> $\text{Zn(s)} + \text{Ag}_2\text{O(s)} + \text{H}_2\text{O(l)} \rightarrow \text{Zn}^{2+}(\text{aq}) + 2\text{Ag(s)} + 2\text{OH}^-(\text{aq})$ <p>Give the cell representation and determine the value of <math>K_c</math> for the above reaction using the following data:</p> $\text{Ag}_2\text{O(s)} + \text{H}_2\text{O(l)} + 2\text{e}^- \rightarrow 2\text{Ag(s)} + 2\text{OH}^-(\text{aq}) \quad (E^0 = 0.344\text{V})$ $\text{Zn}^{2+}(\text{aq}) + 2\text{e}^- \rightarrow \text{Zn(s)} \quad (E^0 = -0.76\text{V})$ <p>(Ans: <math>G^0 = -213072\text{J}</math>, <math>K_c = 2.649 \times 10^{37}</math>)</p>	5
36.	<p>The following chemical reaction is occurring in an electrochemical cell</p> $\text{Mg(s)} + 2\text{Ag}^+(0.0001\text{M}) \rightarrow \text{Mg}^{2+}(0.10\text{M}) + 2\text{Ag(s)}$ <p>Given <math>E^0_{\text{Mg}^{2+}/\text{Mg}} = -2.36\text{V}</math> and <math>E^0_{\text{Ag}^+/\text{Ag}} = 0.81\text{V}</math></p> <p>For this cell calculate/write</p> <p>i) a) <math>E^0</math> value for the electrode <math>2\text{Ag}^+/2\text{Ag}</math>.  b) Standard cell potential <math>E^0_{\text{cell}}</math>.</p> <p>ii) Cell potential (<math>E_{\text{cell}}</math>)</p> <p>iii) a) Symbolic representation of the above cell.  b) Will the above cell reaction be spontaneous.</p> <p>(Ans: i) a) 0.81V b) 3.17V (ii) 2.96 V, iii) b) yes.</p>	5