HOLIDAY ASSIGNMENT.

Electrochemistry XII

1. What is a fuel cell? Draw labelled dgm and write reactions at cathode and Anode.
2. Zn Zn/Ag2O cell $Zn \rightarrow Zn^{2+} + 2e^-$ ($E^\circ = 0.76V$)
   $Ag_2O + H_2O + 2e^- \rightarrow 2Ag + 2OH^-$ $E = 0.334V$.
   (i) What is (a) oxidised (b) reduced.
   (ii) Find E°_{cell} and ΔG in joules
3. Calculate the electrode potential of a copper wire dipped in 0.1M $CuSO_4$ solution at 25°C. Standard electrode potential of copper is 0.34V.
4. Following two reactions can occur at cathode during electrolysis of aq. NaCl
   $Na^+ + 1e^- \rightarrow Na$ $E^\circ = -2.71V$.
   $2H_2O + 2e^- \rightarrow H_2 + 2OH^-$ $E^\circ = -0.83V$.
   Which reaction takes place preferably and why?
5. Define Standard Hydrogen electrode
6. How does molar conductance of a strong and weak electrolyte vary on dilution and why?
7. How many coulombs will be required to discharge half mole of Al^{3+} ions.
8. Can a Nickel spatula be used to stir solution of copper sulphate.
   $E^\circ_{Ni^{2+}/Ni} = -0.25V$ $E^\circ_{Cu^{2+}/Cu} = +0.34V$.
9. Write Nernst equation and find e.m.f of the following cell at 25°C.

P.T.O

Pt Br^- | Br_2 || H^+ | H_2 Pt
(0.01M) (.03M)

$E^\circ Br_2/Br^- = -1.08V$

10. Calculate the pH of the following half cell
Pt H_2 / HCl $E^\circ_{cell} = -0.25V$.
reduction

11. Define molar conductivity and write its units
12. What will happen to the voltage, if salt bridge is removed between the two half cells.
13. What is the effect of conc. on electrode potential?
14. Why rusting is faster in saline water
15. Why Galvanization is better than tinning to prevent iron from rusting?
16. Calculate free energy change for the ~~reaction~~ following cell
$Zn | Zn^{2+} || Cu^{2+} | Cu$. $E^\circ_{Zn^{2+}/Zn} = -0.76V$.
$E^\circ_{Cu^{2+}/Cu} = 0.34V$.
Also calculate equilibrium constant.
17. Calculate Λ_m of Al^{3+} ions when Λ_m of $Al_2(SO_4)_3$ and SO_4^{2-} ions are 858 and 160 $ohm^{-1} cm^2 mol^{-1}$.
18. Calculate strength of current required to deposit 1.2g of magnesium from $MgCl_2$ in one hour. (1F = 96500 coulomb