Assignment IV

• **P6.16.** Consider the cell $Zn(s)|ZnCl_2(aq, 0.005 \text{ mol/kg})|Hg_2Cl_2(s)|Hg(l)$ for which the reaction is $Ua Cl_2(a) + Zn(a) \rightarrow 2Ua(l) + 2Cl^2(aa) + Zn^{2+}(aa)$

 $Hg_2Cl_2(s) + Zn(s) \rightarrow 2Hg(l) + 2Cl^{-}(aq) + Zn^{2+}(aq)$

- Given that $E^{\theta}(Zn^{2+}, Zn) = -0.7628; E^{\theta}(Hg_2Cl_2, Hg) = +0.2676$
- and the measured emf E=+1.2272
 - a) write the Nernst equation for the cell
 - b) determine the standard emf
 - c) find $\Delta_r G$, $\Delta_r G^{\theta}$ and K for the cell reaction
 - d) the mean ionic activity and activity coefficient for ZnCl₂ from the measured cell potential
 - e) the mean ionic activity and activity coefficient for ZnCl₂ from the Debye-Huckel limiting law
 - f) given the emf temperature coefficient -4.52 \cdot 10⁻⁴ V/K calculate Δ S, Δ H.