CH1011 Tutorial 7

Name:

1. Assign the **oxidation state** of carbon in the following compounds:

   $C_{diamond}$ $NaHCO_3$ CH_2F_2

2. The following two redox couple are combined: $E^o_{½}$ $Cr^{3+}_{(aq)}/Cr_{(s)}$ -0.74V $Fe^{3+}_{(aq)}/Fe^{2+}_{(aq)}$ 0.77V
   - Work out and balance the spontaneous **redox reaction**.
   - Calculate the standard cell voltage $\mathbf{E^o_{cell}}$.
   - Identify the component that is the **oxidant** and the component that is the **reductant**.

3. What is the cell reaction in the following cell?
   Calculate the standard free energy change ΔG^o for the reaction:

   Cu | $CuSO_4$ || KCl 0.100M | AgCl(s) | Ag(s)

   Given that the potential of this cell at 298K is +0.030V and that E^o for the electrode reaction $AgCl(s) + e \leftrightarrows Ag(s) + Cl^-$ is + 0.223V, calculate the concentration of $CuSO_4$ in the cell.

   $E^o_{Cu2+/Cu}$ = + 0.340V F = 96,500 coulombs mol^{-1}

4. Outline the chief features of a **calomel electrode** and explain how it is used.

5. What is the **membrane potential** and why is it important in cellular biochemistry?