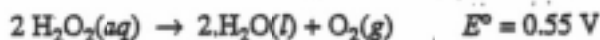


2. Answer the following questions that relate to electrochemical reactions.

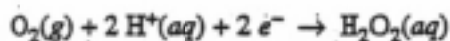
(a) Under standard conditions at 25°C, $Zn(s)$ reacts with $Co^{2+}(aq)$ to produce $Co(s)$.

- Write the balanced equation for the oxidation half reaction.
- Write the balanced net-ionic equation for the overall reaction.
- Calculate the standard potential, E° , for the overall reaction at 25°C.

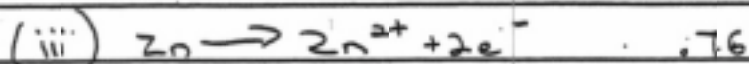
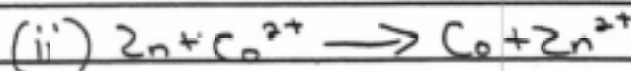
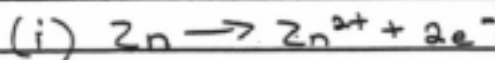
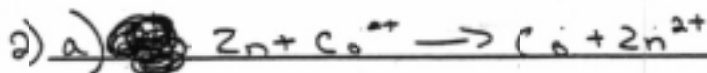
(b) At 25°C, H_2O_2 decomposes according to the following equation.



- Determine the value of the standard free energy change, ΔG° , for the reaction at 25°C.
- Determine the value of the equilibrium constant, K_{eq} , for the reaction at 25°C.
- The standard reduction potential, E° , for the half reaction $O_2(g) + 4 H^+(aq) + 4 e^- \rightarrow 2 H_2O(l)$ has a value of 1.23 V. Using this information in addition to the information given above, determine the value of the standard reduction potential, E° , for the half reaction below.



(c) In an electrolytic cell, $Cu(s)$ is produced by the electrolysis of $CuSO_4(aq)$. Calculate the maximum mass of $Cu(s)$ that can be deposited by a direct current of 100. amperes passed through 5.00 L of 2.00 M $CuSO_4(aq)$ for a period of 1.00 hour.



.48

$$E^\circ = .48$$

GO ON TO THE NEXT PAGE.