Electro #2

I. Balance the following redox reactions and then use your standard reduction potentials in aqueous solution sheet to find the $E°_{cell}$.

$E°_{cell} = E°_{ox} + E°_{red}$: Remember $E°_{0x}$ values are the negative of the $E°_{red}$ values found on the sheet. Read the ½ reactions backwards to make them be $E°_{ox}$ ½ reactions.

1. Co^{+2} (aq) + Fe (s) ⟶ Co (s) + Fe^{2+} (aq)
2. Ni (s) + Ag^{+} (aq) ⟶ Ni^{2+} (aq) + Ag (cr)
3. Co^{+3} (aq) + Ag (s) ⟶ Ag^{+1} (aq) + Co^{+2} (aq)
4. Sn^{+4} (aq) + Cu (s) ⟶ Sn^{+2} (aq)+ Cu^{+2} (aq)

II. For each of the reactions in Part I, find the $\Delta G°$ and the Keq. Relate the signs of the $\Delta G°$ and $E°_{cell}$ to the magnitude of the Keq.

III. For each of the reactions in Part I, find the E_{cell} at nonstandard conditions if the following conditions are changed:

For 1 the $[Co^{+2}]$ = .10M while all other solutions are standard.

For 2 the $[Ni^{+2}]$ = .20M while all other solutions are standard.

For 3 the $[Co^{+2}]$ = 1.10M while all other solutions are standard.

For 4 the $[Sn^{+2}]$ = 0.10M, $[Sn^{+4}]$ = 0.40M, & $[Cu^{+2}]$ = 0.30M.

IV. Of the reactions in Part I which one could you look at the states and say for sure that the $\Delta S°$ is a positive number? Explain your answer.

V. If 3.67 g of sodium chloride is dissolved in100.0 mL of water in a coffee cup calorimeter causing the temperature of the water to decrease from 25.00°C to 24.43 °C,

a. What is the molar heat of dissolving for sodium chloride?

b. Write a thermochemical equation for the dissolving of sodium chloride. If 40.0 g of sodium chloride dissolves how many kJ of heat are absorbed?

c. Using your charts find the $\Delta S°rxn$. Then using the Gibbs Free energy equation find the $\Delta G°rxn$. From the $\Delta G°rxn$ find Keq for the reaction.