Problem of the Day 42 CHEM 1252

1. a) Is the following redox reaction spontaneous as written under standard conditions.

$$Cd(s) + Cu^{2+}(aq) \rightleftharpoons Cd^{2+}(aq) + Cu(s)$$

Circle One.	*Justify your answer here.*
yes	
no	6

b) Calculate K for the reaction.

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2. a) A voltaic cell is composed of the following half-reactions. Write the anode and cathode half-reaction.

$Cl_2 + 2e^- \longrightarrow 2\ Cl^-$ $E° = 1.36$ V

$Br_2 + 2e^- \longrightarrow 2\ Br^-$ $E° = 1.09$ V

anode half-reaction	*cathode half-reaction*
2	2

b) Sketch the voltaic cell; include the direction of electron flow and the direction of ion migration through the salt bridge.

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2. (cont'd)

c) Give the overall balanced reaction and determine $E°_{cell}$ for the voltaic cell.

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3. The following unbalanced redox reaction occurs in acidic solution.

$$Cr_2O_7^{2-}(aq) + Sn^{2+}(aq) \rightleftharpoons Cr^{3+}(aq) + Sn^{4+}(aq)$$

a) Balance the half reaction that occurs at the anode. You must show your work.

Write balanced reaction here.

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b) Balance the half reaction that occurs at the cathode. You must show your work.

Write balanced reaction here.

5

c) Using standard reduction potentials found in Appendix E in your textbook, calculate $E°_{cell}$ for the reaction.

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d) Is this reaction spontaneous under standard conditions? You must justify your answer.

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