13/15

Time: 10' **Chem 205** **Friday, April 20, 2012**
Drop Quiz 6 **H. Deeb**

Name: ___

1. Consider an electrochemical cell in which the following spontaneous reaction occurs:

$Fe^{2+}(aq) + Ag^{+}(aq) \rightarrow Ag(s) + Fe^{3+}(aq)$

a) write the two half reactions involved and mention which one takes place at he cathode and which one takes place at the anode.

$Fe^{2+} \rightarrow 1e^- + Fe^{3+}$ (anode) (oxidation) (loss of es).

$Ag^+ + 1e^- \rightarrow Ag$ (cathode (reduction gain of es)

(3)

b) What is the oxidizing agent in the above cell?

The oxidizing agent is Ag^+ since it undergoes reduction. (2)

c) From the given overall cell reaction, predict which redox couple, Fe^{3+}/Fe^{2+} or Ag^+/Ag, has a higher value for E°.

since Ag^+/Ag is at the cathode & it undergoes reduction, so its E_o is greater than E_o Fe^{3+}/Fe^{2+} (Fe^{3+} undergoes oxidation). (2)

d) Which of the following would you recommend as a salt bridge for the above cell? Justify your answer.

NH_4NO_3 or KBr

~~NH_4NO_3~~ put NH_4NO_3 KBr since Ag reacts NO_3 so we can't since it'll form $AgNO_3$.

e) Why a salt bridge is used in any voltaic cell?

since it is a conducting medium, ⇒ the circuit is closed & the flow of es is continuous. (2)

2. An electrochemical cell based on the following reaction has a standard cell voltage ($E°_{cell}$) of 0.48 V:

$Sn(s) + Cu^{2+}(aq) \rightarrow Sn^{2+}(aq) + Cu(s)$

What is the standard reduction potential of Sn^{2+}/Sn? ($E°(Cu^{2+}/Cu) = 0.34$ V)

$E°_{cell} = E_{cathode} - E_{anode}$

$Sn \rightarrow 2e^- + Sn^{2+}$ ⇒ (oxidation) (anode)

$Cu^{2+} + 2e^- \rightarrow Cu$ ⇒ reduction (cathode)

(4)

$\Rightarrow E°_{cell} = 0.34 - E_{Sn^{2+}/Sn}$

$0.48 = 0.34 - x$

$\Rightarrow x = 0.34 - 0.48 = -0.14$ V.

13

Time: 10' **Chem 205** **Friday, March 22, 2013**
Drop Quiz 6 **H. Deeb**

Name: ___

1. Consider an electrochemical cell in which the following net reaction takes place:

$Ni(s) + Cu^{2+}(aq) \rightarrow Ni^{2+}(aq) + Cu(s)$

$E°_{Ni2+/Ni} = -0.25$ V; $E°_{Cu2+/Cu} = +0.34$ V

a) Write the anode and the cathode half reactions.

Anode : $Ni \rightarrow Ni^{2+} + 2e^-$

Cathode : $Cu^{2+} + 2e^- \rightarrow Cu$.

b) Which reagent is oxidized in the above cell?

Nickel is oxidized.

c) Calculate the standard emf of the above electrochemical cell.

$E_0 = E_{cathode} - E_{anode} = 0.34 - (-0.25)$.

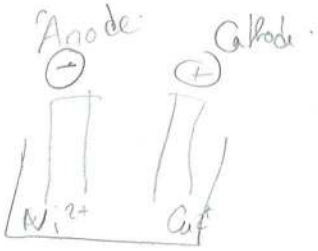
$= 0.59$ ✓

d) Write the cell diagram of the above electrochemical cell

Anode // Cathode.

$Ni^{2+}_{(aq)} / Ni_{(s)} // Cu^{2+}_{(aq)} / Cu_{(s)}$

-2



e) Is the above cell an electrolytic cell or a voltaic cell?

Voltaic cell. .

2. Which of the following metals is the strongest reducing agent and which is the weakest reducing agent?

Pb, Mg, Mn, Al

$E°_{Pb2+/Pb} = -0.13$ V, $E°_{Mn2+/Mn} = -1.18$ V, $E°_{Mg2+/Mg} = -2.36$ V,

$E°_{Al3+/Al} = -1.66$ V, $E°_{Fe2+/Fe} = -0.44$ V

Mg strongest reducing agent because it has the most (-) value.

Pb is the weakest reducing agent because it has the less (-) val