EXP. NUMBER	EXPERIMENT/SUBJECT	DATE
11	Electrochemistry Inquiry	[redacted]
NAME	LAB PARTNER	LOCKER/DESK NO. / COURSE & SECTION NO.
[redacted]	[redacted]	Chem 1A03 L69.

Pre-Lab Questions

1) $Cu^{2+}_{(aq)} + 2e^- \rightarrow Cu(s)$ $\quad E^\circ red = 0.340\ V$

$Zn(s) \rightarrow Zn^{2+}_{(aq)} + 2e^-$ $\quad E^\circ ox = 0.763\ V$

$\therefore E^\circ cell = 1.103\ V$

$Cu^{2+}_{(aq)} + 2e^- \rightarrow Cu(s)$ $\quad E^\circ red = 0.340\ V$

$Sn(s) \rightarrow Sn^{2+} + 2e^-$ $\quad E^\circ ox = 0.137\ V$

$\therefore E^\circ cell = 0.477\ V$

$Cu^{2+}_{(aq)} + 2e^- \rightarrow Cu(s)$ $\quad E^\circ red = 0.340\ V$

$Pb(s) \rightarrow Pb^{2+}_{(aq)} + 2e^-$ $\quad E^\circ ox = 0.125\ V$

$\therefore E^\circ cell = 0.465\ V$

$Cu^{2+}_{(aq)} + 2e^- \rightarrow Cu(s)$ $\quad E^\circ red = 0.340\ V$

$Cu(s) \rightarrow Cu^{2+} + 2e^-$ $\quad E^\circ ox = -0.340\ V$

$\therefore E^\circ cell = 0.000\ V$

The above sample calculations were utilized to tabulate the following result:

Oxidizing Agent $_{(aq)}$	Reducing Agent $_{(s)}$	Standard Potential (V)
Cu^{2+}	$Zn(s)$	1.103
Cu^{2+}	$Sn(s)$	0.477
Cu^{2+}	$Pb(s)$	0.465
Cu^{2+}	$Cu(s)$	0.000
Zn^{2+}	$Cu(s)$	-1.103
Zn^{2+}	$Sn(s)$	-0.626
Zn^{2+}	$Pb(s)$	-0.638
Zn^{2+}	$Zn(s)$	0.000
Sn^{2+}	$Cu(s)$	-0.477
Sn^{2+}	$Zn(s)$	0.626
Sn^{2+}	$Pb(s)$	-0.012
Sn^{2+}	$Sn(s)$	0.000
Pb^{2+}	$Cu(s)$	-0.465
Pb^{2+}	$Zn(s)$	0.638
Pb^{2+}	$Sn(s)$	0.012
Pb^{2+}	$Pb(s)$	0.000

2) Obtain 5.00 mL of 0.05 M $Cu^{2+}_{(aq)}$ solution in a beaker using a pipette.

↓

Rinse a volumetric flask with water and fill it with 45 mL of water.

↓

Pour the 5.00 mL of 0.05 M $Cu^{2+}_{(aq)}$ into the same volumetric flask to make 0.005 M Cu^{2+} solution.

↓

Rinse a second volumetric flask with water and fill it with 49.5 mL of water.

↓

Add [redacted] mL of 0.005 $Cu^{2+}_{(aq)}$ solution to the volumetric flask to make a 0.00005 M Cu^{2+} solution.

3) $Cu(s) | Cu^{2+}_{(aq, 0.00005M)} \| Cu^{2+}_{(aq, 0.05M)} | Cu(s)$

$E^\circ cell = 0.000\ V$ $\quad Cu(s) + Cu^{2+}_{(aq, 0.05M)} \rightarrow Cu^{2+}_{(aq, 0.00005M)} + Cu(s)$

$$E cell = E^\circ cell - \left(\frac{RT}{nF}\right) \ln Q$$

$$= 0 - \left(\frac{(8.314)(298)}{(2)(96,485)}\right) \ln\left(\frac{0.00005\ M}{0.05\ M}\right)$$

$$= 0.089$$

4) From the table on the left, the $E^\circ cell = 1.103\ V$.

$$E cell = E^\circ cell - \frac{0.0592}{2} \log\left[\frac{0.1498}{0.00367}\right]$$

$$= 1.055\ V$$

SIGNATURE	DATE	WITNESS/TA	DATE