(10) Electrochem Text Probs 23d, 79, 43d, 65 (11)

23d. $As_2O_3(s) + 5H_2O \rightarrow 2H_3AsO_4(aq) + 4H^+ + 4e^-$ (×2)

$2NO_3^-(aq) + 4H^+(aq) + 4e^- \rightarrow N_2O_3(g) + 3H_2O(l)$

$As_2O_3(s) + 2NO_3^-(aq) + 2H_2O(l) + 2H^+ \rightarrow 2H_3AsO_4(aq) + N_2O_3(g)$

43d. The reduction potential of IO_3^- is 1.195V

" " " " BrO_3^- is 1.52V

So the stronger the Reducing agent the more easily oxidized

So Look for the smaller Reduction potential (1.195) so IO_3^- is the better R.A

65. a. $Ni^{2+} + 2e^- \rightarrow Ni(s)$ $E^\circ_{red} = -.28V$

$Zn \rightarrow Zn^{2+} + 2e^-$ $E^\circ_{ox} = .76V$

$Ni^{2+} + Zn \rightarrow Ni(s) + Zn^{2+}$ $E^\circ_{cell} = .48V$

b. $E = E^\circ - \frac{.0592}{n} \log \frac{[Zn^{2+}]}{[Ni^{2+}]}$

$E = .48V - \frac{.0592}{2\,mole^-} Log\left(\frac{.100}{3.00}\right) = .53V$

c. $E = .48 - \frac{.0592}{2} log\left(\frac{.800}{.200}\right) = .46V$

79. a. E°_{red} For Cd (−.40V) is less negative than E°_{red} for Zn (−.76V)

So E_{cell} will have a smaller (Less +) value

b. NiMH batteries use an alloy such as $ZrNi_2$ as the anode material. Then no disposal probs w/ Cd!