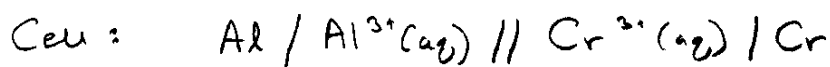
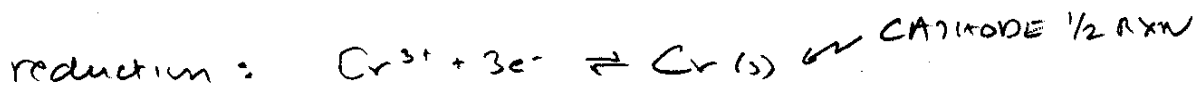
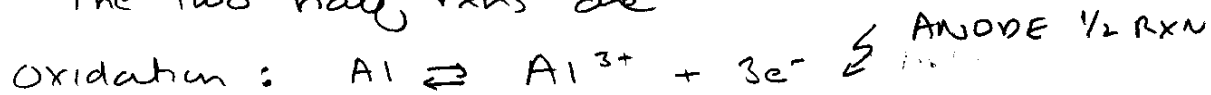


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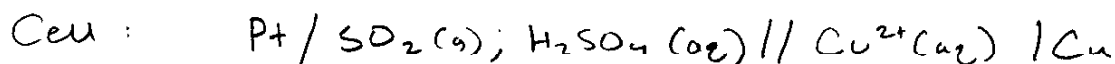
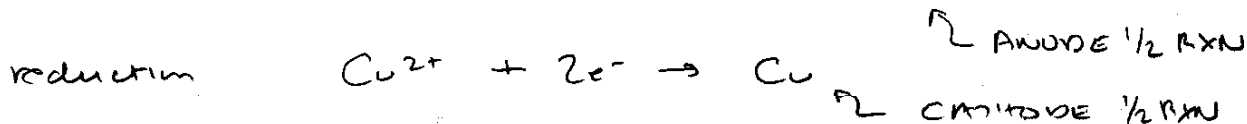
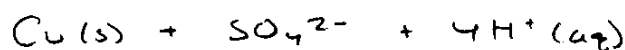
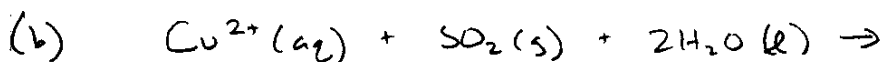


The two half rxns are



$$E^\circ_{\text{cell}} = E^\circ_{\text{cat}} - E^\circ_{\text{an}} = E^\circ_{\text{Cr}^{3+}/\text{Cr}} - E^\circ_{\text{Al}^{3+}/\text{Al}}$$

$$= -0.74\text{V} - (-1.66\text{V}) = \boxed{+0.92\text{V}}$$



Since there is no metal in the anode $\frac{1}{2}$ rxn have to use inert metal as an electrode.

Pt (platinum) is a common choice.

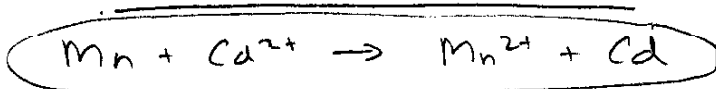
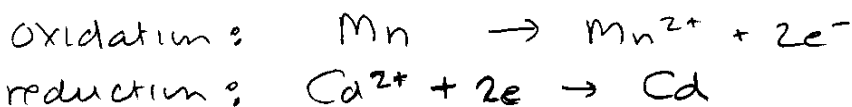
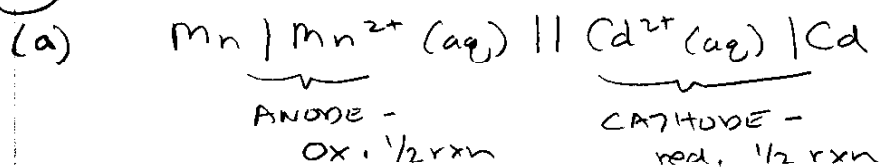
The $\text{H}_2\text{SO}_4(aq)$ comes from the need to supply H^+ s and SO_4^{2-} for the $\frac{1}{2}$ rxn equilibria

$$E^\circ_{\text{cell}} = E^\circ_{\text{cat}} - E^\circ_{\text{an}} = E^\circ_{\text{Cu}^{2+}/\text{Cu}} - E^\circ_{\text{SO}_4^{2-}/\text{SO}_2}$$

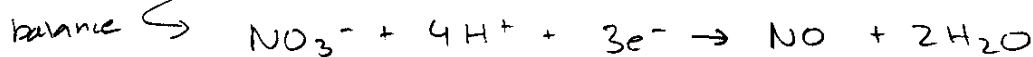
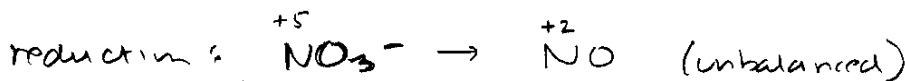
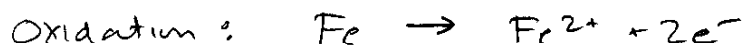
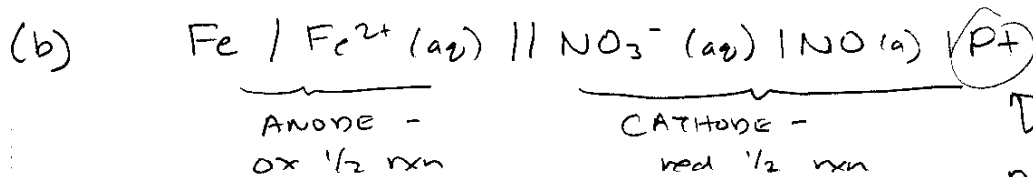
$$= +0.34\text{V} - +0.20\text{V} = \boxed{+0.14\text{V}}$$

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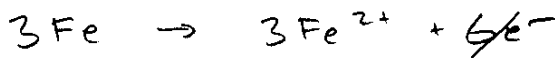
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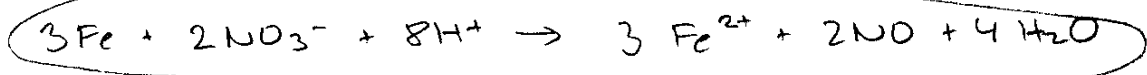
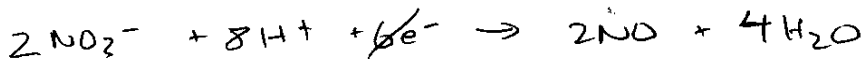
$$E^\circ_{\text{cell}} = E^\circ_{\text{CAT}} - E^\circ_{\text{AN}} = E^\circ_{\text{Cd}^{2+}/\text{Cd}} - E^\circ_{\text{Mn}^{2+}/\text{Mn}} = -0.40\text{V} - (-1.18\text{V}) = \boxed{+0.78\text{V}}$$



x3



x2



Pt again acts as an inert electrode - not involved in rxn

$$E^\circ_{\text{cell}} = E^\circ_{\text{NO}_3^-/\text{NO}} - E^\circ_{\text{Fe}^{2+}/\text{Fe}} = 0.96 - (-0.44) = \boxed{1.40\text{V}}$$