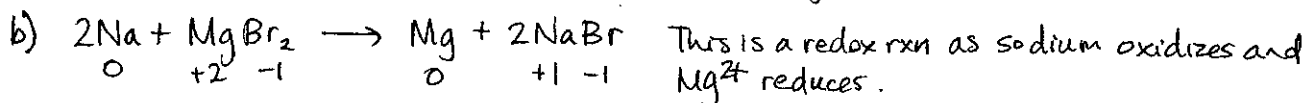
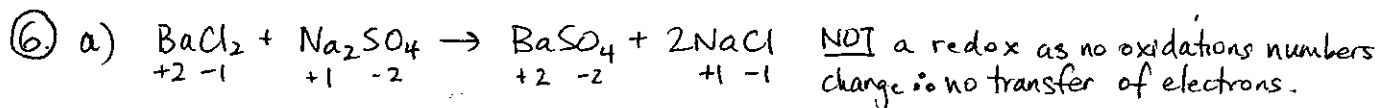
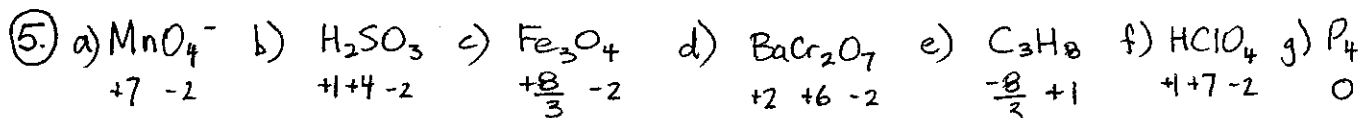
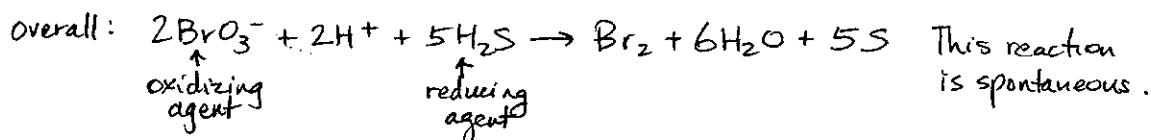
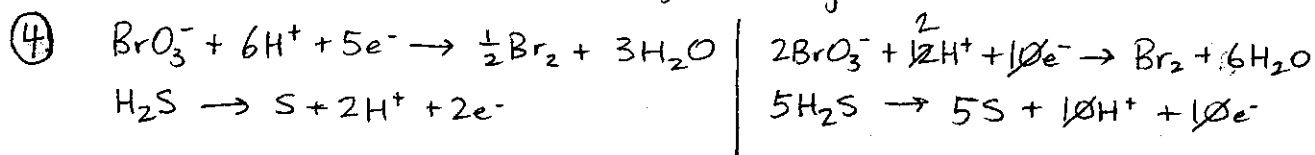
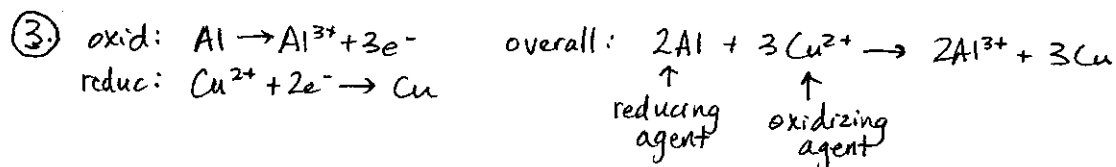


REDOX REVIEW ANSWER KEY

- ① Oxidation: loss of electrons
Reduction: gain of electrons

② A redox reaction is any reaction where a transfer of electrons occurs.

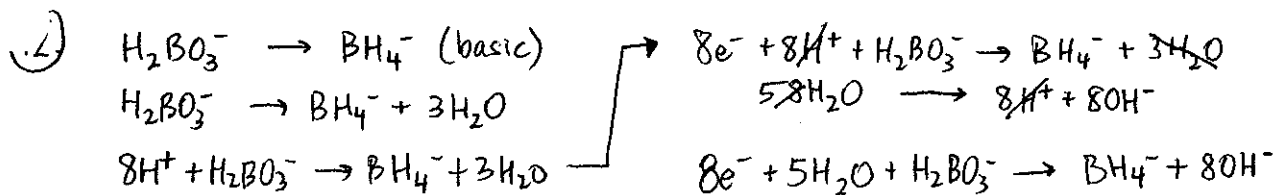
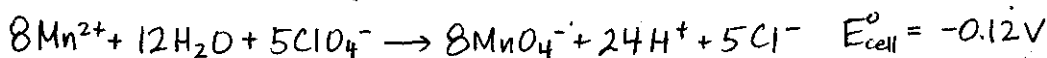
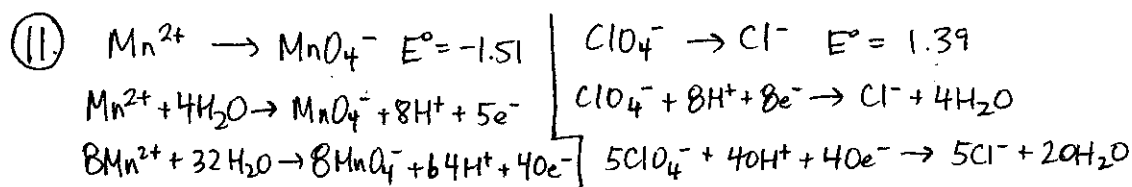


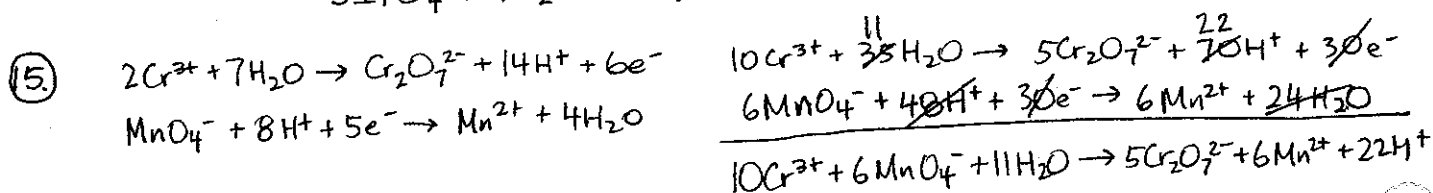
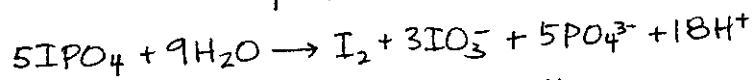
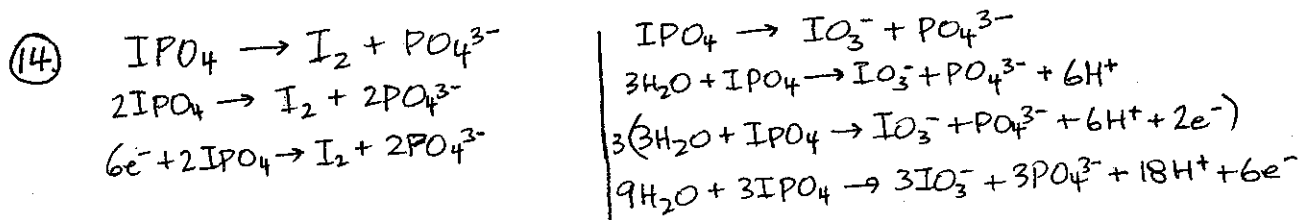
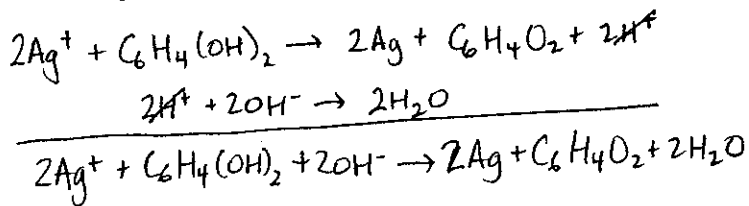
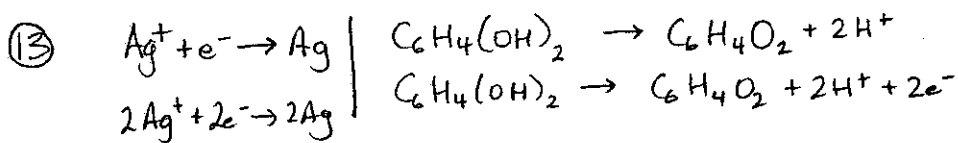
⑦ Au

⑧ Ni, as it is lower on the right side of the table

⑨ O_2 and/or MnO_4^-

⑩ a) no possible reaction (b) non spontaneous (c) spontaneous: $\text{AuCl}_4^- + \text{Al} \rightarrow \text{Au} + 4\text{Cl}^- + \text{Al}^{3+}$



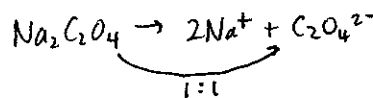
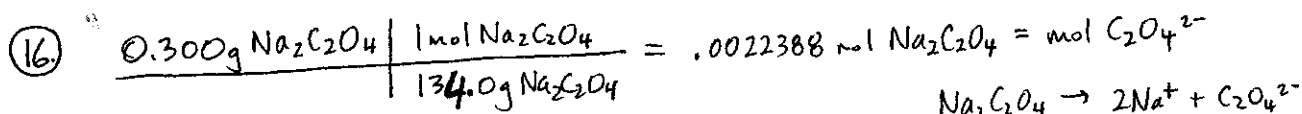


$$\text{moles KMnO}_4 = (0.0500\text{M})(0.02855\text{L}) = .0014275$$

$$\text{mol MnO}_4^- = .0014275$$

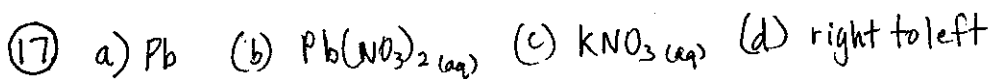
$$\text{mol Cr}^{3+} = \frac{.0014275 \text{ mol MnO}_4^-}{6 \text{ mol MnO}_4^-} \times \frac{10 \text{ mol Cr}^{3+}}{6 \text{ mol MnO}_4^-} = .002379$$

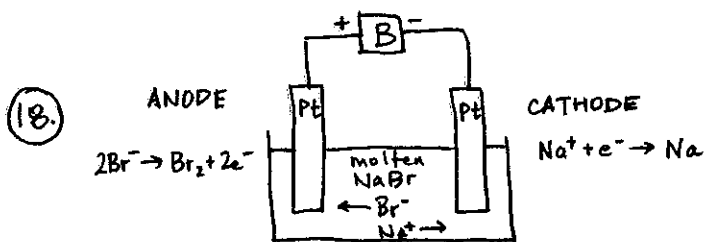
$$[\text{Cr}^{3+}] = \frac{.002379 \text{ mol}}{.01000 \text{ L}} = \underline{0.238 \text{ M}}$$



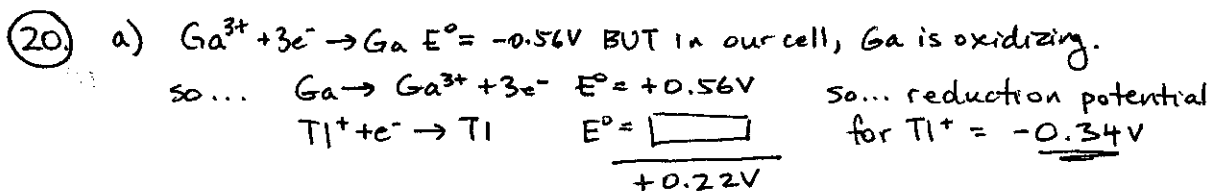
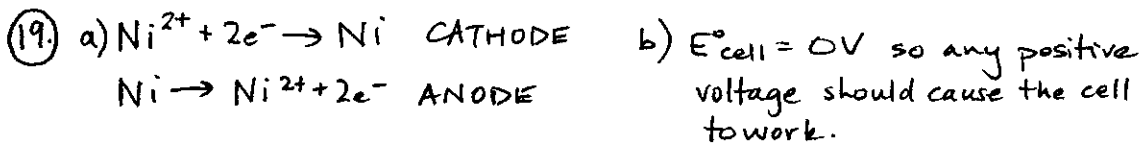
$$\begin{array}{l} \text{mol MnO}_4^- = \frac{.0022388 \text{ mol C}_2\text{O}_4^{2-}}{5 \text{ mol C}_2\text{O}_4^{2-}} \times \frac{2 \text{ mol MnO}_4^-}{1} \\ = 8.955 \times 10^{-4} \text{ mol MnO}_4^- \\ = 8.955 \times 10^{-4} \text{ mol KMnO}_4 \end{array}$$

$$[\text{KMnO}_4] = \frac{8.955 \times 10^{-4} \text{ mol}}{0.02342 \text{ L}} = \underline{0.0382 \text{ M}}$$

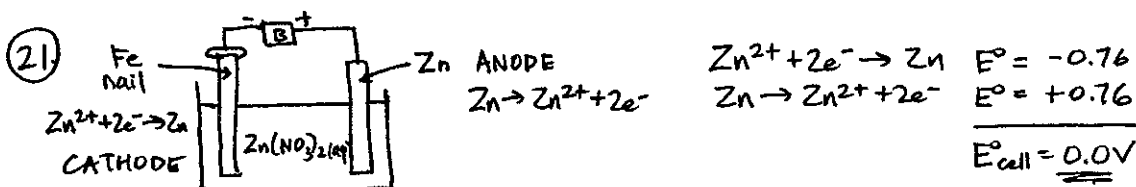




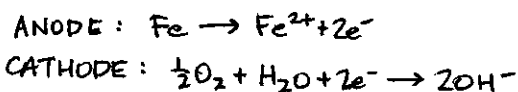
Br₂ produced at the anode.



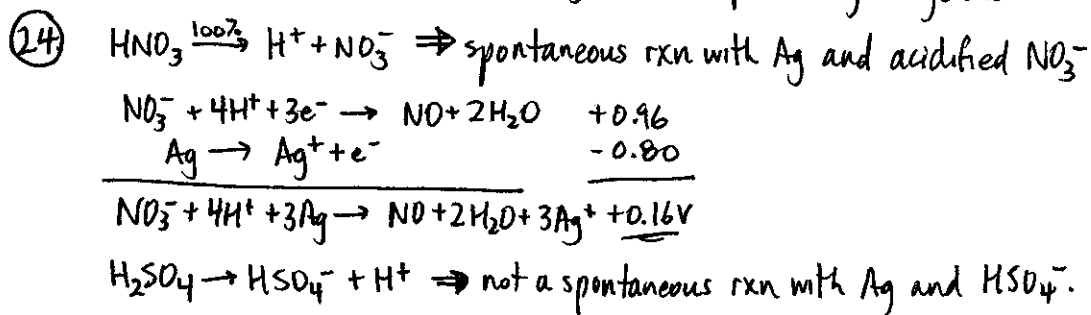
b) oxidizing agent: Tl⁺



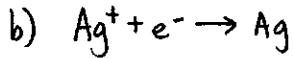
22. two conditions: oxygen and water must be present.



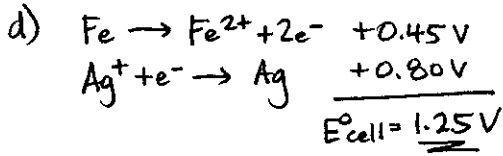
23. Method 1: Physical protection using paint, grease, or plastic
 Advantages: no direct contact of O₂ and H₂O with Fe
 Disadvantages: If the protection scratches or wears off, corrosion will begin
- Method 2: Sacrificial Anode (cathodic protection) - using Zn to preferably oxidize instead of Fe
 Advantages: don't have to coat whole boat in Zn/easy to replace Zn strips/quite cheap
 Disadvantage: requires constant upkeep.
- Method 3: passing an electrical current through the boat
 Advantages: very reliable when in good working order
 Disadvantages: relatively expensive/potentially dangerous.



25) a) toward the anode (the iron half cell)

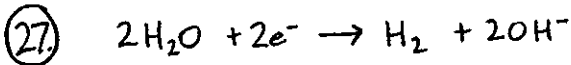
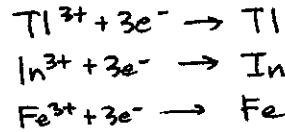


c) Fe

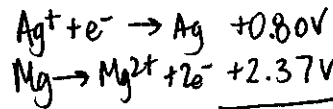
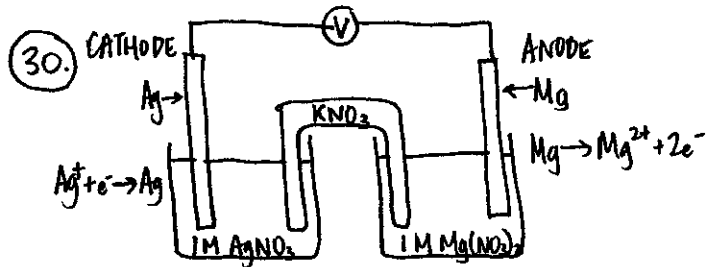
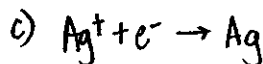
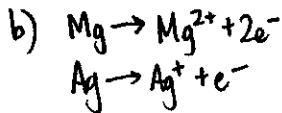
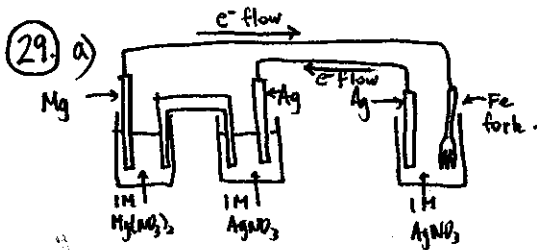
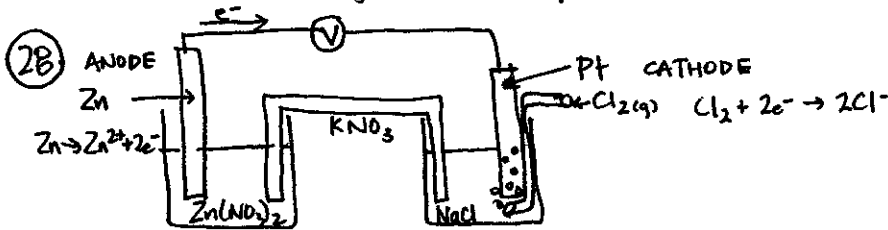


26) a) ~~Metal~~ In^{3+} Tl^{3+} Fe^{3+} b)

In	X	rxn	no rxn
Tl	no rxn	X	no rxn
Fe	rxn	rxn	X



Water has a higher reduction potential than Na^+ , K^+ , Li^+ , Cs^+ .



$E_{cell}^{\circ} = +3.1 V$