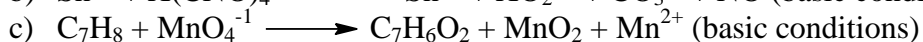
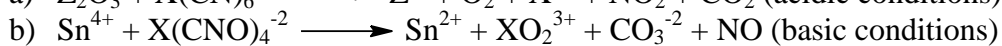
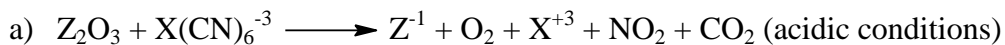


Redox Problem Set 2: Additional Redox Problems

(All of these problems are no calculator friendly.)

1) Balance the following oxidation-reduction under the conditions specified:



2) Stibnite (Sb_2S_3 , Molar mass = 339.7 g) is the most important ore containing antimony. A 0.3397 g sample of ore was chemically treated to produce antimony(III) ions in solution. The antimony(III) was oxidized to antimony(V) by adding 25.00 mL of 0.1000 N $KMnO_4$ solution. The excess $KMnO_4$ was titrated with 0.05000 N Fe^{2+} ; 10.00 mL was required, producing $Fe^{3+}(aq)$ and $Mn^{2+}(aq)$. All reactions were carried out in acidic solutions.

a) Calculate the % by mass Sb_2S_3 in the ore sample. **(Answer = 50.0%)**

b) What is the molarity of the $KMnO_4$ solution? **(Answer = 0.0200 M)**

c) What is the molarity of the Fe^{2+} solution? **(Answer = 0.0500 M)**

3) A 0.1250 g sample of $M_3Fe(C_2O_4)_3$ was dissolved in dilute acid, and all of the iron was converted to Fe^{2+} ions. This acidic solution required 20.00 mL of 0.1000 N $KMnO_4$ solution to reach the end point of this titration in which the products were $Fe^{3+}(aq)$, $Mn^{2+}(aq)$ and $CO_2(g)$.

a) Calculate the molar mass of $M_3Fe(C_2O_4)_3$. **(Answer = 437 g/mol)**

b) What fraction of the total $KMnO_4$ solution was used in the titration of the oxalate ions ($C_2O_4^{-2}$) in the titration? **(Answer = 6/7 of the total volume of $KMnO_4$ used in the titration went to react with the oxalate ions.)**