## ADDITIONAL REDOX QUESTIONS

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

   a. $Z_2O_3 + X(CN)_6^{3-} \rightarrow Z^- + O_2 + X^{3+} + NO_2 + CO_2$ **(acidic conditions)**

   b. $Sn^{4+} + X(CNO)_4^{2-} \rightarrow Sn^{2+} + XO_2^{3+} + CO_3^{2-} + NO$ **(basic conditions)**

   c. $C_7H_8 + MnO_4^- \rightarrow C_7H_6O_2 + MnO_2 + Mn^{2+}$ **(basic conditions)**

2. Stibnite ($Sb_2S_3$, Molar mass = 339.69 g/mol) is the most important ore containing antimony. A 0.5060 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 0.1165 *N* $KMnO_4$ solution. The excess $KMnO_4$ was titrated with 0.08430 *N* $Fe^{2+}$; 2.58 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.
   b. What is the molarity of the $KMnO_4$ solution?
   c. What is the molarity of the $Fe^{2+}$ solution?

3. A 0.1283 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 20.55 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 $M_3Fe(C_2O_4)_3$.

   b. What fraction of the <u>total</u> $KMnO_4$ solution was used in the titration of the oxalate ions ($C_2O_4^{2-}$) in the titration in part (a)?