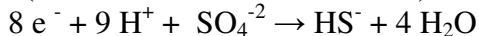**Answer Key Chemistry workshop for May 13, 2008- Part I**
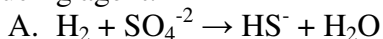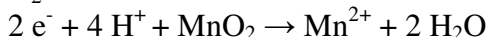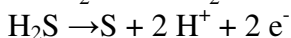
I.
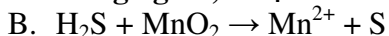1. $2 H^+ + e^- + NO_2^- \rightarrow NO + H_2O$ (oxygen is -2 in each case, N is reduced from +3 to +2
2. $H_2O + NO_2^- \rightarrow NO_3^- + 2 H^+ + 2 e^-$ (O is -2 in each case, N is oxidized from +3 to +5)
3. $2 e^- + 2 H^+ + (CH_3)_2SO \rightarrow (CH_3)_2S + H_2O$ (dimethylsulfoxide to dimethylsulfide, sulfur reduced from +4 to +2, or +2 to O, depending on how you want to treat the C-S bond)
4. $2 e^- + 2 H^+ + S \rightarrow H_2S$ (S is reduced from 0 to -2)
5. $S + 4 H_2O \rightarrow H_2SO_4 + 6 e^- + 6 H^+$ (S is oxidized from 0 to +6)
6. $2 e^- + Hg_2^{+2} \rightarrow Hg$ (Mercury is reduced from +1 to 0)

II. Balance each of the following equations by the half-reaction method. In your balanced equation indicate the element oxidized, the element reduced, the oxidizing agent, and the reducing agent.

A. $H_2 + SO_4^{-2} \rightarrow HS^- + H_2O$
$4(H_2 \qquad\qquad \rightarrow 2 H^+ + 2 e^-)$
$8 e^- + 9 H^+ + SO_4^{-2} \rightarrow HS^- + 4 H_2O$
Net: **$4H_2 + H^+ + SO_4^{-2} \rightarrow HS^- + 4 H_2O$ (S is reduced, H is oxidized; H_2 is the reducing agent, SO_4^{-2} is the oxidizing agent)**
B. $H_2S + MnO_2 \rightarrow Mn^{2+} + S$
$H_2S \rightarrow S + 2 H^+ + 2 e^-$
$2 e^- + 4 H^+ + MnO_2 \rightarrow Mn^{2+} + 2 H_2O$
Net: **$H_2S + 2 H^+ + MnO_2 \rightarrow S + Mn^{2+} + 2 H_2O$ (S is oxidized, Mn is reduced; H_2S is the reducing agent, MnO_2 is the oxidizing agent.**