Name _____ Date _____ Period _____

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4.9 Oxidation-Reduction (Redox) Reactions

AP Chemistry

Show oxidation numbers and half-reactions. Check atoms and charge in every final equation.

1. Assign an oxidation number to every element.

(a) SO_2 (b) Fe_2O_3 (c) NH_4^+ (d) Na_2SO_4 (e) $Cr_2O_7^{2-}$

2. Zinc reacts with hydrochloric acid.

$Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$

(a) Assign oxidation numbers to every element on both sides.

(b) Which element is oxidized? Which is reduced? Which does not change?

(c) How many electrons are transferred in the reaction as written?

3. Label each half-reaction as oxidation or reduction.

(a) $Fe^{3+} + e^- \rightarrow Fe^{2+}$ (b) $Sn^{2+} \rightarrow Sn^{4+} + 2e^-$ (c) $Br_2 + 2e^- \rightarrow 2Br^-$

4. Write the oxidation and reduction half-reactions, then the balanced equation.

$Al(s) + Ag^+(aq) \rightarrow Al^{3+}(aq) + Ag(s)$

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5. Use half-reactions to balance this equation. Show how you matched the electrons.

$Mg(s) + Fe^{3+}(aq) \rightarrow Mg^{2+}(aq) + Fe(s)$

6. Balance this half-reaction in acidic solution. Then state whether it is an oxidation or a reduction.

$Cr_2O_7^{2-}(aq) \rightarrow Cr^{3+}(aq)$

7. Balance this reaction in acidic solution.

$MnO_4^{-}(aq) + SO_3^{2-}(aq) \rightarrow Mn^{2+}(aq) + SO_4^{2-}(aq)$

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