CONCEPT: BALANCING REDOX REACTIONS: BASIC SOLUTIONS

- **Balancing Basic Redox Reactions** requires all the same steps as balancing in an acidic solution plus __ additional step.
  - □ For basic redox reactions we generally have the presence of the _____ ion.

EXAMPLE: Balance the following redox reaction if it is found to be in a basic solution.

$$MnO_4^-\,(aq) \quad + \quad N_2H_4\,(aq) \longrightarrow Mn^{2+}\,(aq) \quad + \quad NO_3^-\,(aq)$$

STEP 1: Break the full redox reaction into 2 half equations.

- □ Focus on the elements that are not **oxygen** or **hydrogen** to determine the 2 half-reactions.

STEP 2: For each half reaction, balance elements that are not **oxygen** or **hydrogen**.

STEP 3: For each half reaction, balance the number **oxygens** by adding _____.

STEP 4: For each half reaction, balance the number **hydrogens** by adding _____.

STEP 5: Balance the overall charge by adding **electrons** to the more _____ charged side of each half reaction.

- □ If the number of electrons of both half reactions differ then multiply to get the lowest common multiple.

STEP 6: Combine the half reactions and cross out reaction intermediates.

Step 7

Balance any remaining $\mathbf{H^+}$ by adding an equal amount of $\mathbf{OH^-}$ to both sides of the equation.

- □ When $\mathbf{H^+}$ and $\mathbf{OH^-}$ are on the same side they will combine together to form H_2O.
- □ If H_2O is on both sides of the equation then treat them as reaction intermediates.

CONCEPT: BALANCING REDOX REACTIONS: BASIC SOLUTIONS

PRACTICE: Balance the following redox reaction in a basic solution.

$$H_2O_2\,(aq) + ClO_2\,(aq) \longrightarrow ClO_2^-\,(aq) + O_2\,(g)$$

PRACTICE: Balance the following redox reaction in a basic solution.

$$ClO_2^-\,(aq) \longrightarrow Cl^-\,(aq) + ClO_4^-\,(aq)$$