

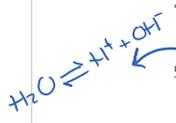
IX) Balancing Full Redox Reactions NOT on the Redox Table

April 30, 2018 8:33 PM

**IX) Balancing Full Redox Reactions not on the Redox Data Table**

Steps:

1. Figure out which reactant substances match up with which product substances to build skeleton half-reactions. Make sure all 'major' elements are present in a half-reaction from the start.
2. Balance each half-reaction using MAJOR OH<sup>-</sup> guidelines. However, do not convert to basic (if asked) until after step 4 of this list.
3. Write newly constructed half-reactions one on top of the other and balance electrons. *↳ put together + balance e<sup>-</sup>*
4. Put half-reactions together and cancel where necessary (electrons should always cancel out). *⇒ Net Redox Rxn: \_\_\_\_\_*
5. If necessary: Convert to basic conditions in same manner as previously. If there are no H<sup>+</sup> ions left to convert to basic, then no conversion is possible or necessary. *cancel any acidic ions.*



Practice Questions: Balance each of the following redox reactions



**Skeleton 1/2 Rxns:**  
 $H_2PO_2^- \rightarrow HPO_3^{2-}$

**major:** ✓  
**oxygen:**  $H_2O + H_2PO_2^- \rightarrow HPO_3^{2-}$   
**hydrogen:**  $H_2O + H_2PO_2^- \rightarrow HPO_3^{2-} + 3H^+$   
**charge:**  $H_2O + H_2PO_2^- \rightarrow HPO_3^{2-} + 3H^+ + 3e^-$

**M:** ✓  
**O:**  $CNO^- \rightarrow CN^- + H_2O$   
**H:**  $CNO^- + 2H^+ \rightarrow CN^- + H_2O$   
**charge:**  $CNO^- + 2H^+ + 2e^- \rightarrow CN^- + H_2O$

2 skeleton 1/2 reactions... balance e<sup>-</sup> + write the NET Redox Rxn.

$2(H_2O + H_2PO_2^- \rightarrow HPO_3^{2-} + 3H^+ + 3e^-) \times 2$   
 $(3CNO^- + 2H^+ + 2e^- \rightarrow 3CN^- + 3H_2O) \times 3$

**\*Balance + cancel e<sup>-</sup>**  
**• 6H<sup>+</sup> cancel**  
**• cancel 2H<sub>2</sub>O**

**Net Redox Rxn:**  $3CNO^- + 2H_2PO_2^- \rightarrow 3CN^- + 2HPO_3^{2-} + H_2O$

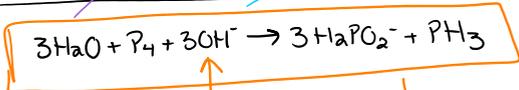
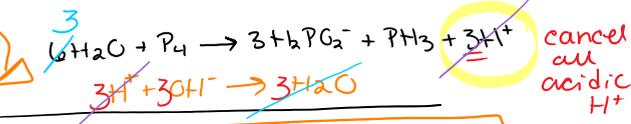
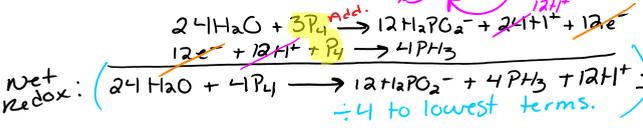
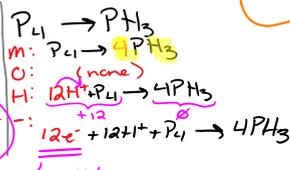
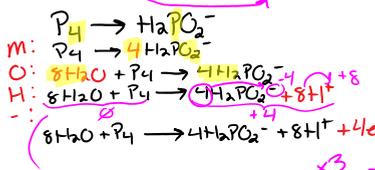
**Disproportionation Reaction:** a redox reaction in which the same substance is both reduced AND oxidized to make two different products.

2) Balance the following disproportionation reaction under basic conditions:



=> very end!

Skeleton rxn:

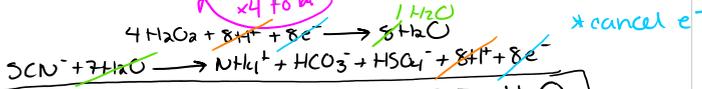
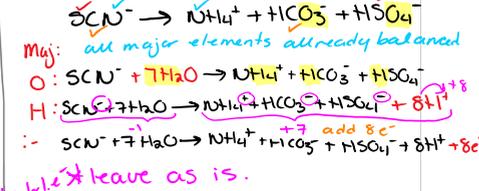
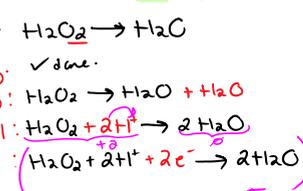


Basic conditions!

\*Follow the elements.

3)  $\text{H}_2\text{O}_2 + \text{SCN}^- \Rightarrow \text{NH}_4^+ + \text{H}_2\text{O} + \text{HCO}_3^- + \text{HSO}_4^-$  (acidic)

Skeleton rxn:



**Assignment 8:**

1) Hebden p. 207 #24a,d,i,j,q,w