## RUBRIC FOR REDOX CALCULATION EXAMPLE CALCULATIONS.

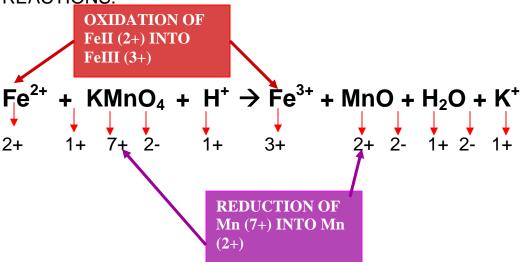
Part 1, balancing the reaction.

$$Fe^{2+} + KMnO_4 + H^+ \rightarrow Fe^{3+} + MnO + H_2O + K$$

**FIRST**- Calculate the oxidation state of *EACH* element in each compound.

$$Fe^{2+}$$
 + KMnO<sub>4</sub> + H<sup>+</sup>  $\rightarrow$   $Fe^{3+}$  + MnO + H<sub>2</sub>O + K<sup>+</sup>  
2+ 1+ 7+ 2- 1+ 3+ 2+ 2- 1+ 2- 1+

**SECOND-** IDENTIFY THE OXIDATION AND REDUCTION HALF REACTIONS.



## **THIRD**-BALANCE HALF REACTIONS

$$Mn^{7+} \rightarrow Mn^{2+}$$
  $5e^{-} + Mn^{7+} \rightarrow Mn^{2+}$   $5e^{-} + Mn^{7+} \rightarrow Mn^{2+}$   $Fe^{2+} \rightarrow Fe^{3+}$   $Fe^{2+} \rightarrow Fe^{3+} + 1e^{-}$   $5Fe^{2+} \rightarrow 5Fe^{3+} + 5e^{-}$ 

**FOURTH**- ADD ANY COEFFICIENTS YOU USED TO CANCELL ELECTRONS IN THE HALF REACTIONS (the red fives) TO THE NET REACTION.THE REACTION IS NOW BALANCED ELECTRONICALLY – BUT YOU ARE NOT DONE!

$$5Fe^{2+} + KMnO_4 + H^+ \rightarrow 5Fe^{3+} + MnO + H_2O + K^+$$

FIFTH- BALANCE BY REGULAR INSPECTION METHOD.

$$5Fe^{2+} + KMnO_4 + 6H^+ \rightarrow 5Fe^{3+} + MnO + 3H_2O + K^+$$