Dougherty Valley HS AP Chemistry
Electrochemistry – Oxidation and Reduction

WORKSHEET #2

Name: **Date:** **Period:** **Seat #:**

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Assigning oxidation numbers:

Determine the oxidation number of the underlined element.

1.	$\underline{Be}Cl_2$	2.	$\underline{N}O$	3.	$Na_2\underline{S}O_3$	4.	$H_2\underline{O_2}$
5.	$Ag\underline{Br}$	6.	$\underline{Au}Cl_3$	7.	$H\underline{N}O_3$	8.	$H_2\underline{Sn}O_3$
9.	$\underline{S}O_3$	10.	$\underline{U}F_6$	11.	$Ba\underline{Cr}O_4$	12.	$Ca\underline{Se}O_4$
13.	$H\underline{I}$	14.	$H_2\underline{Se}$	15.	$K_2\underline{Pt}Cl_6$	16.	$\underline{Ni}SO_4$
17.	$\underline{N}H_3$	18.	$H\underline{Cl}O$	19.	$\underline{N}H_4Cl$	20.	$(NH_4)_2\underline{Te}$

1.	______	2.	______	3.	______	4.	______
5.	______	6.	______	7.	______	8.	______
9.	______	10.	______	11.	______	12.	______
13.	______	14.	______	15.	______	16.	______
17.	______	18.	______	19.	______	20.	______

The Half-Reaction Method:

1. Write the equation as two half-reactions. Include the particles (atoms, ions, molecules) that are involved in change of oxidation state.
2. Balance each half-reaction with respect to atoms and charges; first atoms other than H and O, then O with H_2O and H with H^+, and ionic charges with electrons (e^-).
3. Equalize the number of electrons lost in the oxidation half-reaction with the number of electrons gained in the reduction half-reaction.
4. Add the two half-reactions to form a balanced net ionic equation.

[a]

$$HCl + K_2Cr_2O_7 \rightarrow KCl + CrCl_3 + Cl_2$$

14, 1, 2, 2, 2, 7H_2O

Reduction half-reaction	Oxidation half-reaction

Overall:

[b]

$$FeCl_2 + KMnO_4 + HCl \rightarrow FeCl_3 + KCl + MnCl_2 + H_2O$$

5, 1, 8, 5, 1, 1, 4H_2O

Reduction half-reaction	Oxidation half-reaction

Overall:

[c] $CuS + NO_3^- \rightarrow Cu^{2+} + S + NO$ 3, 2, $8H^+$, 3, 3, 2, $4H_2O$	
Reduction half-reaction	Oxidation half-reaction
Overall:	

Balance the following redox reactions in acidic solutions:

[d] $HNO_3 + S \rightarrow NO_2 + H_2SO_4 + H_2O$
[e] $KMnO_4 + HCl + H_2S \rightarrow KCl + MnCl_2 + S$
[f] $FeCl_3 + H_2S \rightarrow FeCl_2 + HCl + S$
[g] $Cu + HNO_3 \rightarrow Cu(NO_3)_2 + NO_2$