Redox Review

A. Assigning Oxidation Numbers

Oxidation number is the real or apparent charge an atom has when assigned electrons relative to that of other atoms to which it is bonded. Write the oxidation numbers of the atoms in the following species.

Name	Formula	Atoms	Oxidation Number
Potassium	K	K	_____
Potassium oxide	K_2O	K	_____
		O	_____
Chlorine	Cl_2	Cl	_____
Magnesium chloride	$MgCl_2$	Mg	_____
		Cl	_____
Hydrogen peroxide	H_2O_2	H	_____
		O	_____
Sodium sulfate	Na_2SO_4	Na	_____
		S	_____
		O	_____
Ammonia	NH_3	N	_____
		H	_____
Ammonium carbonate	$(NH_4)_2CO_3$	N	_____
		H	_____
		C	_____
		O	_____
Chromium (III) fluoride	CrF_3	Cr	_____
		F	_____
Lithium chromate	Li_2CrO_4	Li	_____
		Cr	_____
		O	_____

B. Assigning Oxidation numbers in a Chemical Rxn

Assign oxidation numbers for everything here. Then, in a each of the redox reactions, the species that loses electrons is oxidized so label it. The species that gains electrons is reduced, so label it also.

1. $O_2 + 2H_2O \rightarrow 2H_2O_2$
2. $Mg + H_2SO_4 \rightarrow MgSO_4 + H_2$
3. $2Na + Br_2 \rightarrow 2NaBr$
4. $MnO_2 + 4H^+ + 2Cl^- \rightarrow Mn^{2+} + Cl_2 + 2H_2O$
5. $Al + 3AgNO_3 \rightarrow Al(NO_3)_3 + 3Ag$

C. Balancing Redox Reactions in acidic medium: Adding H+ and H2O

A redox reaction is balanced when the number of atoms of each kind and the total electric charge on both sides are the same. When such reactions take place in acidic solution, they are balanced by following a series of steps:

1. Write half-reactions without including electrons.
2. Balance the number of all atoms except oxygen and hydrogen.
3. Balance oxygen atoms by adding water molecules.
4. Balance hydrogen atoms by adding H^+.
5. Balance charge by adding electrons.
6. Equalize electrons in the half-reactions by multiplication.
7. Combine the two half-reactions.
8. Check to see that atoms and charges balance.

Balance the following redox reactions by following the steps above. Show your work.

1. $Cu + NO_3^- \rightarrow Cu^{2+} + NO$

Final: _____

2. $Fe^{2+} + Cr_2O_7^{2-} \rightarrow Cr^{3+} + Fe^{3+}$

Final: _____

3. $Cl_2 + SO_2 \rightarrow SO_4^{2-} + Cl^-$

Final: _____