Oxidation is Loss of e, Reduction is Gain e⁻

Name _____ Period _____

Redox WS **OIL** RIG **LEO says** GER

Reducing Agent is Oxidized **Oxidizing Agent is** Reduced

1st Write the oxidation number above each element before and after reaction.

2nd Determine what was oxidized and what was reduced. 3rd Write each half reaction for reactions that occur.

1. ~~$Ca + H_2O \rightarrow Ca(OH)_2 + H_2$~~ $2Al_{(s)} + 3Cu^{+2}Cl_{2(aq)} \rightarrow 3Cu_{(s)} + 2AlCl_{3(aq)}$

more + Oxidation half reaction: $(Al_{(s)} \rightarrow Al^{+3}_{(aq)} + 3e^-) \times 2$

Reduction half reaction: $(Cu^{+2}_{(aq)} + 2e \rightarrow Cu_{(s)}) \times 3$

more − Net Ionic $2Al_{(s)} + 3Cu^{+2}_{(aq)} \rightarrow 3Cu_{(s)} + 2Al^{+3}_{(aq)}$

Element oxidized: Al from 0 to +3 Reducing Agent: ✓

Element Reduced: Cu from +2 to 0 Oxidizing Agent: ✓

ion

0 0 +1 −2 not on Test

2. $H_2 + O_2 \rightarrow H_2O$

Oxidation half reaction: $(H_2 \rightarrow 2H^+ + 2e) \times 2$

Reduction half reaction: $O_2 + 4e^- \rightarrow 2O^{2-}$

Net Ionic $2H_2 + O_2 \rightarrow 4H^+ + 2O^{2-}$

Element oxidized: H from 0 to +1 Reducing Agent: ✓

Element Reduced: O from 0 to −2 Oxidizing Agent: ✓

not on Test Quiz

+2 −1 0 0 +2 −1

3. ~~$Pb(NO_3)_2$~~ + Cd → Pb + ~~$Cd(NO_3)_2$~~

Oxidation half reaction: $Cd_{(s)} \rightarrow Cd^{+2}_{(aq)} + 2e^-$

Reduction half reaction: $Pb^{+2}_{(aq)} + 2e^- \rightarrow Pb_{(s)}$

Net Ionic $Cd_{(s)} + Pb^{+2}_{(aq)} \rightarrow Cd^{+2}_{(aq)} + Pb_{(s)}$

Element oxidized: Cd from 0 to +2 Reducing Agent: ✓

Element Reduced: Pb from +2 to 0 Oxidizing Agent: ✓

0 +2 -1 0 +2 -1

4. $Mg + ZnCl_2 + \rightarrow Zn + MgCl_2$

Oxidation half reaction: $Mg_{(s)} \rightarrow Mg^{+2}_{(aq)} + 2e^-$

Reduction half reaction: $Zn^{+2}_{(aq)} + 2e^- \rightarrow Zn_{(s)}$

Net Ionic $Mg_{(s)} + Zn^{+2} \rightarrow Mg^{+2} + Zn_{(s)}$

Element oxidized: Mg from 0 to +2 Reducing Agent: ✓

Element Reduced: Zn^{+2} from +2 to 0 Oxidizing Agent: ✓

0 +3 -1 0 +2

5. $Mg + AlCl_3 + \rightarrow Al + MgCl_2$

Oxidation half reaction: $(Mg_{(s)} \rightarrow Mg^{+2}_{(aq)} + 2e^-) \times 3$

Reduction half reaction: $(Al^{+3}_{(aq)} + 3e \rightarrow Al_{(s)}) \times 2$

Net Ionic $3Mg_{(s)} + 2Al^{+3}_{(aq)} \rightarrow 2Al_{(s)} + 3Mg^{+2}_{(aq)}$

Element oxidized: Mg from 0 to +2 Reducing Agent: _____

Element Reduced: Al from +3 to 0 Oxidizing Agent: _____

0 +1 -1 +1 -1

6. $Na + KCl \rightarrow K + NaCl$

Oxidation half reaction: NR

Reduction half reaction: _____

Net Ionic _____

Element oxidized: ___ from ___ to _____ Reducing Agent: _____

Element Reduced: ___ from ___ to _____ Oxidizing Agent: _____

+2 -1 0 0 +3

7. $CuCl_2 + Al \rightarrow Cu + AlCl_3$

Oxidation half reaction: $(Al_{(s)} \rightarrow Al^{+3}_{(aq)} + 3e^-) \times 2$

Reduction half reaction: $(Cu^{+2}_{(aq)} + 2e^- \rightarrow Cu^0_{(s)}) \times 3$

Net Ionic $2Al_{(s)} + 3Cu^{+2}_{(aq)} \rightarrow 3Cu_{(s)} + 2Al^{+3}_{(aq)}$

Element oxidized: Al from 0 to +3 Reducing Agent: ✓

Element Reduced: Cu^{+2} from +2 to 0 Oxidizing Agent: ✓