Oxidation and Reduction

Set 25: Balancing Half Equations

Balance the following half equations and state whether they are reduction or oxidation.

1. $Mg \rightarrow Mg^{2+}$
2. $S \rightarrow S^{2-}$
3. $C\ell^{-} \rightarrow C\ell_2$
4. $Ca \rightarrow Ca^{2+}$
5. $I_2 \rightarrow I^{-}$
6. $Zn \rightarrow Zn^{2+}$
7. $Cu^{+} \rightarrow Cu^{2+}$
8. $Au^{+} \rightarrow Au$
9. $H^{+} \rightarrow H_2$
10. $Cu^{2+} \rightarrow Cu$

Extra for experts: Unless stated otherwise, assume acidic conditions.

11. $AsO_3^{3-} \rightarrow AsO_4^{-}$
12. $S_2O_3^{2-} \rightarrow SO_4^{2-}$
13. $NO_3^{-} \rightarrow NH_4^{+}$
14. $MnO_4^{-} \rightarrow Mn^{2+}$

Answers

1.	$Mg \rightarrow Mg^{2+} + 2e^{-}$	Oxidation
2.	$S + 2e^{-} \rightarrow S^{2-}$	Reduction
3.	$2Cl \rightarrow Cl_2 + 2e^{-}$	Oxidation
4.	$Ca \rightarrow Ca^{2+} + 2e^{-}$	Oxidation
5.	$I_2 + 2e^{-} \rightarrow 2I^{-}$	Reduction
6.	$Zn \rightarrow Zn^{2+} + 2e^{-}$	Oxidation
7.	$Cu^{+} \rightarrow Cu^{2+} + e^{-}$	Oxidation
8.	$Au^{+} + e^{-} \rightarrow Au$	Reduction
9.	$2H^{+} + 2e^{-} \rightarrow H_2$	Reduction
10.	$Cu^{2+} + 2e^{-} \rightarrow Cu$	Reduction
11.	$AsO_3^{3-} + H_2O \rightarrow AsO_4^{3-} + 2H^{+} + 2e^{-}$	Oxidation
12.	$S_2O_3^{2-} + 5H_2O \rightarrow 2SO_4^{2-} + 10H^{+} + 4e^{-}$	Oxidation
13.	$NO_3^{-} + 10H^{+} + 8e^{-} \rightarrow NH_4^{+} + 3H_2O$	Reduction
14.	$MnO_4^{-} + 8H^{+} + 5e^{-} \rightarrow Mn^{2+} + 4H_2O$	Reduction