



Balance the following oxidation-reduction equations. All reactions take place in an acidic solution unless otherwise indicated.

2. $\text{Cr}(\text{cr}) + \text{Sn}^{4+}(\text{aq}) \rightarrow \text{Cr}^{3+}(\text{aq}) + \text{Sn}^{2+}(\text{aq})$
3. $\text{Al}(\text{cr}) + \text{H}^+(\text{aq}) \rightarrow \text{Al}^{3+}(\text{aq}) + \text{H}_2(\text{g})$
4. $\text{Zn}(\text{cr}) + \text{Ag}^+(\text{aq}) \rightarrow \text{Zn}^{2+}(\text{aq}) + \text{Ag}(\text{cr})$
5. $\text{NO}_3^-(\text{aq}) + \text{S}(\text{cr}) \rightarrow \text{NO}_2(\text{g}) + \text{H}_2\text{SO}_4(\text{aq})$
6. $\text{Br}_2(\text{l}) + \text{SO}_3^{2-}(\text{aq}) \rightarrow \text{Br}^-(\text{aq}) + \text{SO}_4^{2-}(\text{aq})(\text{basic})$
7. $\text{Fe}^{2+}(\text{aq}) + \text{MnO}_4^-(\text{aq}) \rightarrow \text{Mn}^{2+}(\text{aq}) + \text{Fe}^{3+}(\text{aq})$
8. $\text{Cu}(\text{cr}) + \text{SO}_4^{2-}(\text{aq}) \rightarrow \text{Cu}^{2+}(\text{aq}) + \text{SO}_2(\text{g})$
9. $\text{Cu}(\text{cr}) + \text{NO}_3^-(\text{aq}) \rightarrow \text{Cu}^{2+}(\text{aq}) + \text{NO}(\text{g})$
10. $\text{MnO}_4^-(\text{aq}) + \text{S}^{2-}(\text{aq}) \rightarrow \text{Mn}^{2+}(\text{aq}) + \text{S}(\text{cr})$
11. $\text{CuS}(\text{cr}) + \text{NO}_3^-(\text{aq}) \rightarrow \text{Cu}^{2+}(\text{aq}) + \text{NO}_2(\text{g}) + \text{S}(\text{cr})$
12. $\text{NO}_2(\text{g}) + \text{ClO}^-(\text{aq}) \rightarrow \text{NO}_3^-(\text{aq}) + \text{Cl}^-(\text{aq})(\text{basic})$
13. $\text{Fe}^{2+}(\text{aq}) + \text{Cr}_2\text{O}_7^{2-}(\text{aq}) \rightarrow \text{Fe}^{3+}(\text{aq}) + \text{Cr}^{3+}(\text{aq})$
14. $\text{MnO}_4^-(\text{aq}) + \text{Cl}^-(\text{aq}) \rightarrow \text{Mn}^{2+}(\text{aq}) + \text{Cl}_2(\text{g})$
15. $\text{IO}_3^-(\text{aq}) + \text{H}_2\text{S}(\text{g}) \rightarrow \text{I}_2(\text{g}) + \text{SO}_3^{2-}(\text{aq})(\text{basic})$
16. $\text{H}_2\text{SeO}_3(\text{aq}) + \text{Br}^-(\text{aq}) \rightarrow \text{Se}(\text{cr}) + \text{Br}_2(\text{g})$
17. $\text{BrO}_3^-(\text{aq}) + \text{MnO}_2(\text{cr}) \rightarrow \text{Br}^-(\text{aq}) + \text{MnO}_4^-(\text{aq})(\text{basic})$
18. $\text{H}_2\text{S}(\text{g}) + \text{NO}_3^-(\text{aq}) \rightarrow \text{S}(\text{cr}) + \text{NO}(\text{g})$