

Oxidation Number Assignments

Assign oxidation numbers to each atom in the following elements, ions, or compounds:

- | | |
|-----------------------|--------------------------------------|
| 1. NaNO_2 | 6. CO_2 |
| 2. MgCl_2 | 7. HNO_3 |
| 3. $\text{F}_2(g)$ | 8. $\text{Fe}(s)$ |
| 4. KMnO_4 | 9. N_2O_4 |
| 5. SO_4^{2-} | 10. $\text{K}_2\text{S}_2\text{O}_8$ |

Half-Reaction Method of Balancing Equations

Balance the ten redox reaction below using the half-reaction method.

11. $\text{Zn}(s) + \text{HNO}_3(aq) \rightarrow \text{Zn}(\text{NO}_3)_2(aq) + \text{H}_2(g)$
12. $\text{KIO}_3(aq) + \text{KI}(aq) + \text{HCl}(aq) \rightarrow \text{H}_2\text{O}(l) + \text{I}_2(s) + \text{KCl}(aq)$
13. $\text{CuI}_2(aq) \rightarrow \text{CuI}(aq) + \text{I}_2(s)$
14. $\text{K}_2\text{Cr}_2\text{O}_7(aq) + \text{H}_2\text{O}(l) + \text{S}(s) \rightarrow \text{SO}_2(g) + \text{KOH}(aq) + \text{Cr}_2\text{O}_3(s)$
15. $\text{KI}(aq) + \text{NaClO}(aq) + \text{H}_2\text{O}(l) \rightarrow \text{I}_2(s) + \text{NaCl}(aq) + \text{KOH}(aq)$
16. $\text{Bi}_2\text{S}_3(aq) + \text{HNO}_3(aq) \rightarrow \text{Bi}(\text{NO}_3)_3(aq) + \text{NO}(g) + \text{S}(s) + \text{H}_2\text{O}(l)$
17. $\text{KI}(aq) + \text{KMnO}_4(aq) + \text{H}_2\text{O}(l) \rightarrow \text{I}_2(s) + \text{MnO}_2(s) + \text{KOH}(aq)$
18. $\text{KMnO}_4(aq) + \text{HCl}(aq) + \text{H}_3\text{AsO}_3(aq) \rightarrow \text{MnCl}_2(aq) + \text{H}_2\text{O}(l) + \text{H}_3\text{AsO}_4(aq) + \text{KCl}(aq)$
19. $\text{KOH}(aq) + \text{Cl}_2(g) \rightarrow \text{KCl}(aq) + \text{KClO}(aq) + \text{H}_2\text{O}(l)$
20. $\text{H}_2\text{C}_2\text{O}_4(aq) + \text{KMnO}_4(aq) \rightarrow \text{CO}_2(g) + \text{K}_2\text{O}(aq) + \text{Mn}_2\text{O}_3(s) + \text{H}_2\text{O}(l)$