

Key

ASSIGNING OXIDATION NUMBERS

Assign the correct oxidation number to each atom in each of the following. Write the numbers directly above the symbols in each formula.

Examples: $\overset{+1}{\text{H}}\overset{-2}{\text{O}}$ $\overset{-3}{\text{N}}\overset{+1}{\text{H}}$ $\overset{+1}{\text{Na}}\overset{+6}{\text{S}}\overset{-2}{\text{O}}$

1. $\overset{0}{\text{K}}$ 10. $\overset{+3}{\text{Fe}}\overset{-1}{\text{Cl}}_3$

2. $\overset{+1}{\text{Rb}}$ 11. $\overset{+2}{\text{Fe}}\overset{-2}{\text{O}}$

3. $\overset{+1}{\text{Na}}_2\overset{-2}{\text{O}}$ 12. $\overset{+2}{\text{Mg}}(\overset{+5}{\text{N}}\overset{-2}{\text{O}})_3$

4. $\overset{+1}{\text{H}}_2\overset{-1}{\text{O}}_2$
peroxide

13. $\overset{+1}{\text{N}}_2\overset{-2}{\text{O}}$

5. $\overset{+2}{\text{Mg}}\overset{-1}{\text{Br}}_2$

14. $\overset{+2}{\text{N}}\overset{-2}{\text{O}}$

6. $\overset{+2}{\text{Ca}}\overset{-2}{\text{S}}$

15. $\overset{+4}{\text{N}}\overset{-2}{\text{O}}_2$

7. $\overset{+1}{\text{K}}_2\overset{+6}{\text{Cr}}_2\overset{-2}{\text{O}}_7$
 $+12 -14$

16. $\overset{+1}{\text{Na}}\overset{-1}{\text{H}}$

8. $\overset{0}{\text{N}}_2$

17. $\overset{0}{\text{Ag}}$

9. $\overset{+1}{\text{N}}(\overset{+4}{\text{H}}\overset{-1}{\text{I}})_2\overset{-2}{\text{S}}$

18. $\overset{+2}{\text{O}}\overset{-1}{\text{F}}_2$

Rules for Assigning Oxidation Numbers

Elemental form	zero (0) Only one kind of atom present, no charge
Atomic ions	= the charge on the atom (monatomic ion)
Group 1A Li, Na, K, Rb, Cs	+1 unless in elemental form
Group 2A Be, Mg, Ca, Sr, Ba	+2 unless in elemental form
Hydrogen (H)	+1 when bonded to a nonmetal, -1 when bonded to a metal
Oxygen (O)	-1 in peroxides O_2^{2-} , -2 in all other compounds (most common)
Fluorine (F)	-1, always
Neutral compounds	The sum of all oxidation numbers of atoms or ions in a neutral compound is zero.
Ionic compounds	The sum of all oxidation numbers of atoms in an ionic compound is the charge on the polyatomic ion.

19. $\overset{+2}{\text{Ca}}\overset{+4}{\text{C}}\overset{-2}{\text{O}}_3$

26. $\overset{+4}{\text{C}}\overset{-2}{\text{O}}_3^{2-}$

20. $\overset{+4}{\text{C}}\overset{-2}{\text{O}}_2$

27. $\overset{+6}{\text{Cr}}\overset{-2}{\text{O}}_4^{2-}$
 $-2+4 = -8$

21. $\overset{+2}{\text{C}}\overset{-2}{\text{O}}$

28. $\overset{+3}{\text{C}}_2\overset{-2}{\text{O}}_4^{2-}$

22. $\overset{+1}{\text{Na}}_3\overset{-2}{\text{S}}_2\overset{-2}{\text{O}}_3$
 $+2 -6$

29. $\overset{+1}{\text{H}}\overset{+6}{\text{S}}\overset{-2}{\text{O}}_4^{\ominus}$
 -2

23. $\overset{+1}{\text{Na}}_2\overset{-2}{\text{S}}\overset{+4}{\text{O}}_3$
 -2

30. $\overset{+5}{\text{I}}\overset{-2}{\text{O}}_3^{\ominus}$
 -6

24. $\overset{+1}{\text{K}}\overset{-1}{\text{Mn}}\overset{+7}{\text{O}}_4$
 $-2 \times 4 = -8$

31. $\overset{+2}{\text{S}}_2\overset{-2}{\text{O}}_3^{2-}$
 $+4 -6$

25. $\overset{-2}{\text{O}}\overset{+1}{\text{H}}$

32. $\overset{+1}{\text{Cl}}\overset{-2}{\text{O}}$