

Balancing Redox Reactions

Mastering the Oxidation Number Method

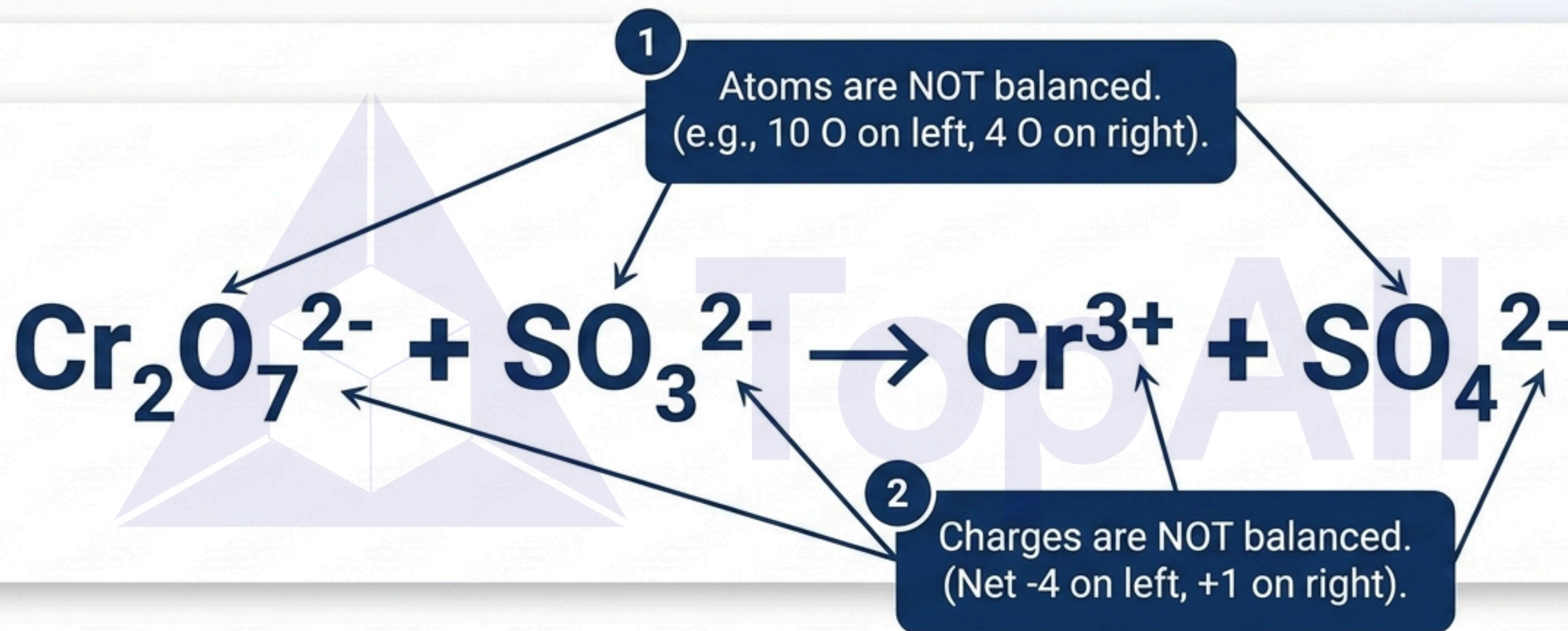
NEET Chemistry Masterclass

The Universal Law: The Electron Ledger



Redox balancing is fundamentally an accounting exercise. Every electron lost must be tracked and gained elsewhere.

Step 1: Write the Skeletal Equation



Identify the precise reactants and products. Strip away spectator ions to focus solely on the species undergoing the chemical change.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



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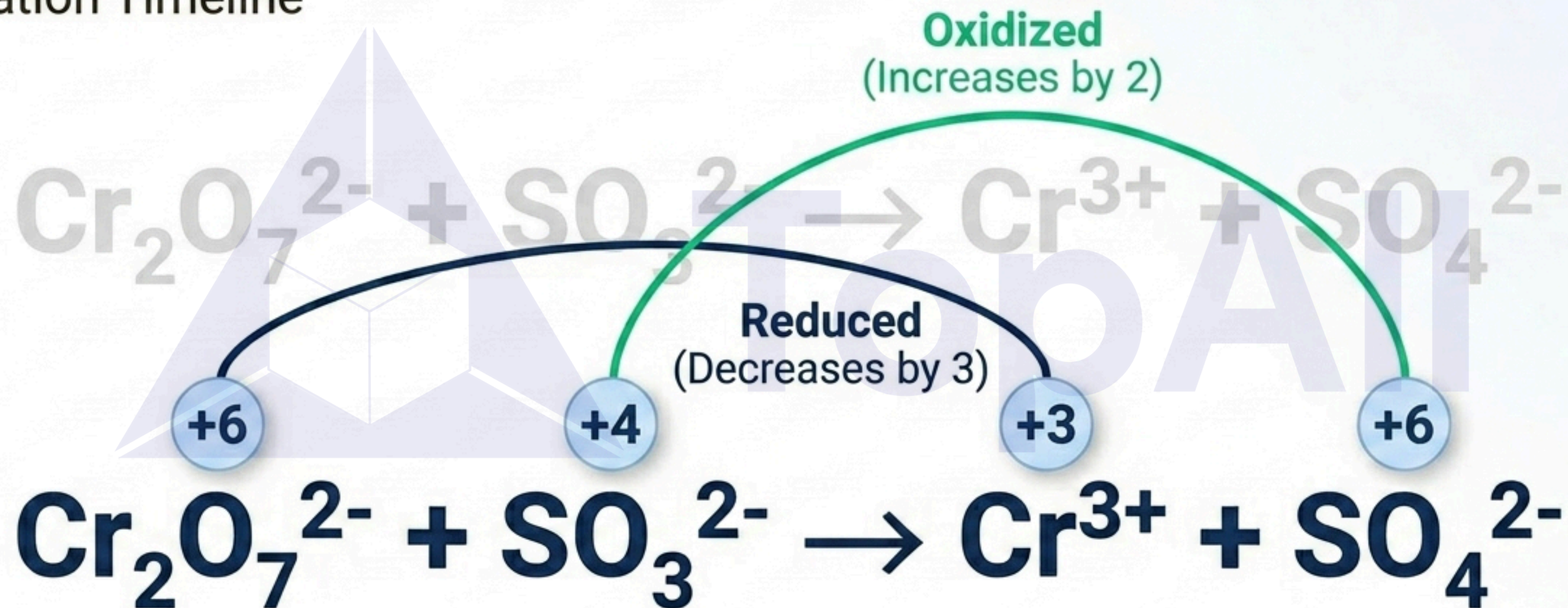
Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



Step 2: Assign Oxidation Numbers

Equation Timeline



Note: Oxygen remains -2 throughout, so it is omitted from the ledger.

Step 3: Equalise Increase and Decrease

The Imbalance

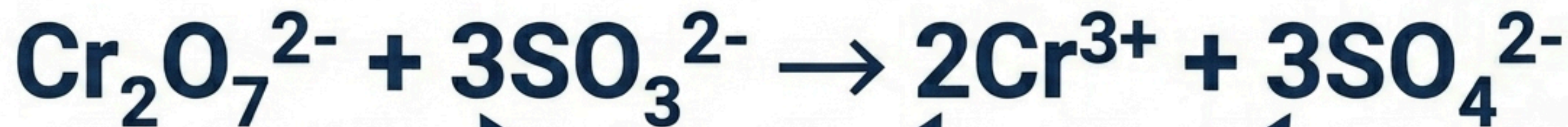
Sulphur: +2 increase per atom.

Chromium: -3 decrease per atom
× 2 atoms = -6 total decrease.

The Fix

Multiply **Sulphur** by 3
to force a balance.

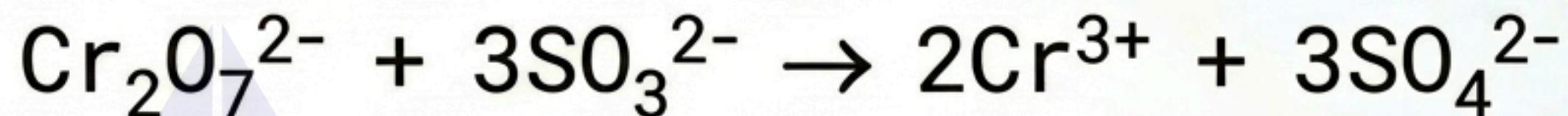
$$(+2) \times 3 = +6 \leftrightarrow (-6) \times 1 = -6$$



The magic numbers that
balance the electron ledger.

Acidic Medium Example (Synthesis)

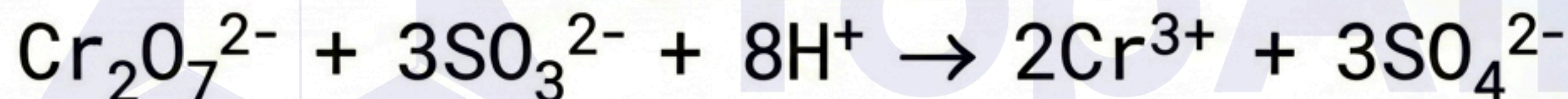
Step A



Balance Charges

Add H^+

Left charge = -8. Right charge = 0.



Balance Atoms

Add H_2O

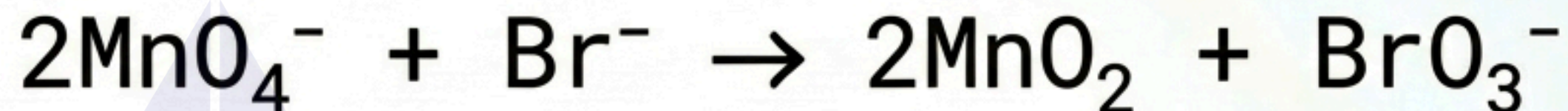
Need to balance 8 Hydrogen atoms on the left.



In an acidic medium, protons (H^+) act as the primary charge balancers.

Basic Medium Example (Permanganate + Bromide)

The Problem (O.N. already equalised):



Warning: Basic Medium requires OH^- , not H^+ to balance charges!

The Execution:

- Left side net charge = -3. Right side net charge = -1.
- Add 2 OH^- to the right side to equalize the charge at -3, then add H_2O to the left to balance Hydrogens.



The Final Diagnostic Checklist

Are all atoms perfectly balanced on both sides?



Is the net ionic charge exactly equal on the reactant and product sides?



Are the total oxidation state increases equalized with the total decreases?



If all three checks pass, your redox equation is unconditionally balanced. The laws of physics are satisfied.



You've Learned the Theory.

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