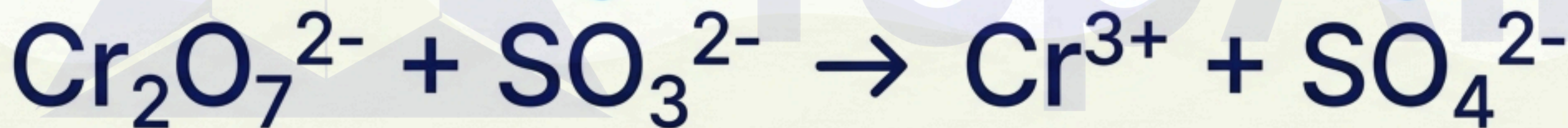




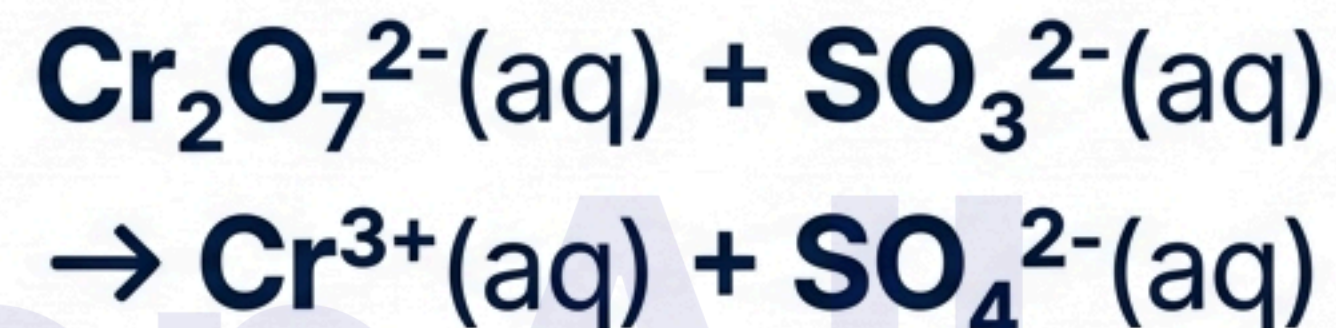
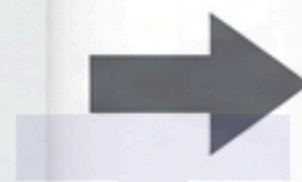
Balancing Redox Reactions

Mastering the Oxidation Number Method



Step 1: Write the Skeletal Equation

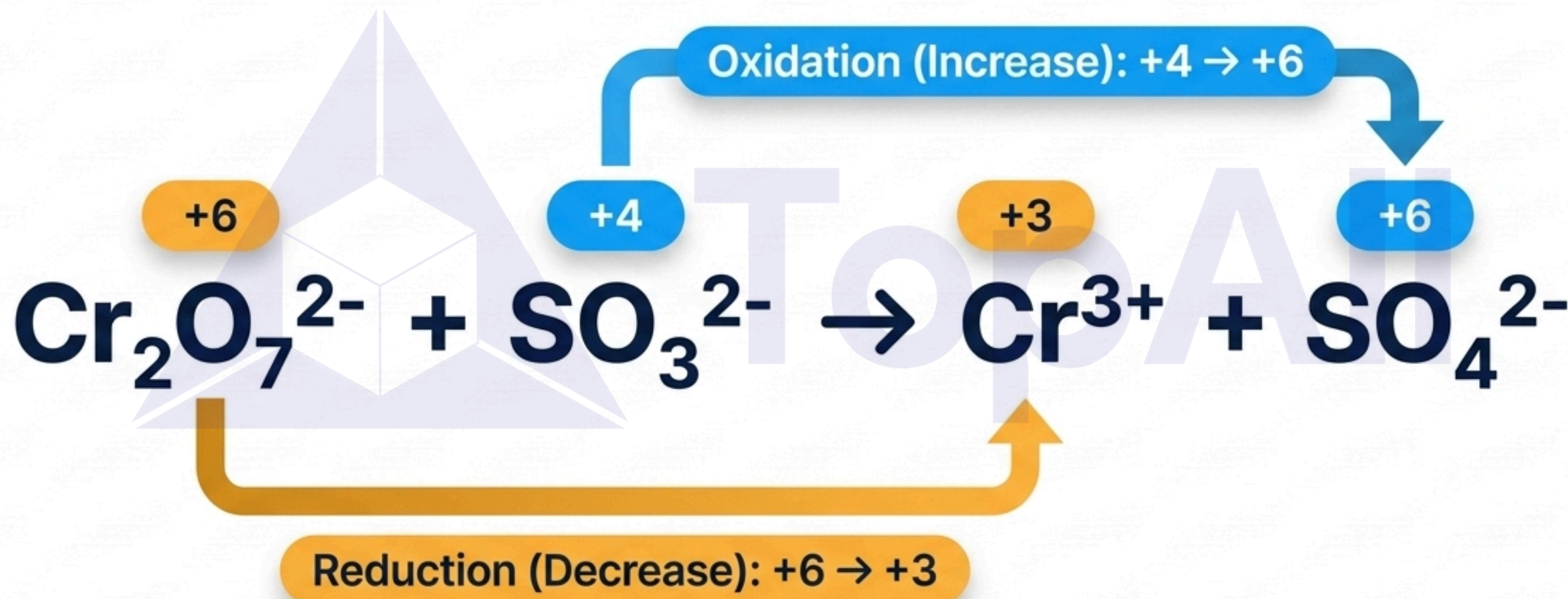
Reaction of potassium dichromate(VI) with sodium sulphite in an acid solution...



Key Takeaway

Strip the Spectators. Identify the core oxidant and reductant. Ignore spectator ions like K^+ or Na^+ that do not participate in electron transfer.

Step 2: Assign Oxidation Numbers





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

$$E=mc^2$$



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Step 3: Equalise Increase and Decrease

Multiplier Matrix

Reduction:

Cr goes $+6 \rightarrow +3$ ($\Delta = 3$)

$\text{Cr}_2\text{O}_7^{2-}$ has 2 Cr atoms.
Total decrease = $3 \times 2 = 6 \text{ e}^-$

Oxidation:

S goes $+4 \rightarrow +6$ ($\Delta = 2$)

Total increase = 2 e^-

$\times 3$

Matches
 6 e^-
Decrease

Living Equation



Step 4: Balance Charge

Acidic Medium → Add H^+

Basic Medium → Add OH^-



Living Equation



Step 5: Balance H using H₂O

Living Equation



LHS has 8 Hydrogen atoms

The Oxygen Proof

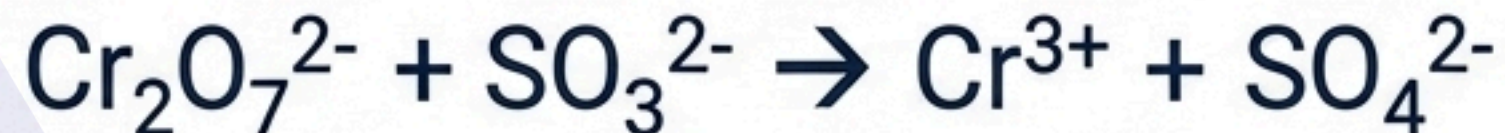
LHS Oxygen: $7 + (3 \times 3) = 16$ ✓

RHS Oxygen: $(3 \times 4) + 4 = 16$ ✓

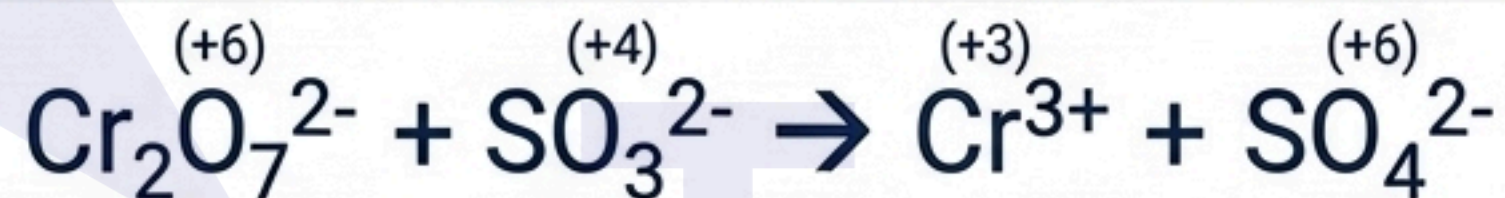
If you followed Steps 2-4 correctly, Oxygen atoms will automatically balance themselves. If they don't, recheck your math.

Master Example: Dichromate + Sulphite (Acidic)

1. Skeletal



2. Ox States



e⁻ transfer

3. Equalise e⁻



Matches 6e⁻ transfer

4. Charge



LHS (-8) vs RHS (0)

5. H/O Balance



O is 16 on both sides

The Final Check

JEE Trap Alert: Balancing Atoms without Balancing Charge

Fake Balanced



Atoms: 1 Al, 1 Cu

Charge: LHS +2, RHS +3 (**FATAL ERROR**)



Truly Balanced



Atoms: 2 Al, 3 Cu

Charge: **LHS +6, RHS +6**



Double-Lock Verification Checklist:  Mass Balanced? AND  Charge Balanced?



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