

Redox reaction $\left\{ \begin{array}{l} \text{Reduction} \\ \text{Oxidation} \end{array} \right\}$ occur simultaneously

Oxidation / reduction occur when species:

- gains O / donates O
- donates H / gain H
- $\uparrow$ oxidation number / $\downarrow$ ox number
- donates e^- / gain e^-

$\downarrow$
species
is oxidized

$\downarrow$
species is
reduced

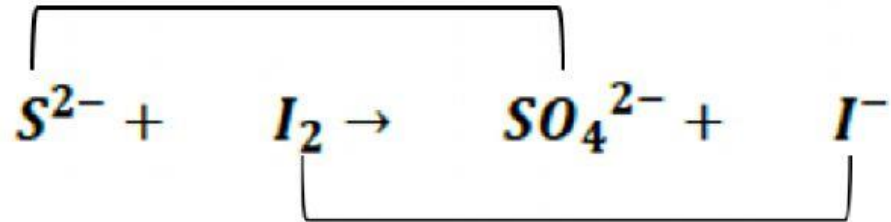
(a) Balancing Redox Reaction In Acidic Solution

- 1) Det oxi and red
- 2) Separate both eq
- 3) Bal the metal
- 4) Bal the non-metal other than H n O
- 5) Bal the O by adding H_2O
- 6) Bal the H by adding H^+ at the other side
- 7) Bal the charge by adding e^- at the side
- 8) Overall eq (delete both e^- from both eqs)
- 9) Recheck

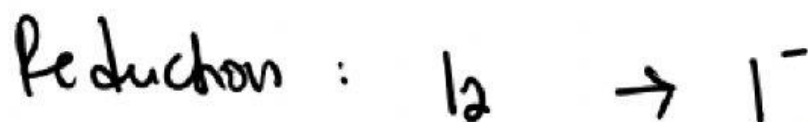
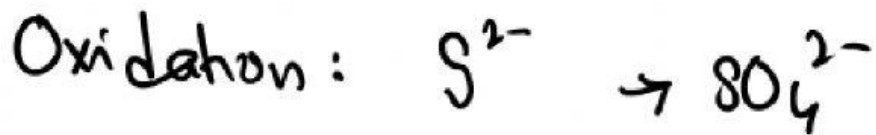
Exercise 3(b) Balancing Redox Reaction In Acidic Solution



Step 1: Determine species undergo reduction and oxidation



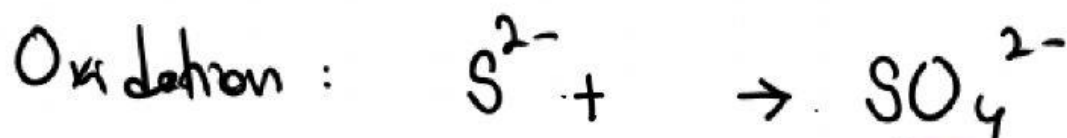
Step 3: Separate the equations



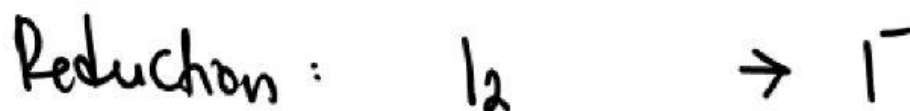
Step 3: **Balance the metal (if any)**

Skip this step. There is no metal to balance

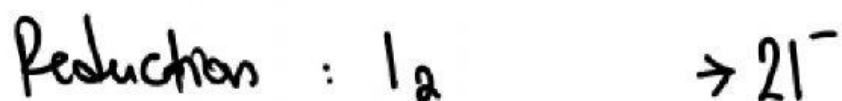
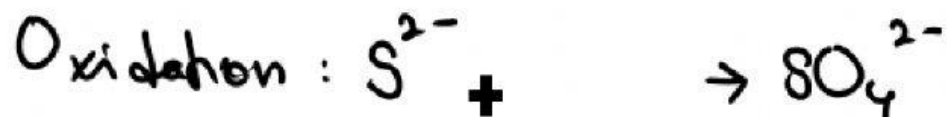
Step 4: **Balance the non-metal other than H and O**



S: Both sides are balanced.

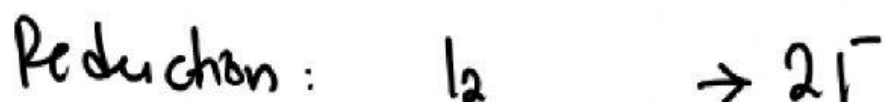
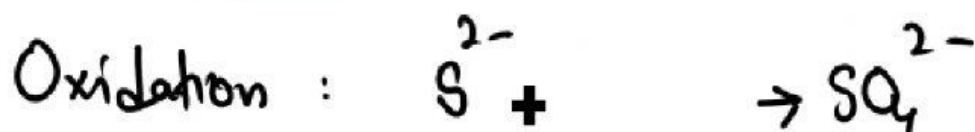


Step 5: Add **H₂O** to balance the O atoms



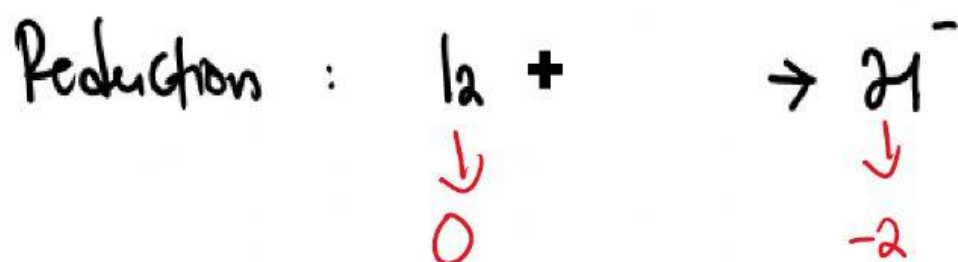
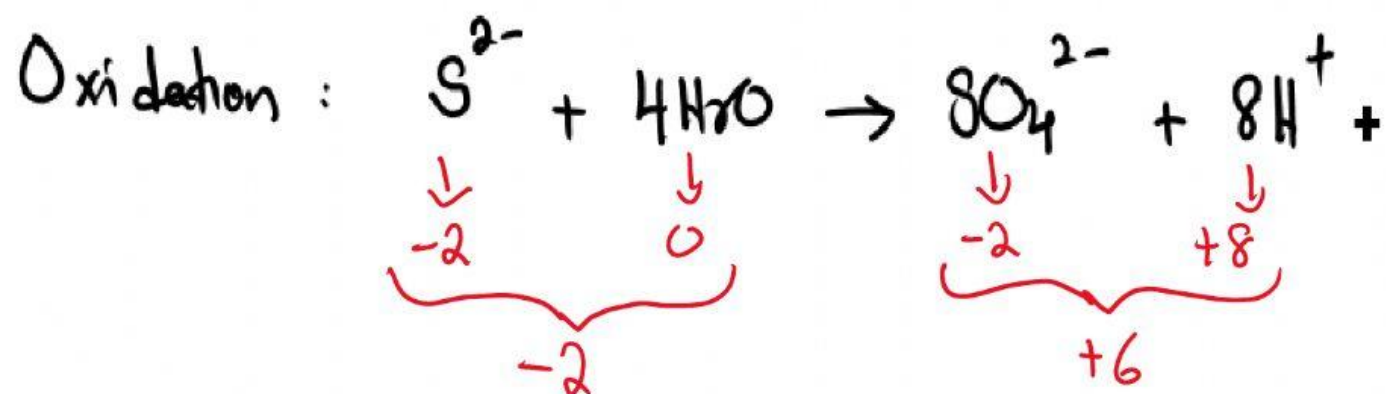
There is no O
at both sides.
SKIP the step

Step 6: Add **H⁺** to balance the H atoms

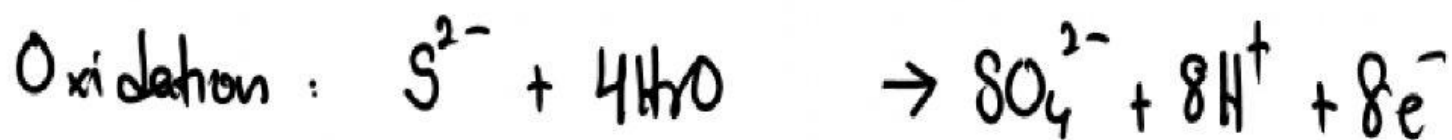


There is no H
at both sides.
SKIP the step

Step 7: Add **electrons** at (+ve) side to balance the charges



Step 8: Overall equation by deleting e at both equations



The whole reduction equation x 8 because there are 8e at oxidation equation



Overall equation :



Step 9: **Recheck** the overall equation



S =

H =

O =

I =

Total Charge =

S =

H =

O =

I =

T. Charge =

If we want to balance the equation in **basic medium**

Step 10 : Add OH^- at both sides of overall equation

