

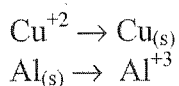
b) Full Redox Reactions

i) Procedure:

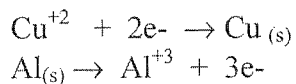
- ① Separate redox into its two half reactions
- ② Balance each half reaction as above
- ③ Make e- the same for both half reactions (*electrons gained = electrons lost*)
- ④ Add the two half reactions together (*cancel out species common to both sides*)

ii) Balance $\text{Cu}^{+2} + \text{Al}_{(s)} \rightarrow \text{Cu}_{(s)} + \text{Al}^{+3}$ (acidic)

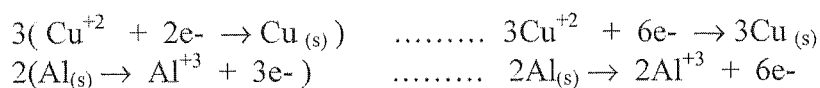
1st Separate half reactions



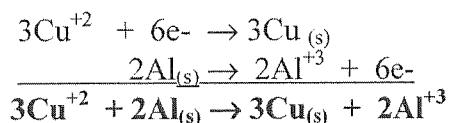
2nd Balance half reactions



3rd Make e- the same

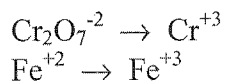


4th Add half reactions together

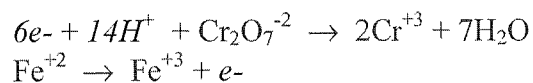
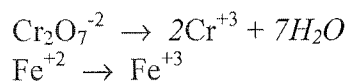


iii) Balance $\text{Cr}_2\text{O}_7^{2-} + \text{Fe}^{+2} \rightarrow \text{Cr}^{+3} + \text{Fe}^{+3}$ (acidic)

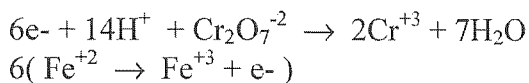
1st Separate half reactions



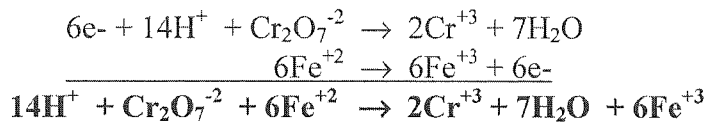
2nd Balance half reactions



3rd Make e- the same

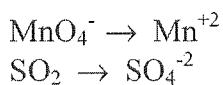


4th Add two half reactions together

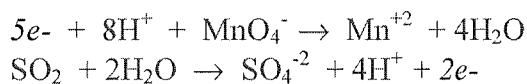
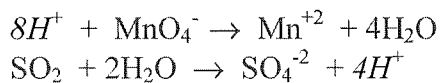
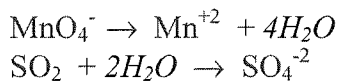


iv) Balance $MnO_4^- + SO_2 \rightarrow Mn^{+2} + SO_4^{2-}$ (acidic)

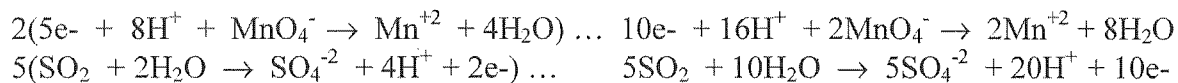
1st Separate half reactions



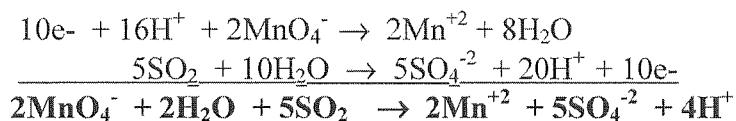
2nd Balance half reactions



3rd Make e- the same



4th Add two half reactions together



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