

Normality Vs Molarity

Molarity (M)		Normality (N)	
1.	No. of moles of solute present in one litre of solution.	1.	No. of equivalents of solute present in one litre of solution
2.	No. of moles = $\frac{W}{M}$	2.	No. of equivalents = $\frac{W}{E}$
3.	$\frac{W}{M} \times 1000 = \text{No. of millimoles}$	3.	$\frac{W}{E} \times 1000 = \text{No. of equivalents}$
4.	Molarity V(in mL) = No. of millimoles	4.	Normality V(in mL) = No. of equivalents
5.	Molarity = $\frac{\text{milli moles}}{\text{Volume of solution in mL}}$	5.	Normality = $\frac{\text{milli equivalents}}{\text{Volume of solution in mL}}$

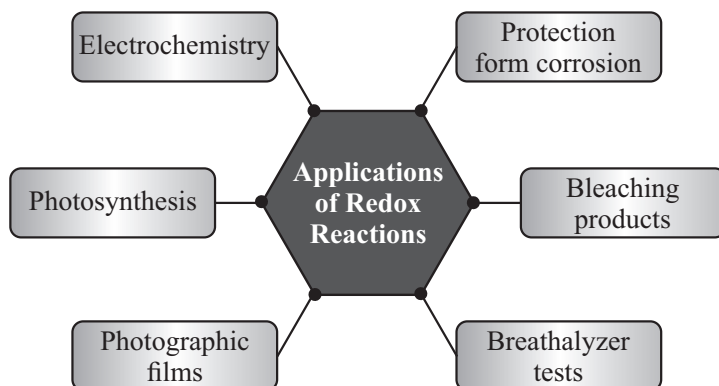


Table: Some Redox Titration Excluding Iodometric/ Iodimetric

	Estimation of	By titrating with	Reaction	Relation* between OA and RA
1.	Fe^{2+}	MnO_4^-	$\text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + \text{e}^-$ $\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \rightarrow \text{Mn}^{2+} + 4\text{H}_2\text{O}$	$5\text{Fe}^{2+} \equiv \text{MnO}_4^-$ Eq. wt. of $\text{Fe}^{2+} = \text{M}/1$
2.	Fe^{2+}	$\text{Cr}_2\text{O}_7^{2-}$	$\text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + \text{e}^-$ $\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6\text{e}^- \rightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O}$	$6\text{Fe}^{2+} \equiv \text{Cr}_2\text{O}_7^{2-}$ Eq. wt. of $\text{Cr}_2\text{O}_7^{2-} = \text{M}/6$
3.	$\text{C}_2\text{O}_4^{2-}$	MnO_4^-	$\text{C}_2\text{O}_4^{2-} \rightarrow 2\text{CO}_2 + 2\text{e}^-$ $\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \rightarrow \text{Mn}^{2+} + 4\text{H}_2\text{O}$	$5\text{C}_2\text{O}_4^{2-} \equiv 2\text{MnO}_4^-$ Eq. wt. of $\text{C}_2\text{O}_4^{2-} = \text{M}/2$
4.	H_2O_2	MnO_4^-	$\text{H}_2\text{O}_2 \rightarrow 2\text{H}^+ + \text{O}_2 + 2\text{e}^-$ $\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \rightarrow \text{Mn}^{2+} + 4\text{H}_2\text{O}$	$5\text{H}_2\text{O}_2 \equiv 2\text{MnO}_4^-$ Eq. wt. of $\text{H}_2\text{O}_2 = \text{M}/2$
5.	As_2O_3	MnO_4^-	$\text{As}_2\text{O}_3 + 5\text{H}_2\text{O} \rightarrow 2\text{AsO}_4^{3-} + 10\text{H}^+ + 4\text{e}^-$ $\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \rightarrow \text{Mn}^{2+} + 4\text{H}_2\text{O}$	Eq. wt. of $\text{As}_2\text{O}_3 = \text{M}/4$
6.	AsO_3^{3-}	BrO_3^-	$\text{AsO}_3^{3-} + \text{H}_2\text{O} \rightarrow \text{AsO}_4^{3-} + 2\text{H}^+ + 2\text{e}^-$ $\text{BrO}_3^- + 6\text{H}^+ + 6\text{e}^- \rightarrow \text{Br}^- + 3\text{H}_2\text{O}$	Eq. wt. of $\text{AsO}_3^{3-} = \text{M}/2$ Eq. wt. of $\text{BrO}_3^- = \text{M}/6$

Iodimetric Titrations

Estimation of	Reaction	Relation between O.A. and R.A.
H_2S (in acidic medium)	$\text{H}_2\text{S} + \text{I}_2 \rightarrow \text{S} + 2\text{I}^- + 2\text{H}^+$	$\text{H}_2\text{S} \equiv \text{I}_2 \equiv 2\text{I}^-$ Eq. wt. of $\text{H}_2\text{S} = \text{M}/2$
SO_3^{2-} (in acidic medium)	$\text{SO}_3^{2-} + \text{I}_2 + \text{H}_2\text{O} \rightarrow \text{SO}_4^{2-} + 2\text{I}^- + 2\text{H}^+$	$\text{SO}_3^{2-} \equiv \text{I}_2 \equiv 2\text{I}^-$ Eq. wt. of $\text{SO}_3^{2-} = \text{M}/2$
Sn^{2+}	$\text{Sn}^{2+} + \text{I}_2 \rightarrow \text{Sn}^{4+} + 2\text{I}^-$	$\text{Sn}^{2+} \text{ I}_2 \equiv 2\text{I}^-$ Eq. wt. of $\text{Sn}^{2+} = \text{M}/2$
As (III) (at pH = 8)	$\text{H}_2\text{AsO}_3^- + \text{I}_2 + \text{H}_2\text{O} \rightarrow \text{HAsO}_4^{2-} + 2\text{I}^- + 2\text{H}^+$	$\text{H}_2\text{AsO}_3^- \equiv \text{I}_2 \equiv 2\text{I}^-$ Eq. wt. of $\text{H}_2\text{AsO}_3^- = \text{M}/2$
N_2H_4	$\text{N}_2\text{H}_4 + 2\text{I}_2 \rightarrow \text{N}_2 + 4\text{H}^+ + 4\text{I}^-$	$\text{N}_2\text{H}_4 \equiv 2\text{I}_2 \equiv 4\text{I}^-$ Eq. wt. of $\text{N}_2\text{H}_4 = \text{M}/4$
I_2	$\text{I}_2 + 2\text{Na}_2\text{S}_2\text{O}_3 \rightarrow 2\text{NaI} + \text{Na}_2\text{S}_4\text{O}_6$ or $\text{I}_2 + 2\text{S}_2\text{O}_3^{2-} \rightarrow 2\text{I}^- + \text{S}_4\text{O}_6^{2-}$	$\text{I}_2 = 2\text{I} \equiv 2\text{Na}_2\text{S}_2\text{O}_3$
CuSO_4	$2\text{CuSO}_4 + 4\text{KI} \rightarrow 2\text{Cu}_2\text{I}_2 + 2\text{K}_2\text{SO}_4 + \text{I}_2$ $\text{Cu}^{2+} + 4\text{I}^- \rightarrow \text{Cu}_2\text{I}_2 + \text{I}_2$ (White ppt.) $\text{CaOCl}_2 + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2 + \text{Cl}_2$	$2\text{CuSO}_4 \equiv \text{I}_2 \equiv 2\text{I}^- \equiv 2\text{Na}_2\text{S}_2\text{O}_3$ Eq. wt. of $\text{CuSO}_4 = \text{M}/1$
CaOCl_2	$\text{Cl}_2 + 2\text{KI} \rightarrow 2\text{KCl} + \text{I}_2$ $\text{Cl}_2 + 2\text{I}^- \rightarrow 2\text{Cl}^- + \text{I}_2$ $\text{MnO}_2 + 4\text{HCl (conc)} \xrightarrow{\Delta} \text{MnCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$ $\text{Cl}_2 + 2\text{KI} \rightarrow 2\text{KCl} + \text{I}_2$	
MnO_2	$\text{MnO}_2 + 4\text{H}^+ + 2\text{Cl}^- \rightarrow \text{Mn}^{2+} + 2\text{H}_2\text{O} + \text{Cl}_2$ $\text{Cl}_2 + 2\text{I}^- \rightarrow \text{I}_2 + 2\text{Cl}^-$	$\text{MnO}_2 \equiv \text{Cl}_2 \equiv \text{I}_2 \equiv 2\text{I}^- \equiv 2\text{Na}_2\text{S}_2\text{O}_3$ Eq. wt. of $\text{MnO}_2 = \text{M}/2$
IO_3^-	$\text{IO}_3^- + 5\text{I}^- + 6\text{H}^+ \rightarrow 3\text{I}_2 + 3\text{H}_2\text{O}$	$\text{IO}_3^- \equiv 3\text{I}_2 \equiv 6\text{I} \equiv 6\text{Na}_2\text{S}_2\text{O}_3$ Eq. wt. of $\text{IO}_3^- = \text{M}/6$