

Questions:

- What are differences between oxidation number and valency?
- Define oxidation number. What are the possible oxidation number of hydrogen?
- Define oxidation and reduction on the basis of oxidation number concept.
- What is redox reaction? Justify with example the oxidation and reduction occur simultaneously.
- Write the formula of compound in which oxidation number of oxygen are -2, -1 and +2.
- Define oxidizing agent (oxidant) and reducing agent (reductant) in terms of oxidation number concept.
- Why KMnO_4 can only act as oxidizing agent and H_2S can only act as reducing agent?
- Why SO_2 , NO , I_2 can act as both oxidizing and reducing agents?
- Give examples of compounds of nitrogen, sulphur, carbon and chlorine in which they are in maximum and minimum oxidation number.

Classwork

- Calculate the oxidation number of the underline elements.
(m) $\underline{\text{N}}\text{H}_4\underline{\text{N}}\text{O}_3$ (n) $\underline{\text{N}}\text{H}_4\underline{\text{N}}\text{O}_3$ (o) $(\underline{\text{N}}\text{H}_4)_2\underline{\text{S}}\text{O}_4$ (p) $(\underline{\text{N}}\text{H}_4)_2\underline{\text{S}}\text{O}_4$ (q) $\underline{\text{N}}\text{i}(\underline{\text{C}}\text{O})_4$ (r) $\underline{\text{C}}_2\underline{\text{H}}_2\underline{\text{O}}_4$
(s) $\text{Fe}_4[\underline{\text{F}}\text{e}(\underline{\text{C}}\text{N})_6]_3$ (t) $\underline{\text{N}}\text{a}.\text{Hg}$ (u) $[\underline{\text{A}}\text{g}(\underline{\text{N}}\text{H}_3)_2]\underline{\text{C}}\text{l}$ (v) $\text{Na}_4[\underline{\text{F}}\text{e}(\underline{\text{C}}\text{N})_6]$ (w) $\underline{\text{H}}\underline{\text{C}}\underline{\text{l}}\text{O}_3$ (x) $\text{H}_2\underline{\text{P}}\underline{\text{O}}_2^-$
- Balance the following redox reaction by oxidation number method or ion electron method.
 - $\text{Zn} + \text{HNO}_3 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{NO} + \text{H}_2\text{O}$
 - $\text{Zn} + \text{HNO}_3 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{NH}_4\text{NO}_3 + \text{H}_2\text{O}$
 - $\text{Cu} + \text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{NO}_2 + \text{H}_2\text{O}$
 - $\text{Zn} + \text{NaNO}_3 + \text{NaOH} \rightarrow \text{Na}_2\text{ZnO}_2 + \text{NH}_3 + \text{H}_2\text{O}$
 - $\text{KMnO}_4 + \text{HCl} \rightarrow \text{KCl} + \text{MnCl}_2 + \text{H}_2\text{O} + \text{Cl}_2$
 - $\text{K}_2\text{Cr}_2\text{O}_7 + \text{HCl} \rightarrow \text{KCl} + \text{CrCl}_3 + \text{Cl}_2 + \text{H}_2\text{O}$
- You are given the equation
 $\text{Zn} + \text{HNO}_3 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{N}_2\text{O} + \text{H}_2\text{O}$
 - Identify oxidation, reduction, oxidant and reductant.
 - Balance the equation by oxidation number method.
 - Indicate the number of HNO_3 molecules acting as oxidizing agent and as an acidic agent.
- Balance the following redox reactions by oxidation number method and ion electron method
 - $\text{Zn} + \text{H}^+ + \text{NO}_3^- \rightarrow \text{Zn}^{++} + \text{NH}_4^+ + \text{H}_2\text{O}$
 - $\text{MnO}_4^- + \text{H}^+ + \text{C}_2\text{O}_4^{--} \rightarrow \text{Mn}^{++} + \text{CO}_2 + \text{H}_2\text{O}$
 - $\text{Zn} + \text{NO}_3^- + \text{OH}^- \rightarrow \text{ZnO}_2^{--} + \text{NH}_3 + \text{H}_2\text{O}$
 - $\text{MnO}_4^- + \text{H}_2\text{O}_2 + \text{H}^+ \rightarrow \text{MnO}_2 + \text{O}_2 + \text{H}_2\text{O}$
 - $\text{Fe}^{2+} + \text{H}^+ + \text{NO}_3^- \rightarrow \text{Fe}^{3+} + \text{NO} + \text{H}_2\text{O}$
 - $\text{P} + \text{OH}^- + \text{H}_2\text{O} \rightarrow \text{H}_2\text{PO}_2^- + \text{PH}_3$
 - $\text{Cr}_2\text{O}_7^{--} + \text{Fe}^{++} \rightarrow \text{Cr}^{+++} + \text{Fe}^{+++}$ (acidic medium)
 - $\text{Cl}_2 \rightarrow \text{Cl}^- + \text{ClO}_3^-$ (basic medium)
 - $\text{Cr}_2\text{O}_7^{--} + \text{H}^+ + \text{I}^- \rightarrow \text{Cr}^{3+} + \text{I}_2 + \text{H}_2\text{O}$
 - $\text{Cr}_2\text{O}_7^{--} + \text{Fe}^{2+} \rightarrow \text{Cr}^3 + \text{Fe}^{3+}$ (in acidic medium)
 - $\text{MnO}_4^- + \text{S}^{2-} + \text{H}_2\text{O} \rightarrow \text{MnO}_2 + \text{S} + \text{OH}^-$