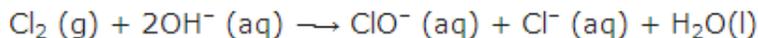


Redox Reaction

Short Answer Type Questions

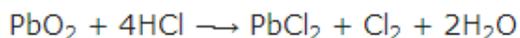
1. The reaction



represents the process of bleaching. Identify and name the species that bleaches the substances due to its oxidising action.

2. MnO_4^{2-} undergoes disproportionation reaction in acidic medium but MnO_4^- does not. Give reason.

3. PbO and PbO_2 react with HCl according to following chemical equations :



Why do these compounds differ in their reactivity?

4. Nitric acid is an oxidising agent and reacts with PbO but it does not react with PbO_2 . Explain why?

5. Write balanced chemical equation for the following reactions:

- (i) Permanganate ion (MnO_4^-) reacts with sulphur dioxide gas in acidic medium to produce Mn^{2+} and hydrogensulphate ion.

(Balance by ion electron method)

- (ii) Reaction of liquid hydrazine (N_2H_4) with chlorate ion (ClO_3^-) in basic medium produces nitric oxide gas and chloride ion in gaseous state.

(Balance by oxidation number method)

- (iii) Dichlorine heptaoxide (Cl_2O_7) in gaseous state combines with an aqueous solution of hydrogen peroxide in acidic medium to give chlorite ion (ClO_2^-) and oxygen gas.

(Balance by ion electron method)

6. Calculate the oxidation number of phosphorus in the following species.

- (a) HPO_3^{2-} and

- (b) PO_4^{3-}

7. Calculate the oxidation number of each sulphur atom in the following compounds:

- (a) $\text{Na}_2\text{S}_2\text{O}_3$
- (b) $\text{Na}_2\text{S}_4\text{O}_6$
- (c) Na_2SO_3
- (d) Na_2SO_4

8. Balance the following equations by the oxidation number method.

- (i) $\text{Fe}^{2+} + \text{H}^+ + \text{Cr}_2\text{O}_7^{2-} \longrightarrow \text{Cr}^{3+} + \text{Fe}^{3+} + \text{H}_2\text{O}$
- (ii) $\text{I}_2 + \text{NO}_3^- \longrightarrow \text{NO}_2 + \text{IO}_3^-$
- (iii) $\text{I}_2 + \text{S}_2\text{O}_3^{2-} \longrightarrow \text{I}^- + \text{S}_4\text{O}_6^{2-}$
- (iv) $\text{MnO}_2 + \text{C}_2\text{O}_4^{2-} \longrightarrow \text{Mn}^{2+} + \text{CO}_2$

9. Identify the redox reactions out of the following reactions and identify the oxidising and reducing agents in them.

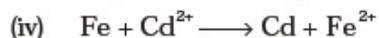
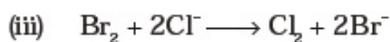
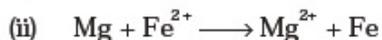
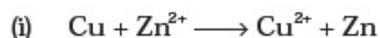
- (i) $3\text{HCl}(\text{aq}) + \text{HNO}_3(\text{aq}) \longrightarrow \text{Cl}_2(\text{g}) + \text{NOCl}(\text{g}) + 2\text{H}_2\text{O}(\text{l})$
- (ii) $\text{HgCl}_2(\text{aq}) + 2\text{KI}(\text{aq}) \longrightarrow \text{HgI}_2(\text{s}) + 2\text{KCl}(\text{aq})$
- (iii) $\text{Fe}_2\text{O}_3(\text{s}) + 3\text{CO}(\text{g}) \xrightarrow{\Delta} 2\text{Fe}(\text{s}) + 3\text{CO}_2(\text{g})$
- (iv) $\text{PCl}_3(\text{l}) + 3\text{H}_2\text{O}(\text{l}) \longrightarrow 3\text{HCl}(\text{aq}) + \text{H}_3\text{PO}_3(\text{aq})$
- (v) $4\text{NH}_3 + 3\text{O}_2(\text{g}) \longrightarrow 2\text{N}_2(\text{g}) + 6\text{H}_2\text{O}(\text{g})$

10. Balance the following ionic equations

- (i) $\text{Cr}_2\text{O}_7^{2-} + \text{H}^+ + \text{I}^- \longrightarrow \text{Cr}^{3+} + \text{I}_2 + \text{H}_2\text{O}$
- (ii) $\text{Cr}_2\text{O}_7^{2-} + \text{Fe}^{2+} + \text{H}^+ \longrightarrow \text{Cr}^{3+} + \text{Fe}^{3+} + \text{H}_2\text{O}$
- (iii) $\text{MnO}_4^- + \text{SO}_3^{2-} + \text{H}^+ \longrightarrow \text{Mn}^{2+} + \text{SO}_4^{2-} + \text{H}_2\text{O}$
- (iv) $\text{MnO}_4^- + \text{H}^+ + \text{Br}^- \longrightarrow \text{Mn}^{2+} + \text{Br}_2 + \text{H}_2\text{O}$

Long Answer Type Questions

1. Explain redox reactions on the basis of electron transfer. Give suitable examples.
2. On the basis of standard electrode potential values, suggest which of the following reactions would take place? (Consult the book for E^\ominus value).



3. Why does fluorine not show disproportionation reaction?
4. Write redox couples involved in the reactions (i) to (iv) given in question 34.
5. Find out the oxidation number of chlorine in the following compounds and arrange them in increasing order of oxidation number of chlorine.
 $\text{NaClO}_4, \text{NaClO}_3, \text{NaClO}, \text{KClO}_2, \text{Cl}_2\text{O}_7, \text{ClO}_3, \text{Cl}_2\text{O}, \text{NaCl}, \text{Cl}_2, \text{ClO}_2$.
Which oxidation state is not present in any of the above compounds?
6. Which method can be used to find out strength of reductant/oxidant in a solution? Explain with an example.