DPP –4 [Redox Reactions]

Chapter: Redox Reactions

"Right now, somewhere, someone is solving the assignment you are avoiding"

TYPE–1 : Definitions of Oxidation and Reduction

1. **Oxidation is defined as –**
   (1) Gain of electrons (2) Decrease in positive valency
   (3) Loss of electrons (4) Addition of electropositive element
2. **Reduction is defined as –**
   (1) Increase in positive valency (2) Gain of electrons
   (3) Loss of protons (4) Decrease in negative valency

TYPE–2 : Identify Oxidised / Reduced Species or Agent

3. **In the reaction $MnO_4^- + SO_3^{2-} + H^+ \longrightarrow SO_4^{2-} + Mn^{2+} + H_2O$**
   (1) MnO_4^- and H^+ both are reduced
   (2) MnO_4^- is reduced and H^+ is oxidised
   (3) MnO_4^- is reduced and SO_3^{2-} is oxidised
   (4) MnO_4^- is oxidised and SO_3^{2-} is reduced
4. **In the reaction $MnO_4^- + SO_3^{2-} + H^+ \longrightarrow SO_4^{2-} + Mn^{2+} + H_2O$**
   (1) MnO_4^- and H^+ both are reduced
   (2) MnO_4^- is reduced and H^+ is oxidised
   (3) MnO_4^- is reduced and SO_3^{2-} is oxidised
   (4) MnO_4^- is oxidised and SO_3^{2-} is reduced
5. **In the reaction $4\,Fe + 3\,O_2 \longrightarrow 4\,Fe^{3+} + 6\,O^{2-}$, which of the following statements is incorrect?**
   (1) It is a redox reaction
   (2) Metallic iron is a reducing agent
   (3) Fe^{3+} is an oxidising agent
   (4) Metallic iron is reduced to Fe^{3+}
6. **In the reaction $Cl_2 + OH^- \longrightarrow Cl^- + ClO_4^- + H_2O$, chlorine is :**
   (1) Oxidised (2) Reduced
   (3) Oxidised as well as reduced (4) Neither oxidised nor reduced
7. **In the reaction $6\,Li + N_2 \longrightarrow 2\,Li_3N$**
   (1) Li undergoes reduction (2) Li undergoes oxidation
   (3) N undergoes oxidation (4) Li is oxidant
8. **$I_2 + KI \longrightarrow KI_3$. In the above reaction :-**
   (1) Only oxidation takes place (2) Only reduction takes place

(3) Both the above (4) Neither oxidation nor reduction

9. **Which of the following reaction represents the oxidising behaviour of H_2SO_4 :-**
   (1) $2\,PCl_5 + H_2SO_4 \longrightarrow 2\,POCl_3 + {}_2HCl + SO_2Cl_2$
   (2) $2\,NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + {}_2H_2O$
   (3) $NaCl + H_2SO_4 \longrightarrow NaHSO_4 + HCl$
   (4) $2\,HI + H_2SO_4 \longrightarrow I_2 + SO_2 + {}_2H_2O$
10. **$Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2$. Zn undergoes –**
   (1) Reduction (2) Oxidation
   (3) Both oxidation and reduction (4) Neither oxidation nor reduction
11. **Which of the following involves the reduction of copper?**
   (1) $Cu(s) + \frac{1}{2}\,O_2(g) \longrightarrow CuO(s)$
   (2) $Cu^{2+}(aq) + 2\,I^-(aq) \longrightarrow 2\,CuI(aq)$
   (3) $CuCl_2(s) + 2\,F^-(aq) \longrightarrow CuF_2 + Cl_2(g)$
   (4) None of these
12. **In the reaction $2\,H_2O_2 \longrightarrow {}_2H_2O + O_2$**
   (1) Oxygen is oxidised only
   (2) Oxygen is reduced only
   (3) Oxygen is neither oxidised nor reduced
   (4) Oxygen is both oxidised and reduced

TYPE–3 : Classify Reactions – Redox or Not?

13. **Which of the following reactions do not involve oxidation–reduction?**
   (1) $2\,Rb + 2\,H_2O \longrightarrow 2\,RbOH + H_2$
   (2) $2\,CuI_2 \longrightarrow 2\,CuI + I_2$
   (3) $NH_4Cl + NaOH \longrightarrow NaCl + NH_3 + H_2O$
   (4) $3\,Mg + N_2 \longrightarrow Mg_3N_2$
14. **Which of the following is not a redox reaction?**
   (1) $MnO_4^- \longrightarrow MnO_2 + O_2$
   (2) $Cl_2 + H_2O \longrightarrow HCl + HClO$
   (3) $2\,CrO_4^{2-} + 2\,H^+ \longrightarrow Cr_2O_7^{2-} + H_2O$
   (4) $MnO_4^- + 8\,H^+ + 5\,Ag \longrightarrow Mn^{2+} + 4\,H_2O + 5\,Ag^+$
15. **Choose the redox reaction from the following –**
   (1) $Cu + 2\,H_2SO_4 \longrightarrow CuSO_4 + SO_2 + 2\,H_2O$
   (2) $BaCl_2 + H_2SO_4 \longrightarrow BaSO_4 + 2\,HCl$
   (3) $2\,NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + 2\,H_2O$
   (4) $KNO_3 + H_2SO_4 \longrightarrow 2\,HNO_3 + K_2SO_4$
16. **Which one of the following is a redox reaction?**
   (1) $H_2 + Br_2 \longrightarrow {}_2HBr$
   (2) $2\,NaCl + H_2SO_4 \longrightarrow Na_2SO_4 + {}_2HCl$
   (3) $HCl + AgNO_3 \longrightarrow AgCl + HNO_3$
   (4) $NaOH + HCl \longrightarrow NaCl + H_2O$
17. **Which of the following is not a redox change?**
   (1) $2\,H_2S + SO_2 \longrightarrow 2\,H_2O + {}_3S$

(2) $2\,BaO + O_2 \longrightarrow 2\,BaO_2$

(3) $BaO_2 + H_2SO_4 \longrightarrow BaSO_4 + H_2O_2$

(4) $2\,KClO_3 \longrightarrow 2\,KCl + {}_3O_2$

18. **Which is a redox reaction?**

(1) $2\,CuI_2 \longrightarrow CuI + I_2$

(2) $NaCl + AgNO_3 \longrightarrow AgCl + NaNO_3$

(3) $NH_4Cl + NaOH \longrightarrow NH_3 + NaCl + H_2O$

(4) $Cr_2(SO_4)_3 + 6\,KOH \longrightarrow 2\,Cr(OH)_3 + 3\,K_2SO_4$

19. **Which one of the following is not a redox reaction :-**

(1) $CaCO_3 \longrightarrow CaO + CO_2$

(2) $2\,H_2 + O_2 \longrightarrow {}_2H_2O$

(3) $Na + H_2O \longrightarrow NaOH + \frac{1}{2}\,H_2$

(4) $MnCl_3 \longrightarrow MnCl_2 + \frac{1}{2}\,Cl_2$

20. **Which of the following reaction involves neither oxidation nor reduction :-**

(1) $CrO_4^{2-} \longrightarrow Cr_2O_7^{2-}$ (2) $Cr \longrightarrow CrCl_3$

(3) $Na \longrightarrow Na^+$ (4) $2\,S_2O_3^{2-} \longrightarrow S_4O_6^{2-}$

21. **Which of the following reaction involves oxidation & reduction :-**

(1) $NaBr + HCl \longrightarrow NaCl + HBr$

(2) $HBr + AgNO_3 \longrightarrow AgBr + HNO_3$

(3) $2\,NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + 2\,H_2O$

(4) $H_2 + Br_2 \longrightarrow 2\,HBr$

22. **Which of the following reactions involves oxidation and reduction?**

(1) $NaBr + HCl \longrightarrow NaCl + HBr$

(2) $HBr + AgNO_3 \longrightarrow AgBr + HNO_3$

(3) $Na_2O + H_2SO_4 \longrightarrow Na_2SO_4 + H_2O$

(4) $H_2 + Br_2 \longrightarrow 2\,HBr$

TYPE–4: Disproportionation and Comproportionation Reactions

23. **$H_2O_2 + H_2O_2 \longrightarrow 2\,H_2O + O_2$ is an example of disproportionation because –**

(1) Oxidation number of oxygen only decreases

(2) Oxidation number of oxygen only increases

(3) Oxidation number of oxygen decreases as well as increases

(4) Oxidation number of oxygen neither decreases nor increases

24. **Which of the following example does not represent disproportionation?**

(1) $MnO_2 + 4\,HCl \longrightarrow MnCl_2 + Cl_2 + 2\,H_2O$

(2) $2\,H_2O_2 \longrightarrow 2\,H_2O + O_2$

(3) $4\,KClO_3 \longrightarrow 3\,KClO_4 + KCl$

(4) $3\,Cl_2 + 6\,NaOH \longrightarrow 5\,NaCl + NaClO_3 + 3\,H_2O$

25. **Which of the following change represents a disproportionation reaction(s) :**

(1) $Cl_2 + {}_2OH^- \longrightarrow ClO^- + Cl^- + H_2O$

(2) $Cu_2O + {}_2H^+ \longrightarrow Cu + Cu^{2+} + H_2O$

(3) $2\,HCuCl_2 \xrightarrow{\text{dilution with water}} Cu + Cu^{2+} + 4\,Cl^- + {}_2H^+$

(4) All of the above

26. **Select the example of disproportionation reaction.**

(1) $BaCl_2 + H_2SO_4 \longrightarrow BaSO_4 + 2\,HCl$

(2) $NH_4NO_3 \longrightarrow N_2O + 2\,H_2O$

(3) $4\,H_3PO_3 \longrightarrow PH_3 + 3\,H_3PO_4$

(4) $AgCl + 2\,NH_3 \longrightarrow Ag(NH_3)_2Cl$

27. **Which of the given reaction is an example of disproportionation reaction? [NCERT Pg. 272]**

(1) $3\,Cl_2 + {}_6OH^- \longrightarrow {}_5Cl^- + ClO_3^- + 3\,H_2O$

(2) $CuSO_4 + Zn \longrightarrow ZnSO_4 + Cu$

(3) $2\,H_2O \longrightarrow 2\,H_2 + O_2$

(4) $3\,Mg + N_2 \longrightarrow Mg_3N_2$

28. **White P reacts with caustic soda, the products are PH_3 and NaH_2PO_2. The reaction is an example of**

(1) Oxidation (2) Reduction (3) Disproportionation (4) Neutralization

29. **In which of the following compounds, the underlined element can undergo disproportionation reaction? [NCERT Pg. 272]**

(1) $KMnO_4$ (2) HNO_3 (3) $HClO_4$ (4) HNO_2

30. **Which of the following reactions are disproportionation reactions? [NEET–2019]**

(a) $2\,Cu^+ \longrightarrow Cu^{2+} + Cu^0$

(b) $3\,MnO_4^{2-} + 4\,H^+ \longrightarrow 2\,MnO_4^- + MnO_2 + {}_2H_2O$

(c) $2\,KMnO_4 \xrightarrow{\Delta} K_2MnO_4 + MnO_2 + O_2$

(d) $2\,MnO_4^- + 3\,Mn^{2+} + 2\,H_2O \longrightarrow 5\,MnO_2 + 4\,H^+$

(1) (a) and (b) only (2) (a), (b) and (c) (3) (a), (c) and (d) (4) (a) and (d) only

31. **Which element undergoes disproportionation in water?**

(1) Cl_2 (2) F_2 (3) K (4) Cs

TYPE–5 : Types of Redox (Intermolecular, Intramolecular, Spontaneous, Comproportionation)

32. **The fast reaction between water and sodium is the example of –**

(1) Oxidation (2) Reduction (3) Intermolecular redox (4) Intramolecular redox

33. **The decomposition of $KClO_3$ to KCl and O_2 on heating is an example of :**

(1) Intermolecular redox change (2) Intramolecular redox change

(3) Disproportionation or auto redox change (4) Comproportionation

34. **The reaction $2\,K_2MnO_4 + Cl_2 \longrightarrow 2\,KMnO_4 + {}_2KCl$ is an example of**

(1) Redox (2) Reduction only (3) Neutralization (4) Disproportionation

35. **Which of the following reaction is spontaneous oxidation–reduction reaction?**

(1) $Mn^{2+} + 5\,Fe^{3+} + 4\,H_2O \longrightarrow MnO_4^- + 5\,Fe^{2+} + 8\,H^+$
(2) $MnO_4^- + 5\,Fe^{3+} + 8\,H^+ \longrightarrow Mn^{2+} + 5\,Fe^{2+} + 4\,H_2O$
(3) $MnO_4^- + 5\,Fe^{2+} + 8\,H^+ \longrightarrow Mn^{2+} + 5\,Fe^{3+} + 4\,H_2O$
(4) $Mn^{2+} + 5\,Fe^{2+} + 4\,H_2O \longrightarrow MnO_4^- + 5\,Fe^{3+} + 8\,H^+$

TYPE–6 : Oxidation Number / Oxidation State Calculations

36. **The charge on cobalt in $[Co(CN)_6]^{3-}$ is –**
(1) −6 (2) −3 (3) +3 (4) +6

37. **Which of the following halogen always show only one oxidation state in its compounds?**
(1) Cl (2) F (3) Br (4) I

38. **When Cl_2 gas reacts with hot and concentrated sodium hydroxide solution, the oxidation number of chlorine changes from:**
(1) Zero to −1 and zero to +3 (2) Zero to +1 and zero to −3
(3) Zero to +1 and zero to −5 (4) Zero to −1 and zero to +5

39. **$K_2Cr_2O_7$ reacts with hydrazine to form a product. The oxidation state of Cr in the product will be :-**
(1) +4 (2) +3 (3) +5 (4) +2

40. **The reaction of aqueous $KMnO_4$ with H_2O_2 in acidic conditions gives :-**
(1) Mn^{4+} and O_2 (2) Mn^{2+} and O_2
(3) Mn^{2+} and O_3 (4) Mn^{4+} and MnO_2

41. **In weak alkaline medium $KMnO_4$ is converted into :-**
(1) MnO_2 (2) K_2MnO_4 (3) $Mn(OH)_2$ (4) MnO

42. **When $KMnO_4$ reacts with H_2O_2 in acidic medium, which of the following is formed?**
(1) Mn^{2+} (2) Mn^{7+} (3) MnO_2 (4) Mn_2O_3

43. **When fluorine reacts with ice, the following chemical reaction takes place : $H_2O(s) + F_2(g) \longrightarrow HF(g) + HOF(g)$ The oxidation state of fluorine changes from [NCERT Pg. 268]**
(1) 0 to −1 (2) 0 to +1 (3) −1 to 0 (4) +1 to 0