31. An aqueous solution containing 0.10 g KIO_3 (formula weight = 214.0) was treated with an excess of KI solution. The solution was acidified with HCl. The liberated I_2 consumed 45.0 mL of thiosulphate solution to decolourise the blue starch-iodine complex. Calculate the molarity of the sodium thiosulphate solution. ▶ **(1998)**

32. The oxidation number of sulphur in S_8, S_2F_2, H_2S respectively, are : **(1999)**

(A) $0, +1$ and -2 (B) $+2, +1$ and -2

(C) $0, +1$ and $+2$ (D) $-2, +1$ and -2

33. Amongst the following identify the species with an atom in $+6$ oxidation state : **(2000)**

(A) MnO_4^- (B) $Cr(CN)_6^{3-}$

(C) NiF_6^{2-} (D) CrO_2Cl_2

34. Hydrogen peroxide solution (20 mL) reacts quantitively with a solution of $KMnO_4$ (20 mL) aciditied with dilute H_2SO_4. The same volume of the $KMnO_4$ solution is just decolourised by 10 mL of $MnSO_4$ in neutral medium simultaneously forming a dark brown precipitate of hydrated MnO_2. The brown precipitate is dissolved in 10 mL of 0.2 M sodium oxalate under boiling condition in the presence of dilute H_2SO_4. Write the balanced equations involved in the reactions and calculate the molarity of H_2O_2. ▶ **(2001)**

35. The reaction, $3ClO^-(aq) \longrightarrow ClO_3^-(aq) + 2Cl^-(aq)$, is an example of : **(2001)**

(A) oxidation reaction

(B) reduction reaction

(C) disproportionation reaction

(D) decomposition reaction

36. In the standardization of $Na_2S_2O_3$ using $K_2Cr_2O_7$ by iodometry, the equivalent weight of $K_2Cr_2O_7$ is :

(A) molecular weight/2 **(2001)**

(B) molecular weight/6

(C) molecular weight/3

(D) same as molecular weight

37. The pair of the molecules in which both the metals are in the highest possible oxidation state is :

(A) $[Fe(CN)_6]^{3-}, [Co(CN)_6]^{3-}$ (B) CrO_2Cl_2, MnO_4^- **(2004)**

(C) TiO_3, MnO_2 (D) $[Co(CN)_6]^{3-}, MnO_3$

38. Consider a titration of potassium dichromate solution with acidified Mohr's salt solution using diphenylamine as indicator. The number of moles of Mohr's salt required per mole of dichromate is :
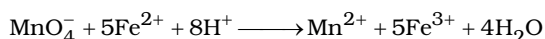
(A) 3 (B) 4 **(2007)**

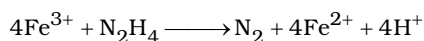(C) 5 (D) 6

39. Match the reactions in column I with nature of the reaction/type of the products in column II. ▶ **(2007)**

	Column-I		Column-II
A	$O_2^- \longrightarrow O_2 + O_2^{2-}$	**1.**	Redox reaction
B	$CrO_4^{2-} + H^+ \longrightarrow$	**2.**	One of the products has trigonal planar structure.
C	$MnO_4^- + NO_2^- + H^+ \longrightarrow$	**3.**	Dimeric bridged tetrahedral metal ion
D	$NO_3^- + Fe^{2+} + H_2SO_4 \longrightarrow$	**4.**	Disproportionation

40. Among the following, what is the number of elements showing only one non-zero oxidation state ? **(2010)**

O, Cl, F, N, P, Sn, Tl, Na, Ti

41. The difference in the oxidation numbers of the two types of sulphur atoms in $Na_2S_4O_6$ is : **(2011)**

Reactions : ▶

$$4Fe^{3+} + N_2H_4 \longrightarrow N_2 + 4Fe^{2+} + 4H^+$$

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

42. The oxidation state of Cr in $\left[Cr(H_2O)_6\right]Cl_3$, $\left[Cr(C_6H_6)_2\right]$, and $K_2\left[Cr(CN)_2(O)_2(O_2)(NH_3)\right]$ respectively are: **(2018)**

(A) $+3, 0,$ and $+6$ **(B)** $+3, 0$ and $+4$ **(C)** $+3, +4$ and $+6$ **(D)** $+3, +2$ and $+4$

43. To measure the quantity of $MnCl_2$ dissolved in an aqueous solution, it was completely converted to $KMnO_4$ using the reaction, $MnCl_2 + K_2S_2O_8 + H_2O \longrightarrow KMnO_4 + H_2SO_4 + HCl$

(equation not balanced). ▶ **(2018)**

Few drops of concentrated HCl were added to this solution and gently warmed. Further oxalic acid (225 mg) was added in portions till the colour of the permanganate ion disappeared. The quantity of $MnCl_2$ (in mg) present in the initial solution is _____. (Atomic weights in $g\,mol^{-1}$: Mn = 55, Cl = 35.5)