Solved Example

Ex.1 Oxidation numbers of A, B and C are +6, – 2 and –1, respectively. What will be the formula of the molecule when A, B and C associate with each other ?

(1) AB_2C_2 (2) ABC_2 (3) AB_2C (4) A_2BC

Sol. The total of positive and negative charge should be zero in the compound.

Thus, compound will be AB_2C_2 where +6 – 4 – 2 = 0

Ex.2 One mole of X_2H_4 releases 10 moles of electrons to form a compound Y. What should be the oxidation number of X in the compound Y ?

(1) +3 (2) –3 (3) –6 (4) +1

Sol. $X_2H_4 - 10e^- \longrightarrow (X_2H_4)^{+10}$

2x + 4 = +10 2x = 10 – 4 = 6 x = +3

Ex.3 $3CuO + 2NH_3 \longrightarrow 3Cu + N_2 + 3H_2O$

In the above conversion, the oxidation number of nitrogen is changing in from

(1) +5 to 0 (2) 0 to +2 (3) –3 to 0 (4) –3 to –5

Sol. In $3CuO + 2NH_3 \longrightarrow 3Cu + \overset{0}{N_2} + 3H_2O$

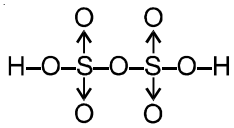
x+ 3 = 0 x = –3 ∴ Change in 0.s = – 3 to 0

Ex.4 What should be the oxidation number of S in $H_2S_2O_7$?

(1) +5 (2) +6 (3) +4 (4) +7

Sol. $H_2S_2O_7$

+2 + 2x – 14 = 0 2x = 12 x = +6



Ex.5 Oxidation numbers of the two nitrogen atoms present in ammonium nitrate are respectively ?

(1) +3 and +3 (2) 0 and 0 (3) –3 and +5 (4) –1 and –1

Sol. (i) NH_4^{+1} NO_3^{-1} Average oxidation number

X + 4 = +1 x – 6 = –1 $\frac{-3+5}{2} = +1$

x = –4 + 1, x = –3 x = +5

Ex.6 Oxidation number of iodine in the following reaction $IO_3^{-1} + HI \longrightarrow H_2O + I_2$

(1) increases (2) decreases

(3) increases as well as decreases (4) neither increases nor decrease

Sol. IO_3^{-1} + HI $\longrightarrow$ H_2O + I_2

x – 6 = –1 + 1 + x = 0 x = 0 x = 0

x = +5 x = –1

Oxidation number decreases from +5 to 0 and increases from –1 to 0

Ex.7 Oxidation product of Na_3AsO_3 is ?

(1) $As_2O_3^{-3}$ (2) AsO_4^{-3} (3) AsO_3 (4) AsO_2

Sol. $As_2O_3^{-3}$ AsO_4^{-3}

(Arsenite) (Arsenate)

$x - 6 = 3$ $x - 8 = -3$

$x = +3$ $x = +5$

Ex.8 Reaction between 1 mole of $HgCl_2$ and 1 mole of $SnCl_2$ occurs as follows. $2\,HgCl_2 + SnCl_2 \rightarrow SnCl_4 + Hg_2Cl_2$

Which of the following ions will be there after completion of the reaction?

(1) Hg^{+1}, Sn^{+2}, Sn^{+4} (2) Hg^{+2}, Sn^{+2} (3) Sn^{+2}, Sn^{+4} (4) Hg^{+2}, Sn^{+2}, Sn^{+4}

Sol. According to the reaction, 2 mole $HgCl_2$ reacts with 1 mole $SnCl_2$. Therefore, 1 mole $HgCl_2$ will react with 1/2 mole $SnCl_2$ & 1/2 mole $SnCl_2$ will be left. Thus, Sn^{+4}, Hg^{+1} and Sn^{+2} ions will remain in the solution .

Ex.9 In the presence of humidity, SO_2

(1) loses proton (2) accepts electron (3) is an oxidant (4) is a reductant

Sol. $SO_2 + H_2O + O_2 \longrightarrow H_2SO_4$

Therefore, it changes from +4 to +6. Due to this SO_2 is a reductant.

SO_2 H_2SO_4

$x - 4 = 0$ $+2 + x - 8 = 0$

$x = +4$ $x = +6$

Ex.10 In the following reaction, $MnO_4^{-1} + 8H^+ + 5e^- \longrightarrow Mn^{+2} + 4H_2O$ how many grams of $KMnO_4$ should be taken if its 0.5 litre of 0.2 N solution is to be prepared ?

(1) 31.6 g (2) 63.2 g (3) 158.0 g (4) 94.8 g

Sol. $MnO_4^{-1} \longrightarrow Mn^{+2}$

$x - 8 = -1$ $x = +2$

$x = +7$

Equivalent weight = $\dfrac{\text{Molecular weigth}}{\text{Change in oxidation number}}$ = $\dfrac{158}{5}$ = 31.6 g

Weight in g = Equivalent weight × Normality × Volume = 31.6 × 0.2 × 5 = 31.6 g

Ex.11 What will be the oxidation state of copper in $YBa_2Cu_3O_7$, if oxidation state of (Y) is +3 ?

(1) 7/3 (2) 7 (3) 3 and 5 (4) none of the above

Sol. $YBa_2Cu_3O_7$

$+3 + 4 + 3x - 14 = 0$ $3x = 7$ $x = 7/3$

Ex.12 How many moles of nitrogen produced by the oxidation of one mole of hydrazine by $\frac{2}{3}$ mole bromate ion ?

(1) $\frac{1}{3}$ (2) 1 (3) 1.5 (4) $\frac{2}{3}$

Sol. The balanced equation between N_2H_4 and BrO_3^{-1} is

$3N_2H_4 + 2BrO_3^- \rightarrow 3N_2 + 2Br^- + 6H_2O$

Dividing by 3, we get : $\frac{3}{3}\,N_2H_4 + \frac{2}{3}\,BrO_3^- \rightarrow N_2 + \frac{2}{3}\,Br^- + 2H_2O$ **Ans is 1**

Ex.13 How many moles of $K_2Cr_2O_7$ are reduced by 1 mole of formic acid ?

(1) $\frac{1}{3}$ Mole (2) 1Mole (3) $\frac{2}{3}$ Mole (4) $\frac{5}{3}$ Mole

Sol. Equation is

$Cr_2O_7^{-2} + 8H^+ + 3HCOOH \rightarrow 2Cr^{3+} + 3CO_2 + 7H_2O$

$\because$ 3 moles of formic acid reduces = 1 mole $K_2Cr_2O_7$

$\therefore$ 1 mole of formic acid reduce = $\frac{1}{3}$ mole $K_2Cr_2O_7$ **Ans is 1/3 mole**

Ex.14 One mole $KMnO_4$ oxidises how many moles of ferrous oxalate ?

(1) $\frac{1}{5}$ (2) $\frac{5}{3}$ (3) $\frac{1}{3}$ (4) $\frac{2}{3}$

Sol. Reaction is

$5e + 8H^+ + MnO_4^- \rightarrow Mn^{+2} + 4H_2O] \times 3$ $Fe^{+2} \rightarrow Fe^{+3} + e] \times 5$

$C_2O_4^{-2} \rightarrow 2CO_2 + 2e] \times 5$

$5Fe^{+2} + 24H^+ + 3MnO_4^- + 5\,C_2O_4^- \rightarrow 3Mn^{+2} + 5Fe^{+3} + 10CO_2 + 12H_2O$

$\because$ 3 moles of $KMnO_4$ oxidises = 5 moles FeC_2O_4

$\therefore$ 1 mole of $KMnO_4$ oxidises = $\frac{5}{3}$ moles FeC_2O_4 **Ans is 1/5**

Ex.15 $WO_3 + 8CN^- + 2H_2O \rightarrow [W(CN)_8]^{4-} + 1/2\ O_2 + 4OH^-$ In the above process, oxidant is -

(1) WO_3 (2) CN^- (3) H_2O (4) O_2

Sol. Oxidation no. of W decreases

O.N. of W in WO_3 = +6 O.N. of W in $[W/(CN)_8]^{4-}$ = +4 **Ans is WO_3**

Ex.16 How many ml. of 0.1 M oxalic acid solution is required to reduce 0.01 mole $KMnO_4$ to MnO_2 ?

(1) 250 (2) 150 (1) 100 (4) 500

Sol. $3e + 8H^+ + MnO_4^- \rightarrow Mn^{+4} + 4H_2O$

Equivalent weight = $\frac{M}{3}$ 0.01 mole $KMnO_4$ = 0.03 equivalent $KMnO_4$

For oxalic acid : 0.1M oxalic acid = 0.2 equivalent

We have: normality = (equivalent) $\times \frac{1000}{V}$

$0.2 = 0.03 \times \frac{1000}{V}$ V = 150 ml.

Ex.17 When one mole NO_3^- is converted into 1 mole NO_2, 0.5 mole. N_2 and 0.5 mole N_2O respectively. It accepts x, y and z mole of electrons x, y and z are respectively.

(1) 1, 5, 4 (2) 1, 2, 3 (3) 2, 1, 3 (4) 2, 3, 4

Sol. The equation are :

$NO_3^- + 2H^+ + e \rightarrow NO_2 + H_2O$

$NO_3^- + 6H^+ + 5e \rightarrow 0.5N_2 + 3H_2O$

$NO_3^- + 5H^+ + 4e \rightarrow 0.5N_2O + 2.5H_2O$

$\therefore$ x, y and z respectively are 1, 5 and 4.

Ex.18 Calculate the equivalent weight of potassium permanganate ($KMnO_4$) in (i) neutral medium (ii) acidic medium (iii) alkaline medium, by oxidation number method.

Sol. (i) $Mn^{+7} + 3e \rightarrow Mn^{+4}$; Eq. wt. = M/3

(ii) $Mn^{+7} + 5e \rightarrow Mn^{+2}$; Eq. wt. = M/5

(iii) $Mn^{+7} + 1e \rightarrow Mn^{+6}$; Eq. wt. = M/1

Ex.19 An element A in a compound ABD has an oxidation no. A^{-n}. It is oxidised by $Cr_2O_7^{-2}$ in acid medium. In an experiment 1.68×10^{-3} mole of $K_2Cr_2O_7$ was required for 3.26×10^{-3} mole of the compound ABD. Calculate new oxidation state of A.

Sol. $A^{-n} \longrightarrow A^{+a} + (a + n)e$

$6e + Cr_2^{+6} \longrightarrow 2Cr^{+3}$

$\therefore$ Meq. of A^{-n} = Meq. of $Cr_2O_7^{-2}$ or $3.26 \times 10^{-3} \times (a + n) = 1.68 \times 10^{-3} \times 6$

$\therefore$ $a + n = 3$ or $a = \mathbf{3 - n}$

Ex.20 Find out the value of n in $MnO_4^- + 8H^+ + ne \rightarrow Mn^{+2} + 4H_2O$

Sol. $\therefore$ Total charge on L.H.S. = Total charge on R.H.S.

$-1 + 8 - (-n) = +2$; $\therefore$ $n = 5$

Ex.21 In the reaction $8\,Al + 3\,Fe_3O_4 \rightarrow 4\,Al_2O_3 + 9\,Fe$

(a) Which element is oxidised or reduced ?

(b) Total number of electrons transferred during the change.

Sol. $8\,Al^0 \rightarrow 4Al_2^{3+} + 24e$

$24e + 3Fe_3^{(8/3)+} \rightarrow 9Fe^0$

or $8Al^0 + 3\,Fe_3^{(8/3)+} \rightarrow 4\,Al_2^{3+} + 9Fe$

Reductant is Al i.e. **Al is oxidised**

Oxidant is Fe_3O_4 or $Fe^{(8/3)+}$ i.e. **$Fe^{(8/3)+}$ is reduced**

Number of electrons used during redox change = **24**

Ex.22 A student unsuccessfully tried to balance the following equation :

$Cr_2O_7^{2-} + Fe^{3+} + H^+ \rightarrow Cr^{3+} + Fe^{2+} + H_2O$. Why could not student balance the equation?

Sol. Both parts are reduction part i.e. Cr^{+6} as well as Fe^{3+} both are reduced without a reductant which is not possible.

Ex.23 Six moles of Cl_2 undergo a loss and gain of 10 moles of electrons to form two oxidation state of Cl.

Write down the two half reactions & find out the oxidation number of each Cl atom involved.

Sol. $6Cl_2 \rightarrow 2\,Cl^{5+} + 10\,Cl^-$

$+5$; -1;

Exercise # 1

Q.1 Reduction is defined as :
(1) Increase in positive valency (2) Gain of electrons
(3) Loss of protons (4) Decrease in negative valency

Q.2 A compound contains atoms X, Y and Z the oxidation number of X is + 2, Y is + 5 and Z is – 2 therefore a possible formula of the compound is :
(1) XYZ_2 (2) $X_2(YZ_3)_2$ (3) $X_3(YZ_4)_2$ (4) $X_3(Y_4Z)_2$

Q.3 The atomic number of an element which shows the oxidation state of + 3 is :
(1) 13 (2) 32 (3) 33 (4) 17

Q.4 Which of the following is the correct oxidation number of phosphorus in $Mg_2P_2O_7$:
(1) – 3 (2) + 2 (3) + 5 (4) + 3

Q.5 $Co(s) + Cu^{2+}(aq) \rightarrow Co^{2+}(aq) + Cu(s)$. The above reaction is :
(1) Oxidation reaction (2) Reduction reaction (3) Redox reaction (4) None of these

Q.6 Which of the following reactions depict the oxidising behavior of H_2SO_4 :
(1) $2PCl_5 + H_2SO_4 \rightarrow 2POCl_3 + 2HCl + SO_2Cl_2$ (2) $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$
(3) $NaCl + H_2SO_4 \rightarrow NaHSO_4 + HCl$ (4) $2HI + H_2SO_4 \rightarrow I_2 + SO_2 + 2H_2O$

Q.7 Oxidation number of sulphur in Na_2SO_4 is :
(1) – 2 (2) + 6 (3) + 2 (4) – 6

Q.8 Oxidation state of O_2 in H_2O_2 is :
(1) – 2 (2) – 1 (3) + 1 (4) + 2

Q.9 In $C + H_2O \rightarrow CO + H_2$, H_2O acts as :
(1) Oxidising agent (2) Reducing agent (3) Both (4) None

Q.10 If three electrons are lost by a metal ion M^{3+}, its final oxidation number should be :
(1) 0 (2) + 6 (3) + 2 (4) + 4

Q.11 Oxidation number of Fe in $K_3[Fe(CN)_6]$ is :
(1) + 2 (2) + 3 (3) + 1 (4) + 4

Q.12 Reducing agent is that :
(1) Which takes electrons (2) Which takes protons
(3) Which donates electrons (4) Which donates protons

Q.13 HBr and HI reduce sulphuric acid. HCl can reduce $KMnO_4$ and HF can reduce :
(1) H_2SO_4 (2) $KMnO_4$ (3) $K_2Cr_2O_7$ (4) None of these

Q.14 The compound which gives oxygen on moderate heating is :
(1) Ferric oxide (2) Zinc oxide (3) Mercuric oxide (4) Aluminium oxide

Q.15 Oxidation number of sulphur in S_2Cl_2 is :
(1) + 1 (2) 0 (3) – 1 (4) + 6

Q.16 In a reaction between zinc and iodine in which zinc iodide is formed, what is being oxidised :
(1) Zinc ions (2) Iodide ions (3) Zinc atom (4) Iodine

Q.17 Oxidation number of sulphur in $S_2O_2^{2-}$ is :
(1) – 2 (2) + 1 (3) + 6 (4) 0

Q.18 Oxidation number of nitrogen in NH_3 is :
(1) – 3 (2) + 3 (3) 0 (4) + 5

Q.19 In acidic medium equivalent weight of $K_2Cr_2O_7$ (molecular weight = M) is :
(1) M / 3 (2) M / 4 (3) M / 6 (4) M / 2

Q.20 In the following reactions : $4P + 3KOH + 3H_2O \rightarrow 3KH_2PO_2 + PH_3$
(1) Only phosphorus is oxidized (2) Only phosphorus is reduced
(3) Phosphorus is both oxidized and reduced (4) Phosphorus is neither oxidized nor reduced

Q.21 The oxidation number of nitrogen in NH_2OH is :
(1) + 1 (2) – 1 (3) – 3 (4) – 2

Q.22 The reaction of $Zn^{++} + 2e^- \rightarrow Zn$ is an example of :
(1) Oxidation (2) Reduction (3) Redox reaction (4) None

Q.23 Oxidation number of P in KH_2PO_2 is :
(1) +1 (2) 6 (3) 4 (4) 7

Q.24 In the reaction $3Cl_2 + 6OH^- \rightarrow 5Cl^- + ClO_3^- + 3H_2O$ chlorine is :
(1) Oxidised (2) Reduced
(3) Oxidised as well as reduced (4) Neither oxidised nor reduced

Q.25 In the compounds $KMnO_4$ and $K_2Cr_2O_7$, the highest oxidation state is of the element :
(1) Potassium (2) Manganese (3) Chromium (4) Oxygen

Q.26 In the reaction $3Br_2 + 6CO_3^{2-} + 3H_2O \rightarrow 5Br^- + BrO_3^- + 6HCO_3^-$
(1) Bromine is oxidised and carbonate is reduced (2) Bromine is both reduced and oxidised
(3) Bromine is neither reduced nor oxidised (4) Bromine is reduced and water is oxidised

Q.27 A gas X bleaches a flower by reduction and another gas Y by oxidation these gases are , respectively
(1) NH_3 & SO_3 (2) NO_2 & N_2O_5 (3) SO_2 & Cl_2 (4) SO_2 & PCl_3

Q.28 What will happen when copper rod is dipped in aluminium nitrate solution, if the electropositive properties are as follows : Al > Zn > Cu > Ag
(1) Aluminium will get deposited on the rod (2) Colour of the solution will becomes blue
(3) Copper aluminium alloy will be formed (4) No reaction will occur

Q.29 The normal oxidation state of an element is – 2. The number of electrons in its outermost shell will be
(1) 4 (2) 2 (3) 6 (4) 8

Q.30 For the reaction : $4Fe + 3O_2 \rightarrow 4Fe^{3+} + 6O^{2-}$ which of the following is a wrong statement ?
(1) It is an example of redox reaction (2) Metallic iron reduces to Fe^{3+}
(3) Fe is oxidised (4) Metallic iron is a reducing agent

Q.31 Oxidation number of Ni in $Ni(CO)_4$ is :
(1) 0 (2) 4 (3) 8 (4) 2

Q.32 The oxidation number of nitrogen in NH_4NO_3 is :
(1) + 3 (2) + 5 (3) – 3 and + 5 (4) + 3 and + 5

Q.33 In acidic medium, reaction : $MnO_4^- \rightleftharpoons Mn^{2+}$ is an example of :

(1) Oxidation by three electrons (2) Reduction by three electrons

(3) Oxidation by five electrons (4) Reduction by five electrons

Q.34 Which of the following halogens always shows only one oxidation state ?

(1) Cl (2) F (3) Br (4) I

Q.35 In the reaction

$MnO_4^- + NO_2^- \rightarrow NO_3^- + Mn^{2+}$

one mole of MnO_4^- oxidises _____ moles of NO_2^-

(1) 5 (2) 5/2 (3) 3 (4) 3/2

Q.36 In the following reaction

$As_2S_5 + NO_3^- \rightarrow AsO_4^{3-} + SO_4^{2-} + NO_2$

The equivalent weight of As_2S_5 is

(1) M/8 (2) M/6 (3) M/40 (4) M/30

Q.37 In a reaction the equivalent weight of $KMnO_4$ becomes one third of its molecular weight. The oxidation state of Mn in the final product is

(1) + 6 (2) + 4 (3) + 3 (4) + 2

Q.38 In which of the following compound oxidation number of Cl is + 3 ?

(1) ICl (2) ClO_3^- (3) ClF_3 (4) $HClO_4$

Q.39 The oxidation number of cobalt in $[Co(CN)_6]^{3-}$ is -

(1) + 3 (2) - 3 (3) + 6 (4) - 6

Q.40 In which of the following compound oxidation number of iron is not +3

(1) Fe_3O_4 (2) Fe_2O_3 (3) $FeCl_3$ (4) $FePO_4$

Q.41 The oxidation number of Mn in MnC_2O_4 is -

(1) + 3 (2) + 8/3 (3) + 1 (4) +2

Q.42 In the following equation $ClO_3^- + 6\,H^+ + X \rightarrow Cl^- + 3H_2O$, then X is

(1) O (2) $6e^-$ (3) O_2 (4) $5e^-$

Q.43 The correct oxidation number of phosphorus in magnesium pyrophosphate $[Mg_2P_2O_7]$ is -

(1) + 2 (2) + 3 (3) - 3 (4) + 5

Q.44 Oxidation number of sulphur in H_2SO_5 is -

(1) + 2 (2) + 4 (3) + 8 (4) + 6

Q.45 In which of the following compound, iodine is in its highest oxidation state -

(1) KI (2) KIO_4 (3) KI_3 (4) IF_5

Q.46 Oxidation number of chlorine in Hypochlorous acid is–

(1) –1 (2) zero (3) + 1 (4) + 2

Q.47 Which one of the following compounds can act as an oxidising as well as reducing agent -

(1) $KMnO_4$ (2) H_2O_2 (3) BaO (4) $K_2Cr_2O_7$

Q.48 When acidic solution of ferrous ammonium sulphate is treated with potassium permanganate solution then the ion which is oxidised is -

(1) MnO_4^- (2) NH_4^+ (3) Fe^{2+} (4) SO_4^{2-}

Q.49 The violent reaction between sodium and water is an example of -

(1) Reduction (2) Oxidation (3) Redox reaction (4) Neutralization

Q.50 The equivalent weight of reducing agent in the reaction

$2[Fe(CN)_6]^{3-} + 2OH^- + H_2O_2 \rightarrow 2[Fe(CN)_6]^{4-} + 2H_2O + O$ -

(1) 17 (2) 212 (3) 16 (4) 6/8

Q.51 In the formation of $Pb(NO_3)_2$ form PbO_2 -

(1) PbO_2 is oxidised (2) PbO_2 is reduced

(3) PbO_2 is both oxidised and reduced. (4) PbO_2 is neither oxidised nor reduced

Q.52 The compound in which oxidation state of metal is zero -

(1) $Fe_2(CO)_9$ (2) $Ni(CO)_4$ (3) $Fe_3(CO)_9$ (4) All of the above

Q.53 The oxidation state of phosphorus is + 3 in -

(1) Orthophosphorous acid (2) Orthophosphoric acid

(3) Pyrophosphoric acid (4) Metaphosphoric acid

Q.54 Which of the following is a true statement -

(1) Oxidation state of oxygen in HOF is zero. (2) Oxidation state of fluorine in HOF is – 1.

(3) Oxidation state of chlorine in HOCl is + 1. (4) All of the above.

Q.55 The following reaction is used in the extraction of chromium from its ore

$2Fe_2O_3.Cr_2O_3 + 4Na_2CO_3 + 3O_2 \rightarrow 2Fe_2O_3 + 4Na_2CrO_4 + 4CO_2$

What is true about the oxidation states of the substance in the reaction -

(1) Chromium is oxidised from + 3 to + 6 oxidation state.

(2) Iron is reduced from + 3 to + 2 oxidation state.

(3) Carbon is oxidised from + 3 to + 4 oxidation state

(4) There is no change in the oxidation states of the substances.

Q.56 Oxidation state of nitrogen is incorrectly given for -

Compounds	Oxidation states	Compounds	Oxidation states
(1) $[Co(NH_3)_5Cl]Cl_2$	– 3	(2) NH_2OH	– 1
(3) $(N_2H_5)_2SO_4$	+ 2	(4) Mg_3N_2	– 3

Q.57 Which of the following is an example of reduction -

(1) $CuO \rightarrow Cu_2O$ (2) $[Fe(CN)_6]^{4-} \rightarrow [Fe(CN)_6]^{3-}$

(3) $KI \rightarrow I_2$ (4) $H_2S \rightarrow S$

Q.58 Out of the following acids which has different oxidation state of phosphorus as compared to others -

(1) Phosphorous acid (2) Orthophosphoric acid (3) Metaphosphoric acid (4) Pyrophosphoric acid

Q.59 Reaction $[Ag(NH_3)_2]^+ + 2H^+ \rightarrow Ag^+ + 2NH_4^+$ is an example of -

(1) Oxidation (2) Reduction

(3) Neither oxidation nor reduction (4) Oxidation and reduction both

Q.60 The brown ring complex compound is formulated as $[Fe(H_2O)_5NO^+]SO_4$. The oxidation state of iron is -

(1) 1 (2) 2 (3) 3 (4) zero

Q.61 Which of the following reactions involves neither oxidation nor reduction -

(1) $CrO_4^{2-} \rightarrow Cr_2O_7^{2-}$ (2) $Cr^- \rightarrow CrCl_3$ (3) $VO^{2+} \rightarrow V_2O_2$ (4) $2S_2O_3^{2-} \rightarrow S_4O_6^{2-}$

Q.62 When $KMnO_4$ is reduced with oxalic acid in acidic solution, the oxidation number of Mn changes from -

(1) 7 to 4 (2) 6 to 4 (3) 7 to 2 (4) 4 to 2

Q.63 What would happen when a small quantity of H_2O_2 is added to a solution of $FeSO_4$ -

(1) Colour disappears (2) H_2 is evolved

(3) An electron is added to Fe^{++} (4) An electron is lost by Fe^{++}

Q.64 The oxidation number of each sulphur in $Na_2S_4O_6$ is -

(1) 2.5 (2) 2 and 3 (two S have + 2 and the other two have + 3)

(3) 2 and 4 (three S have + 2 and one S has + 4) (4) 5 and 0 (two S have + 5 and the other S have 0)

Q.65 In a redox reaction $K_2Cr_2O_7$ changes to $Cr_2(SO_4)_3$. If the molecular weight of $K_2Cr_2O_7$ is M and equivalent weight E then -

(1) M = 3E (2) M = 6E (3) E = 2M (4) E = 6M

Q.66 Fe_3O_4 is oxidised to Fe_2O_3. If the molecular weight of Fe_3O_4 is M and equivalent weight E then -

(1) E = M (2) $E = \frac{M}{3}$ (3) $E = \frac{2}{3}M$ (4) $E = \frac{3}{2}M$

Q.67 In a triatomic molecule the oxidation states of atoms A, B and C are + 6, + 1 and – 2 respectively. The molecular formula of the compound will be -

(1) B_2AC_4 (2) $B_2A_2C_7$ (3) Both of the above. (4) None of the above

Q.68 The reaction $2TiCl_3 \rightarrow TiCl_2 + TiCl_4$ example of -

(1) dissociation (2) disproportation (3) reversible reaction (4) exothermic reaction

Q.69 The anodic reaction in the electrolysis of the aqueous solution of NaCl is -

(1) Oxidation of chloride ion (2) Evolution of oxygen

(3) reduction of chloride ion (4) Oxidation of sodium ion.

Q.70 Which of the following statements is not correct -

(1) Two mole of electrons are used in the reduction of MnO_4^- to MnO_3^-

(2) Three electrons per chromium atom are used in the reduction of dichromate by Fe (II)

(3) The oxidation state of oxygen is $-\frac{1}{2}$ in potassium superoxide.

(4) The oxidation number increases in the process of reduction.

Q.71 In the reaction -

$2FeCl_3 + H_2S \rightarrow 2FeCl_2 + 2HCl + S$

(1) $FeCl_3$ is used as an oxidant. (2) $FeCl_3$ and H_2S both are oxidised.

(3) $FeCl_3$ is oxidised and H_2S is reduced. (4) H_2S is used as an oxidant.

Answer Key - 1

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	3	1	3	3	4	2	2	1	2	2	3	4	3	1	2	2	1	3	3
Qus.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	2	2	1	3	2	2	3	4	3	2	1	3	4	2	2	3	2	3	1	1
Qus.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	4	2	4	4	2	3	2	3	3	1	2	4	1	4	1	3	1	1	3	1
Qus.	61	62	63	64	65	66	67	68	69	70	71									
Ans.	1	3	4	4	2	1	3	2	1	4	1									