Miscellaneous Exercise Question Bank

1. 36 mL 0.5 M Br_2 solution upon being made alkaline undergoes complete disproportionation into Br^- and BrO_3^-. The resulting solution requires 45 mL As (III) solution to reduce BrO_3^- to Br^-. Given that As(III) is oxidized to As(V), what is the molarity of As(III) solution ?

(A) 0.2 **(B)** 0.1 **(C)** 0.4 **(D)** 0.5

2. Oxidation of Cu_3P to $CuSO_4$ and H_3PO_4 involves the loss of :

(A) 3 electrons **(B)** 5 electrons **(C)** 9 electrons **(D)** 11 electrons

3. If the molecular weight of $Ba(MnO_4)_2$ is M, then the equivalent weight of $Ba(MnO_4)_2$ in acidic medium is :

(A) $\frac{M}{5}$ **(B)** $\frac{M}{10}$ **(C)** $\frac{M}{3}$ **(D)** M

4. Equivalent weights of CO_2 in the following reactions, $2NaHCO_3 \longrightarrow Na_2CO_3 + H_2O + CO_2$ and $NaHCO_3 + HCl \longrightarrow NaCl + H_2O + CO_2$ are respectively :

(A) 22 and 44 **(B)** 44 and 22 **(C)** 44 and 44 **(D)** 22 and 22

5. 0.96 gm a metal oxide MO is dissolved in excess dilute sulphuric acid, $KMnO_4$ of strength $\frac{M}{10}$ requires to react with it and the volume needed to reach the equivalent point is 20 mL, assuming that MO is converting into M_2O_3 then what is the atomic mass of M ?

(A) 80 **(B)** 96 **(C)** 70 **(D)** 50

6. The number of moles of $KMnO_4$ that will be needed to react completely with one mole of ferrous oxalate in acidic medium is :

(A) 3/5 **(B)** 2/5 **(C)** 4/5 **(D)** 1

7. 25 mL of H_2O_2 solution were added to excess of acidified solution of KI and iodine so liberated required 20 mL of 0.1 N $Na_2S_2O_3$ for titration. The normality of H_2O_2 is :

(A) 0.02 **(B)** 0.04 **(C)** 0.08 **(D)** 0.03

8. 25.4 g of iodine and 14.2 g of chlorine are made to react completely to yield a mixture of ICl and ICl_3. Calculate the ratio of moles of ICl and ICl_3.

(A) 1 : 1 **(B)** 1 : 2 **(C)** 1 : 3 **(D)** 2 : 3

9. 10 mL of a solution of H_2O_2 labelled '10 volume' just decolourizes 100 mL of potassium permanganate solution acidified with dilute H_2SO_4. Calculate the amount of potassium permanganate in the given solution:

(A) 0.1563 gm **(B)** 0.563 gm **(C)** 5.63 gm **(D)** 0.256 gm

10. It takes 0.15 mole of ClO^- to oxidize 12.6 g of chromium oxide of a specific formula to $Cr_2O_7^{2-}$, ClO^- became Cl^-. The formula of the oxide is (atomic weight of Cr = 52, O = 16)

(A) CrO_3 **(B)** CrO_2 **(C)** CrO_4 **(D)** CrO

11. 8 g of sulphur is burnt to form SO_2 which is oxidized by Cl_2 water. The solution is treated with $BaCl_2$ solution: The amount of $BaSO_4$ precipitated is

(A) 1 mole **(B)** 0.5 mole **(C)** 0.24 mole **(D)** 0.25 mole

12. Equal volumes of 1 M each of $KMnO_4$ and $K_2Cr_2O_7$ are used to oxidize Fe(II) solution in acidic medium. The amount of Fe oxidized will be :

(A) more with $KMnO_4$ **(B)** more with $K_2Cr_2O_7$

(C) equal with both oxidizing agents **(D)** cannot be determined

13. The number of moles of $Cr_2O_7^{2-}$ needed to oxidize 0.136 equivalents of $N_2H_5^+$ by the reaction,

$N_2H_5^+ + Cr_2O_7^{2-} \longrightarrow N_2 + Cr^{3+} + H_2O$, is :

(A) 0.136 **(B)** 0.272 **(C)** 0.816 **(D)** 0.0227

14. What is oxidation state of Sulphur in oleum ?

(A) +6 **(B)** +7 **(C)** +8 **(D)** +4

15. In which of the following is there an element with the same oxidation state as that of chromium in $K_2Cr_2O_7$?

(A) Cl_2O_7 **(B)** $\left[Fe(CN)_6\right]^{3-}$ **(C)** VO^{2+} **(D)** K_2MnO_4

16. In which of the following ions does the metal have an oxidation state +3 ?

(A) VO^{2+} **(B)** AlO_2^- **(C)** $\left[Fe(CN)_6\right]^{2-}$ **(D)** $\left[CrCl_2(H_2O)_4\right]^{2+}$

***17.** Which equation(s) might be used to illustrate the action of nitric acid as an oxidant?

(A) $P_4O_{10} + 4HNO_3 \rightarrow 4HPO_3 + 2N_2O_5$ **(B)** $6Fe^{2+} + 8HNO_3 \rightarrow 6Fe^{3+} + 2NO + 4H_2O + 6NO_3^-$

(C) $CO_3^{2-} + 2HNO_3 \rightarrow CO_2 + H_2O + 2NO_3^-$ **(D)** $Cu + 4HNO_3 \rightarrow Cu^{2+} + 2NO_3^- + 2H_2O + 2NO_2$

***18.** Chlorine can exist with oxidation state ranging from –1 to +7. In which of the ions chlorine will not undergo disproportionation ?

(A) ClO^- **(B)** ClO_4^- **(C)** ClO_3^- **(D)** Cl^-

19. 25 mL of 0.50 M H_2O_2 solution added to 50 mL of 0.20 M $KMnO_4$ in acidic medium. Which of the following statements are true?

(A) 0.01 mol of oxygen is liberated **(B)** 0.005 mol of $KMnO_4$ does not react with H_2O_2

(C) 0.0125 gm mol of oxygen gas is evolved **(D)** 0.0025 mol of H_2O_2 does not react with $KMnO_4$

20. The equivalent wt. of $Na_2S_2O_3$ in the reaction, $Na_2S_2O_3 + H_2O + Cl_2 \rightarrow Na_2SO_4 + 2HCl + S$, is:

(A) $\frac{\text{mol. wt.}}{1}$ **(B)** $\frac{\text{mol. wt.}}{2}$ **(C)** $\frac{\text{mol. wt.}}{4}$ **(D)** $\frac{\text{mol. wt.}}{8}$

21. Which of the following act both as an oxidizing as well as reducing agent?

(A) HNO_2 **(B)** H_2O_2 **(C)** H_2S **(D)** SO_2

22. 0.1 mol of MnO_4^- in acidic medium can oxidize :

(A) 0.5 mol of Fe^{2+} **(B)** 0.166 mol of FeC_2O_4

(C) 0.25 mol of $C_2O_4^{2-}$ **(D)** 0.60 mol of $Cr_2O_7^{2-}$

Paragraph for Question No. 23 to 27

Read the following passage and answer the questions:

In permanganate titrations, potassium permanganate is used as an oxidizing agent in acidic medium. The medium is maintained acidic by the use of dilute sulphuric acid. Potassium permanganate acts as self indicator. The potential equation, when potassium permanganate acts as an oxidizing agent is

$$2KMnO_4 + 3H_2SO_4 \rightarrow K_2SO_4 + 2MnSO_4 + 3H_2O + 5[O] \text{ or } MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$$

Before the end point, the solution remains colourless but after the equivalence point only one extra drop of $KMnO_4$ solution imparts pink colour, i.e. appearance of pink colour indicates end point. These titrations are used for estimation of ferrous salts, oxalic acid, oxalates, hydrogen peroxide, As_2O_3 etc.

23. In order to prepare one litre of normal solution of $KMnO_4$, how many grams of $KMnO_4$ is required if solution is to be used in acid medium for oxidation?

(A) 158 gm **(B)** 31.6 gm **(C)** 62 gm **(D)** 790 gm

24. For decolourization of 1 mol of $KMnO_4$, the number of moles of H_2O_2 required is :

(A) $\frac{1}{2}$ **(B)** $\frac{3}{2}$ **(C)** $\frac{5}{2}$ **(D)** $\frac{7}{2}$

25. In alkaline condition, $KMnO_4$ reacts as follows,

$$2KMnO_4 + 2KOH \rightarrow 2K_2MnO_4 + H_2O + [O]$$

Therefore, its equivalent mass will be :

(A) 31.6 **(B)** 52.7 **(C)** 72 **(D)** 158

26. Mass of KHC_2O_4 (potassium acid oxalate) required to reduce 100 mL of 0.02 $KMnO_4$ in acidic medium (MnO_4^- changes to Mn^{2+}) is x gm and to neutralize 100 mL of 0.05 M $Ca(OH)_2$ is y gm, then :

(A) x = y **(B)** 2x = y **(C)** x = 2y **(D)** none of the above

27. 10 mL of $NaHC_2O_4$ solution is neutralized by 10 mL of 0.1 M NaOH. 10 mL of same $NaHC_2O_4$ solution is oxidized by 10 mL of $KMnO_4$ solution in acidic medium. Hence, molarity of $KMnO_4$ is :

(A) 0.1 M **(B)** 0.2 M **(C)** 0.04 M **(D)** 0.02 M

Paragraph for Question No. 28 to 31

Read the following passage and answer the questions:

In iodometric titrations an oxidizing agent such as $KMnO_4$, $K_2Cr_2O_7$, $CuSO_4$, H_2O_2 are allowed to react in neutral medium or in acidic medium with excess of potassium iodide to liberate free iodine.

$$KI + \text{oxidizing agent} \rightarrow I_2$$

Free iodine is titrated against standard reducing agent usually with sodium thiosulphate, i.e.

$$K_2Cr_2O_7 + 6KI + 7H_2SO_4 \rightarrow Cr_2(SO_4)_3 + 4K_2SO_4 + 7H_2O + I_2$$

$$2CuSO_4 + 4KI \rightarrow Cu_2I_2 + 2K_2SO_4 + I_2$$

$$I_2 + Na_2S_2O_3 \rightarrow 2NaI + Na_2S_4O_6$$

In iodometric titration, starch solution is used as an indicator. Starch solution gives blue or violet colour with free iodine. At the end point, blue or violet colour disappears when iodine is completely changed to iodide.

28. What volume of 0.40 M $Na_2S_2O_3$ would be required to react with I_2 liberated by adding 0.04 mole of KI to 50 mL of 0.20 M $CuSO_4$ solution ?

(A) 12.5 mL **(B)** 25 mL **(C)** 50 mL **(D)** 2.5 mL

29. A 1.1 g sample of copper ore is dissolved and Cu^{2+}(aq.) is treated with KI. I_2 liberated required 12.12 mL of 0.1 M $Na_2S_2O_3$ solution for titration. The % of Cu in the ore is :

(A) 2.5% **(B)** 7% **(C)** 5.8% **(D)** 4.2%

30. 25 mL of N $K_2Cr_2O_7$ acidified solution will liberate.....iodine from KI solution :

(A) 0.3175 g **(B)** 3.175 g **(C)** 1.75 g **(D)** 317.5 g

31. 5 mL of an aqueous solution of H_2O_2 was treated with excess of KI in dil. H_2SO_4. The liberated iodine required 40 mL of 0.1 N $Na_2S_2O_3$ for complete reaction . The concentration of H_2O_2 is :

(A) 0.34 **(B)** 0.8 **(C)** 0.17 **(D)** 0.85

32. The reaction $H_2S + H_2O_2 \longrightarrow S + 2H_2O$ manifests :

(A) Acidic nature of H_2O_2 **(B)** Basic nature of H_2O_2

(C) Oxidising action of H_2O_2 **(D)** Reducing action of H_2O_2

33. The oxidation number of carbon in $C_x(H_2O)_y$ is :

(A) 0 **(B)** +4 **(C)** +2 **(D)** +6

34. Oxidation state of sodium in sodium amalgam is :

(A) +1 **(B)** –1 **(C)** + 2 **(D)** 0

35. Oxidation state of sulphur in $SOCl_2$ is :

(A) +20 **(B)** 0 **(C)** +4 **(D)** +6

36. If three electrons are lost by a metal ion M^{4+}, its final oxidation state should be :

(A) 0 **(B)** +7 **(C)** +2 **(D)** +8

37. Oxidation state of calcium in bleaching powder is :

(A) + 4 **(B)** + 2 **(C)** 0 **(D)** Can't be determined

38. Oxidation state of chromium in $Cr(CO)_6$ is :

(A) 0 **(B)** + 2 **(C)** –2 **(D)** + 6

39. The oxidation number of oxygen in KO_3 :

(A) + 3 **(B)** + 2 **(C)** + 1 **(D)** –1/3

40. In alkaline medium one mole of MnO_4^- accepts how many moles of electrons in redox process :

(A) 1 **(B)** 3 **(C)** 5 **(D)** 6

41. The compound that can work both as an oxidising and reducing agent is

(A) $KMnO_4$ **(B)** H_2O **(C)** H_2O_2 **(D)** $K_2Cr_2O_7$

42. Oxidation state of phosphorus in $Ca_3(PO_4)_2$ is :

(A) 6.5 **(B)** 7 **(C)** 3.5 **(D)** +5

43. Oxidation state of carbon in HCOOH is :

(A) +2 **(B)** 0 **(C)** +1 **(D)** +3

44. In acid solution, the reaction MnO_4^- to Mn^{2+} involves :

(A) Oxidation by 3 electrons **(B)** Reduction by 3 electrons

(C) Oxidation by 5 electrons **(D)** Reduction by 5 electrons

45. The atomic number of an element which shows the maximum oxidation state of +3 is :

(A) 13 **(B)** 32 **(C)** 33 **(D)** 17

46. Iodine has the maximum oxidation state in :

(A) K_2HgI_4 **(B)** $KICl_2$ **(C)** I_4O_9 **(D)** KI_3

47. In the following reaction, $4P + 3KOH + 3H_2O \longrightarrow 3KH_2PO_2 + PH_3$

(A) P is oxidized only **(B)** P is reduced only

(C) P is oxidized as well as reduced **(D)** None

48. The oxidation state of C in HCN is :

(A) +2 **(B)** –3 **(C)** +3 **(D)** 0

49. Which is not a redox change :

(A) $CaCO_3 \longrightarrow CaO + CO_2$ **(B)** $2H_2O + O_2 \longrightarrow 2H_2O$

(C) $Na + H_2O \longrightarrow NaOH + \frac{1}{2}H_2$ **(D)** $MnCl_3 \longrightarrow MnCl_2 + \frac{1}{2}Cl_2$

50. In the reaction, $Zn + 2H^+ + 2Cl^- \longrightarrow Zn^{2+} + 2Cl^- + H_2$, the spectator ion is :

(A) Cl^- **(B)** Zn^{2+} **(C)** H^+ **(D)** All

51. In sodium hydride, oxidation state of sodium is :

(A) 0 **(B)** +1 **(C)** –1 **(D)** +2

52. Which of the following reactions involves oxidation and reduction ?

(A) $NaBr + HCl \longrightarrow NaCl + HBr$ **(B)** $HBr + AgNO_3 \longrightarrow AgBr + HNO_3$

(C) $H_2 + Br_2 \longrightarrow 2HBr$ **(D)** $Na_2O + H_2SO_4 \longrightarrow Na_2SO_4 + H_2O$

53. In which one of the following reactions, hydrogen is acting as an oxidising agent ?

(A) With Li to give LiH **(B)** With I_2 to give HI

(C) With N_2 to give NH_3 **(D)** With S to give H_2S

54. Which of the following equation is a balanced one ?

(A) $5BiO_3^- + 22H^+ + Mn^{2+} \longrightarrow 5Bi^{3+} + 7H_2O + MnO_4^-$

(B) $5BiO_3^- + 14H^+ + 2Mn^{2+} \longrightarrow 5Bi^{3+} + 7H_2O + 2MnO_4^-$

(C) $2BiO_3^- + 4H^+ + Mn^{2+} \longrightarrow 2Bi^{3+} + 2H_2O + MnO_4^-$

(D) $6BiO_3^- + 12H^+ + Mn^{2+} \longrightarrow 6Bi^{3+} + 6H_2O + 3MnO_4^-$

55. The number of electrons required to balance the following equation $NO_3^- + 4H^+ + e^- \longrightarrow 2H_2O + NO$ are :

(A) 5 **(B)** 4 **(C)** 3 **(D)** 2

56. For the redox reaction, $MnO_4^- + C_2O_4^{2-} + OH^- \longrightarrow MnO_4^{2-} + CO_3^{2-} + H_2O$ the correct coefficients of the reactants for the balanced reaction are :

	MnO_4^-	$C_2O_4^{2-}$	OH^+
(A)	2	1	4
(B)	2	5	16
(C)	1	2	4
(D)	5	2	16

57. Which of the following statement is correct about the oxidation number?

(A) The oxidation number of all atoms in elementary state is 0

(B) The sum of oxidation number of all the atoms in the formula of a compound is always zero

(C) Alkali and alkaline earth metals have +1 and +2 oxidation states respectively

(D) All of the above

58. The sum of the oxidation numbers of all the carbons in C_6H_5CHO is :

(A) +2 **(B)** 0 **(C)** +4 **(D)** –4

59. The oxidation state of nitrogen in hydrazoic acid, N_3H is :

(A) $+\frac{1}{2}$ **(B)** +3 **(C)** –1 **(D)** $-\frac{1}{3}$

60. Oxidation number of S in $S_2O_3^{2-}$ is :

(A) –2 **(B)** + 2 **(C)** + 6 **(D)** 0

61. The oxidation state of molybdenum in its oxo complex species is $[Mo_2O_4(C_2H_4)_2(H_2O)_2]^{2-}$

(A) 2 **(B)** 3 **(C)** 4 **(D)** 5

62. The oxidation states of the most electronegative element in the products of the reaction, BaO_2 with dilute H_2SO_4 are :

(A) 0 and –1 **(B)** –1 and –2 **(C)** –2 and 0 **(D)** –2 and +1

63. The oxidation number of phosphorus in $Ba(H_2PO_2)_2$ is :

(A) +3 **(B)** +2 **(C)** +1 **(D)** –1

64. In which of the following compound, iron has the lowest oxidation state ?

(A) $FeSO_4.(NH_4)_2SO_4.6H_2O$ **(B)** $K_4[Fe(CN)_6]$

(C) $Fe(CO)_5$ **(D)** FeO

65. Oxidation number of iron in $Fe_{0.94}O$ is :

(A) +2 **(B)** +3 **(C)** 200/94 **(D)** 8/3

66. In the reaction, $4Fe + 3O_2 \longrightarrow 4Fe^{3+} + 6O^{2-}$ which of the following statement is incorrect ?

(A) It is a redox reaction

(B) Metallic iron is a reducing agent

(C) Oxygen is an oxidising agent.

(D) Metallic iron is reduced to Fe^{3+}

67. In the following reaction, $3Br_2 + 6CO_3^{2-} + 3H_2O \longrightarrow 5Br^- + 3BrO_3^- + 6HCO_3^-$:

(A) Bromine is oxidized and carbonate is reduced

(B) Bromine is reduced and water is oxidized

(C) Bromine is oxidized and reduced as well

(D) Bromine is neither oxidized nor reduced

68. In the equation $NO_2^- + H_2O \longrightarrow NO_3^- + 2H^+ + ne^-$, n stands for :

(A) H^+ **(B)** e^- **(C)** $2e^-$ **(D)** $3e^-$

69. How many moles of electrons are involved in the reduction of one mole of MnO_4^- ion in alkaline medium to MnO_3^-.

(A) 2 **(B)** 1 **(C)** 3 **(D)** 4

70. The oxidation state of I in $H_4IO_6^-$ is :

(A) +7 **(B)** −1 **(C)** +5 **(D)** +1

71. Oxidation number of carbon in carbon sub-oxide is :

(A) $\frac{+2}{3}$ **(B)** $\frac{+4}{3}$ **(C)** $+4$ **(D)** $\frac{-4}{3}$

***72.** Which of the following reactions do not involve oxidation and reduction ?

(A) $2Rb + H_2O \longrightarrow 2RbOH + H_2$ **(B)** $2CuI_2 \longrightarrow 2CuI + I_2$

(C) $NH_4^+ + NaOH \longrightarrow NaCl + NH_3 + H_2O$ **(D)** $4KCN + Fe(CN)_2 \longrightarrow K_4\left[Fe(CN)_6\right]$

***73.** Consider the redox reaction, $2S_2O_3^{2-} + I_2 \longrightarrow S_4O_6^{2-} + 2I^-$

(A) $S_2O_3^{2-}$ gets reduced to $S_4O_6^{2-}$

(B) $S_2O_3^{2-}$ gets oxidized to $S_4O_6^{2-}$

(C) I_2 gets reduced to I^-

(D) I_2 gets oxidized to I^-

***74.** Which of the following represent redox reactions ?

(A) $Cr_2O_7^{2-} + 2HO^- \longrightarrow CrO_4^{2-} + H_2O$ **(B)** $SO_5^{2-} + I^- \longrightarrow I_2 + SO_4^{2-}$

(C) $Ca(OH)_2 + Cl_2 \longrightarrow Ca(OCl)_2 + CaCl_2$ **(D)** $PCl_5 \longrightarrow PCl_3 + Cl_2$

***75.** Impossible oxidation state of 'C' is :

(A) +4 **(B)** –4 **(C)** +7 **(D)** –5

***76.** The compound that can work both as an oxidising and reducing agent is :

(A) $KMnO_4$ **(B)** SO_2 **(C)** H_2O_2 **(D)** $K_2Cr_2O_7$

***77.** Which one of the following reactions shows reducing action of SO_2 ?

(A) $3Fe + SO_2 \longrightarrow 2Fe + FeS$

(B) $2H_2S + SO_2 \longrightarrow 3S + 2H_2O$

(C) $I_2 + SO_2 + 2H_2O \longrightarrow 2I^- + SO_4^{2-} + 4H^+$

(D) $Cr_2O_7^{2-} + 3SO_2 + 2H^+ \longrightarrow 2Cr^{3+} + 3SO_4^{2-} + H_2O$

***78.** Amongst the following, identify the species with an atom in +6 oxidation state

(A) MnO_4^- **(B)** $Cr_2O_7^{2-}$ **(C)** NiF_6^{2-} **(D)** CrO_2Cl_2

***79.** Oxidation state of nitrogen is correctly given for :

(A) $[CO(NH_3)_5Cl]Cl_2$, O.S. = 0 **(B)** NH_2OH, O.S. = −1

(C) $(N_2H_5)_2SO_4$, O.S. = +2 **(D)** Mg_3N_2, O.S. = −3

80. The reaction between Yttrium metal and dilute hydrochloric acid produces $H_2(g)$ and Y^{3+} ions. The molar ratio of Yttrium used to hydrogen produced is :

(A) 1 : 2 **(B)** 2 : 3 **(C)** 2 : 1 **(D)** 3 : 2

81. The moles of Ammonium sulphate needed to react with one mole of MnO_2 in acidic medium in a reaction giving $MnSO_4$ and $(NH_4)_2S_2O_8$ is :

(A) 2 **(B)** $\frac{1}{2}$ **(C)** 1 **(D)** $\frac{1}{3}$

82. Which of the following are examples of disproportionation reactions?

(A) $Ag(NH_3)_2^+ + 2H^+ \longrightarrow Ag^+ + 2NH_4^+$

(B) $Cl_2 + OH^- \longrightarrow ClO^- + Cl^- + H_2O$

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

(D) $2HCuCl_2 \xrightarrow{\text{dilute with } H_2O} Cu + Cu^{2+} + 4Cl^- + 2H^+$

83. What is the normality of 0.3 M H_3PO_3 when it undergoes the following reaction ?

$H_3PO_3 + 2OH^- \longrightarrow HPO_3^{2-} + 2H_2O$

(A) 0.6 N **(B)** 0.15 N **(C)** 0.9 N **(D)** 0.1 N

84. The equivalent mass of Na_2SO_4 is equal to its molar mass when it is converted to :

(A) $Na_2S_4O_6$ **(B)** Na_2SO_4

(C) Na_2SO_3 **(D)** Na_2S

85. The nitrate anion can be converted into ammonium ion. The equivalent mass of NO_3^- ion in this reaction would be :

(A) 6.2 g **(B)** 7.75 g **(C)** 10.5 g **(D)** 21 g

86. When one gram mole of $KMnO_4$ reacts with HCl, the volume of chlorine liberated at NTP will be:

(A) 11.2 litres **(B)** 22.4 litres **(C)** 44.8 litres **(D)** 56.0 litres

87. When BrO_3^- ion reacts with Br^- ion in acid solution Br_2 is liberated. The equivalent weight of $KBrO_3$ in this reaction is

(A) M/8 **(B)** M/3 **(C)** M/5 **(D)** M/6

where M is the molar mass of $KBrO_3$

88. In which of the following redox reaction 'n' factor of every reactant is non–fractional ?

(A) $CsBr + Br_2 \longrightarrow CsBr_3$ **(B)** $Mn_3O_4 \longrightarrow Mn^{2+}$

(C) $KI + I_2 \xrightarrow{\text{water}} KI_3$ **(D)** $NaNH_2 + N_2O \longrightarrow NaN_3 + H_2O$

89. For 1.34×10^{-3} moles of $KBrO_3$ to reduce into bromide, 4.02×10^{-3} mole of X^{n+} ion is needed. New oxidation state of X would be :

(A) n + 2 **(B)** n – 2

(C) 2 **(D)** –2

90. Which of the following sequence is correct with reference to the oxidation number of iodine:

(A) $I_2 < ICl < HI < HIO_4$ **(B)** $HIO_4 < ICl < I_2 < HI$

(C) $I_2 < HI < ICl < HIO_4$ **(D)** $HI < I_2 < ICl < HIO_4$

91. In the equation $H_2S + 2HNO_3 \longrightarrow 2H_2O + 2NO_2 + S$. The equivalent weight of hydrogen sulphide is :

(A) 16 **(B)** 68 **(C)** 34 **(D)** 17

92. **Assertion (A) :** The oxidation numbers are artificial, they are useful as a book keeping device of electrons in reactions.

Reason (R) : The oxidation numbers do not usually represent real charge on atoms, they are simply conventions that indicate what the maximum charge could possibly be on an atom in a molecule.

(A) Both A and R are true and R is a correct explanation of A

(B) Both A and R are true but R is not a correct explanation of A

(C) A is true but R is false

(D) Both A and R are false

93. The oxide which cannot act as a reducing agent is

(A) SO_2 **(B)** NO_2 **(C)** CO_2 **(D)** ClO_2

94. H_2S acts only as a reducing agent while SO_2 can act both as a reducing and oxidizing agent because :

(A) S in H_2S has -2 oxidation state

(B) S in SO_2 has oxidation state $+4$

(C) Hydrogen in H_2S more +ve than oxygen

(D) Oxygen is more –ve in SO_2

95. Match List–I (Compound) with List–II (Oxidation state of N) and select the correct answer using the codes given below the Lists :

List–I		List–II	
(A)	KNO_3	**(p)**	$-1/3$
(B)	HNO_2	**(q)**	-3
(C)	NH_4Cl	**(r)**	0
(D)	NaN_3	**(s)**	+3
		(t)	+5

96. For the balanced redox reaction $a\,NO_3^- + b\,As_2S_3 + 4\,H_2O \longrightarrow x\,AsO_4^{3-} + y\,NO + zSO_4^{2-} + 8H^+$ which of the following statements are correct?

(A) Equivalent weight of As_2S_3 is M/28 where M is molecular weight of As_2S_3

(B) The value of a : b = 28 : 3

(C) The value of $\frac{a+2b}{x+y}$ is 1

(D) The value of $\frac{z-x}{3}$ is 1

97. When FeS_2 is oxidized with sufficient O_2, then its oxidation product is found to be Fe_2O_3 and SO_2, if the molecular weight of FeS_2, Fe_2O_3 and SO_2 are M, M' and M'', then which of the following statements are correct ?

(A) Equivalent weight of FeS_2 is M/11 **(B)** The molar ratio of FeS_2 to O_2 is 4 : 11

(C) The molar ratio of FeS_2 to O_2 is 11 : 4 **(D)** The molar ratio of Fe_2O_3 and SO_2 is 1 : 4

98. 10 mL of $NaHC_2O_4$ is oxidized by 10 mL of 0.02 M MnO_4^-. Therefore, 10 mL of $NaHC_2O_4$ can be neutralized by :

(A) 10 mL of 0.1 M NaOH **(B)** 10 mL of 0.02 M NaOH

(C) 10 mL of 0.1 N $Ca(CaOH)_2$ **(D)** 10 mL of 0.05 M $Ba(OH)_2$

99. $H_2C_2O_4$ acts as an acid as well as an oxidizing agent. The correct statement (s) about $H_2C_2O_4$ is/are :

(A) it forms two series of salts

(B) equivalent weight of $H_2C_2O_4$ as an acid is 45 g

(C) 100 mL of 0.1 N solution of $Ca(OH)_2$ will be completely neutralized by 50 mL of 0.2 N $H_2C_2O_4$

(D) 100 mL of 0.1 M solution of $KMnO_4$ (acid) will be completely reduced by 50 mL of 0.1 M $H_2C_2O_4$

100. During the disproportionation of I_2 to iodide and iodate ions, the ratio of Iodate and Iodide ions formed in alkaline medium is :

(A) 1 : 5 **(B)** 5 : 1 **(C)** 3 : 1 **(D)** 1 : 3