

UNIT 3
GENERAL CHEMISTRY : STOICHIOMETRY

1. Avogadro's number equals the number of
 - (a) molecules per gram
 - (b) atoms per gram-equivalent
 - (c) atoms per gram-atom
 - (d) electrons per coulomb
2. The number of oxygen atoms in 72 g of water are
 - (a) N
 - (b) 2N
 - (c) 4N
 - (d) 8N
3. The mass equivalent of one a.m.u. is
 - (a) $1/12^{\text{th}}$ the mass of one C-12 atom
 - (b) 1.67×10^{-24} g
 - (c) 1.67×10^{-31} kg
 - (d) all the above
4. The density of hydrogen at S.T.P. is 0.09 g/litre. The number of H_2 molecules in a small bubble of the gas, whose volume at S.T.P. is 0.63 ml is
 - (a) 8.1×10^{17}
 - (b) 1.6×10^{29}
 - (c) 1.1×10^{27}
 - (d) none of these
5. How many moles of ferric alum, $(\text{NH}_4)_2\text{SO}_4 \cdot \text{Fe}_2(\text{SO}_4)_3 \cdot 24 \text{H}_2\text{O}$, can be made from a sample of iron containing
 - (a) 3.0×10^{-4}
 - (b) 5.0×10^{-4}
 - (c) 1.5×10^{20}
 - (d) none of these
6. Which of the following masses of ^{12}C contain 1 mole of electrons ?
 - (a) 12 g
 - (b) 6 g
 - (c) 2 g
 - (d) 1 g
7. Loschmidt number is
 - (a) 6.0×10^{23}
 - (b) 2.7×10^{19}
 - (c) 3.0×10^{23}
 - (d) 2.24×10^{27}
8. The number of water molecules in a drop of water measuring 0.05 ml is
 - (a) 2.0×10^{21}
 - (b) 6.0×10^{23}
 - (c) 55.4
 - (d) none of these
9. Which of the following contains the largest number of molecules ?
 - (a) 1.0 g CH_4
 - (b) 1.0 g H_2O
 - (c) 1.0 g HNO_3
 - (d) 1.0 g N_2O_4
10. The electrolysis of 72 g of water will yield
 - (a) 8.0 g of O_2
 - (b) 9 g of O_2
 - (c) 36 g of O_2
 - (d) 64 g of O_2
11. The number of atoms in 1.00 gram of gold (at. Wt. 197) is
 - (a) 1.19×10^{26}
 - (b) 3.05×10^{21}
 - (c) 3.27×10^{24}
 - (d) none of these
12. The weight of one atom of Uranium is 238 amu. Expressed in grams, its weight is
 - (a) 1.43×10^{26}
 - (b) 3.94×10^{-22}
 - (c) 6.99×10^{-27}
 - (d) none of these
13. The atomic weight of hydrogen is 1.008 therefore 1008 grams of hydrogen contain
 - (a) 6.02×10^{26} atoms
 - (b) 5.97×10^6 atoms
 - (c) 6.02×10^{20} atoms
 - (d) none of these
14. A solution of H_2SO_4 contains 3.60 g of H_2SO_4 in 1000 g of water. What fraction of the total number of molecules is H_2SO_4 ?
 - (a) 0.00066
 - (b) 0.00033
 - (c) 0.00132
 - (d) none of these
15. Suppose that x and y are two elements that form the compounds, Y_2X_3 and Y_2X . If 0.05 moles of Y_2X_3 weigh 9.0 g, and 0.10 moles of Y_2X weigh 10 g, what are the atomic weights of x and y ?
 - (a) 40, 30
 - (b) 80, 60
 - (c) 18, 27
 - (d) 27, 18
16. How many g-atoms of hydrogen are present in 8.5 g of NH_3 ?
 - (a) 1.5
 - (b) 0.50
 - (c) 9.03×10^{23}
 - (d) 1.2
17. How many sulphur atoms would weigh 40.0 g ?
 - (a) 7.53×10^{20}
 - (b) 7.53×10^{21}
 - (c) 7.53×10^{22}
 - (d) 7.53×10^{23}
18. Naturally occurring boron consists of ^{10}B (10.013 amu) and ^{11}B (11.009 amu). The atomic weight of Boron is 10.811 amu. What is the relative abundance of lighter isotope ?
 - (a) 20%
 - (b) 80%

QUEST TUTORIALS

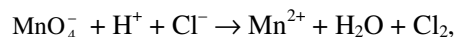
- (c) 30% (d) 25%
19. If an atom of Hg weighs 333×10^{-24} g, its atomic weight is nearly
 (a) 100.3 (b) 200.6
 (c) 33.3 (d) 333
20. How many chloride ions are there in 25.0 g of CaCl_2 ?
 (a) 1.36×10^{23} (b) 3.72×10^{23}
 (c) 2.72×10^{23} (d) 2.5×10^{23}
21. Which one of the following reactions does not involve oxidation reduction ?
 (a) $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$
 (b) $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$
 (c) $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
 (d) $3\text{NaI} + \text{H}_3\text{PO}_4 \rightarrow \text{Na}_3\text{PO}_4 + 3\text{HI}$
22. The oxidation state of sulphur in the ion SO_5^{2-} is
 (a) +8 (b) +6
 (c) +4 (d) +2
23. In the reaction $\text{NH}_4\text{NO}_2 \rightarrow \text{N}_2 + 2\text{H}_2\text{O}$
 (a) Nitrogen in NO_2^- loses $3e^-$
 (b) Nitrogen in NH_4^+ gains $3e^-$
 (c) Nitrogen in NO_2^- gains $3e^-$
 (d) There is no loss or gain of electrons
24. In the reaction
 $3\text{Ag} + 4\text{HNO}_3 \rightarrow 3\text{AgNO}_3 + \text{NO} + 2\text{H}_2\text{O}$
 some of Nitrogen atoms
 (a) gain 2 electrons (b) lose 2 electrons
 (c) lose 3 electrons (d) gain 3 electrons
25. In the reaction $4\text{Zn} + 10 \text{HNO}_3 \rightarrow 4\text{Zn}(\text{NO}_3)_2 + \text{NH}_4\text{NO}_3 + 3\text{H}_2\text{O}$
 some of Nitrogen atoms
 (a) lose 4 electrons (b) gain 4 electrons
 (c) lose 8 electrons (d) gain 8 electrons
26. In which reaction is H_2 acting as oxidising agent ?
 (a) $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
 (b) $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
 (c) $\text{Ca} + \text{H}_2 \rightarrow \text{CaH}_2$
 (d) $\text{WO}_3 + 3\text{H}_2 \rightarrow \text{W} + \text{H}_2\text{O}$
27. Ferric alum oxidises hydroxylamine to N_2O , the change in oxidation state is
 (a) 2 (b) 1
 (c) 3 (d) 5
28. In which series oxidation state shows an ascending order ?
 (a) $\text{Cl}_2, \text{HCl}, \text{HClO}_3, \text{HClO}_4$
 (b) $\text{PH}_3, \text{H}_3\text{PO}_2, \text{H}_3\text{PO}_3, \text{H}_3\text{PO}_4$
 (c) $\text{H}_2\text{SO}_4, \text{H}_2\text{SO}_3, \text{H}_2\text{S}_2\text{O}_3, \text{H}_2\text{S}_2\text{O}_7$
 (d) $\text{H}_2\text{SO}_4, \text{H}_2\text{SO}_5, \text{H}_2\text{S}_2\text{O}_8, \text{SO}_2\text{Cl}_2$
29. The oxidation state of zero is shown in all the following except
 (a) $\text{H} - \text{C} = 0$ (b) $\text{C}_{12}\text{H}_{22}\text{O}_{11}$
 (c) $\text{Ni}(\text{CO})_4$ (d) $\text{Cr}(\text{H}_2\text{O})_6\text{Cl}_3$
30. Pick up an example of disproportionation reaction ?
 (a) $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$
 (b) $\text{NH}_4\text{NO}_3 \rightarrow \text{N}_2\text{O} + 2\text{H}_2\text{O}$
 (c) $4\text{H}_3\text{PO}_3 \rightarrow \text{PH}_3 + 3\text{H}_3\text{PO}_4$
 (d) $\text{AgCl} + 2\text{NO}_3 \rightarrow \text{Ag}(\text{NH}_3)_2\text{Cl}$
31. Disproportionation reactions are often encountered in the chemistry of
 (a) halogens
 (b) sulphur
 (c) phosphorous
 (d) transition metals
32. How many moles of Sn^{2+} ions are oxidised by 1 mole of dichromate in acidic solution ?
 (a) 2 (b) 3
 (c) 4 (d) 5
33. How many moles of ferrous oxalate are oxidised by 1 mole of permanganate in acid solution ?
 (a) 3/5 (b) 4/5
 (c) 5/3 (d) 5/2
34. How many moles of iodide ions are oxidized by 1 mole of dichromate in acid solution ?
 (a) 3 (b) 6
 (c) 12 (d) none of these
35. In the unbalanced equation,
 $\text{KClO}_3 + \text{C}_{12}\text{H}_{22}\text{O}_{11} \rightarrow \text{KCl} + \text{CO}_2 + \text{H}_2\text{O}$
 The number of moles of KClO_3
 Needed to react with one mole of sugar is
 (a) 2 (b) 4
 (c) 6 (d) 8
36. The oxidation number of sulphur in the gas evolved when copper is heated with conc. H_2SO_4 is
 (a) +1 (b) +2
 (c) +3 (d) +4

37. When ethylene is passed through aqueous KMnO_4 solution, the oxidation state of Mn changes from
 (a) +7 to +2 (b) +7 to +4
 (c) +7 to +6 (d) none of these
38. In which of the following compounds of Cr, the oxidation state of Cr is not +6 ?
 (a) CrO_3 (b) CrO_2Cl_2
 (c) Cr_2O_3 (d) $\text{K}_2\text{Cr}_2\text{O}_7$
39. In the reaction
 $3\text{CuO} + 2\text{NH}_3 \rightarrow 3\text{Cu} + \text{N}_2 + 3\text{H}_2\text{O}$
 (a) gains $3e^-$ (b) loses $3e^-$
 (c) gains $6e^-$ (d) loses $6e^-$
40. The poorest reducing agent in reaction with conc. H_2SO_4 is
 (a) HI (b) HCl
 (c) HBr (d) HF
41. Which one of the following cannot be oxidised ?
 (a) NO_2 (b) NO
 (c) SO_2 (d) SO_3
42. When a yellow solution of sodium metavanadate, NaVO_3 , is reduced with Zn and dil. H_2SO_4 , the solution changes from yellow to blue to green to violet. This is due to
 (a) successive changes of oxidation state
 (b) formation of different species
 (c) successive changes in enthalpy of hydration
 (d) none of these
43. Which one of the following is not a reasonable formula for an oxide of Cr ?
 (a) Cr_2O (b) CrO
 (c) Cr_2O_3 (d) CrO_3
44. In which of the following reactions, the equivalent weight of KMnO_4 is same as its formula weight ?
 (a) $\text{KMnO}_4 + \text{H}_2\text{SO}_4 + \text{FeSO}_4 \rightarrow \text{K}_2\text{SO}_3 + \text{MnSO}_4 + \text{H}_2\text{O} + \text{Fe}_2(\text{SO}_4)_3$
 (b) $\text{KMnO}_4 + \text{HCl} \rightarrow \text{KCl} + \text{MnCl}_2 + \text{Cl}_2 + \text{H}_2\text{O}$
 (c) $\text{KMnO}_4 + \text{Na}_2\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{MnO}_2 + \text{KOH} + \text{Na}_2\text{SO}_4$
 (d) $\text{KMnO}_4 + \text{KOH} + \text{C}_6\text{H}_5\text{CH}_3 \rightarrow \text{K}_2\text{MnO}_4 + \text{C}_6\text{H}_5\text{COOH} + \text{H}_2\text{O}$
45. Which one of the following is not a disproportionation reaction ?
 (a) $3\text{Cl}_2 + 6\text{NaOH} \rightarrow 5\text{NaCl} + \text{NaClO}_3 + 3\text{H}_2\text{O}$
 (b) $3\text{Cr}_2 + 3\text{Na}_2\text{CO}_3 \rightarrow 5\text{NaBr} + \text{NaBrO}_3 + 3\text{H}_2\text{O}$
 (c) $5\text{HI} + \text{HIO}_3 \rightarrow 3\text{H}_2\text{O} + 3\text{I}_2$
 (d) $\text{P}_4 + 3\text{NaOH} + 3\text{H}_2\text{O} \rightarrow 3\text{NaH}_2\text{PO}_2 + \text{PH}_3$
46. In the balanced equation
 $\text{Zn} + \text{H}^+ + \text{NO}_3^- \rightarrow \text{NH}_4^+ + \text{Zn}^{2+} + \text{H}_2\text{O}$,
 The coefficient of NH_4^+ is
 (a) 4 (b) 3
 (c) 2 (d) 1
47. In the balanced equation
 $\text{MnO}_4^- + \text{H}^+ + \text{C}_2\text{O}_4^{2-} \rightarrow \text{Mn}^{2+} + \text{CO}_2 + \text{H}_2\text{O}$, the moles of CO_2 formed are
 (a) 2 (b) 4
 (c) 5 (d) 10
48. The oxidation state of Mn is $\text{Ca}(\text{MnO}_4)_2$ is
 (a) -2 (b) +2
 (c) +4 (d) +7
49. The oxidation state of Xenon in perxenoic acid H_4XeO_6 is
 (a) 0 (b) +2
 (c) +6 (d) +8
50. In the reaction,
 $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$
 The species which is undergoing oxidation is
 (a) H^+ (b) Cl^-
 (c) Mn^{4+} (d) O^{2-}
51. The oxidation state of halogens in perhalates is
 (a) +1 (b) +3
 (c) +5 (d) +7
52. Chlorine gas is bubbled into a solution containing iodide ions (aqueous). Which equation best describes the reaction ?
 (a) $\text{I}^- + \text{Cl}^- \rightarrow \text{I} + \text{Cl}$
 (b) $\text{I}^- + \frac{1}{2}\text{Cl}_2 \rightarrow \frac{1}{2}\text{I}_2 + \text{Cl}^-$
 (c) $\frac{1}{2}\text{I}_2 + \frac{1}{2}\text{Cl}_2 \rightarrow \text{I}^- + \text{Cl}^-$
 (d) $2\text{I}^- + \text{Cl}_2 \rightarrow \text{I}_2 + \text{Cl}_2$
53. Bromide ions can reduce
 (a) iodine atoms (b) iodide ions
 (c) chlorine atoms (d) chloride ions

54. Which reaction involves neither oxidation nor reduction ?

- (a) burning tin in Chlorine gas
 (b) reaction of Fe with S
 (c) decomposition of KClO_3
 (d) neutralisation of NaOH with H_2SO_4

55. In the balanced equation



the correct co-efficient for Cl^- (aq) is

- (a) 8 (b) 5
 (c) 10 (d) 16

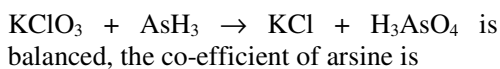
56. In the unbalanced equation



The co-efficient for iodic acid is

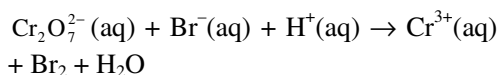
- (a) 1 (b) 6
 (c) 3 (d) 10

57. When the equation



- (a) 4 (b) 3
 (c) 8 (d) 2

58. In the equation (when balance(d)



the co-efficient of Br_2 is

- (a) 1 (b) 3
 (c) 6 (d) 14

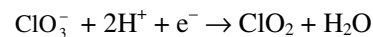
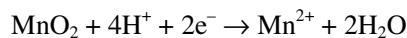
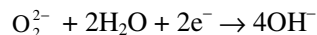
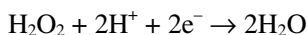
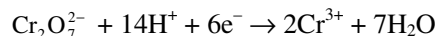
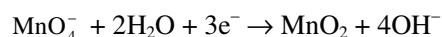
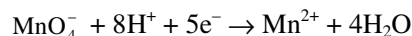
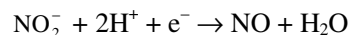
59. There is no oxidation reduction in a reaction involving

- (a) single replacement
 (b) double replacement
 (c) simple decomposition
 (d) direct combination of elements

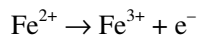
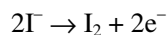
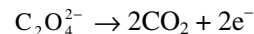
60. Which element is the best oxidising agent ?

- (a) I_2 (b) Br_2
 (c) Cl_2 (d) F_2

Partial equations of common oxidants



Partial equation of common reductants



61. In a balanced chemical equation

- (a) atoms are conserved
 (b) molecules are conserved
 (c) moles are conserved
 (d) reactant and product molecules are conserved

62. The law of multiple proportion is illustrated by

- (a) KCl and KClO_3
 (b) H_2O_2 and H_2O
 (c) NaBr and NaCl
 (d) MnSO_4 and MgSO_4

63. Two oxides of a metal M contain respectively 22.53% and 30.38% of O_2 . If the formula of first oxide is MO , the formula of second oxide is

- (a) M_2O_3 (b) MO_3
 (c) M_2O (d) M_2O_4

64. The energy equivalent when 1 g of matter is annihilated is (in ergs)

- (a) 9×10^{20} (b) 9×10^{21}
 (c) 9×10^{10} (d) 3×10^{20}

65. Red lead is composed of 90.65% Pb and 9.35% oxygen. (Pb = 207.19).

The formula of red lead is

- (a) PbO (b) PbO_2
 (c) Pb_3O_4 (d) none of these

66. A compound consists of 12g of Mg; 12g of carbon and 14g of nitrogen. A formula of this compound is

- (a) MgCN (b) $\text{Mg}(\text{CN})_2$
 (c) MgCN_2 (d) Mg_2CN

67. A given compound consists of 1.20×10^{23} atoms carbon, 3.61×10^{23} atoms hydrogen and 6.02×10^{22} atoms oxygen. The simplest formula of the compound is

- (a) CH_4O (b) $\text{C}_2\text{H}_6\text{O}$

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- (c) C_3H_8O (d) $C_4H_{10}O$
68. What weight of H_2SO_4 (in tons) can be obtained by burning 100 tons of FeS_2 ? $Fe = 56$
 (a) 165 (b) 83
 (c) 16.5 (d) 8.3
69. What weight of copper (in lb) can be obtained from one compound of $CuSO_4 \cdot 5H_2O$ (formula weight 249.6) ?
 (a) 115 (b) 230
 (c) 460 (d) 57.5
70. 1.222 g of $BaCl_2 \cdot xH_2O$, on heating, left 1.042 g $BaCl_2$. The number of water moles with 1 mole $BaCl_2$ (M.W = 208) is
 (a) 1 (b) 2
 (c) 3 (d) 4
71. Element x reacts with chlorine to form a compound with the formula XCl_3 . The formula for the compound of X and oxygen is most likely to be
 (a) XO_2 (b) X_3O
 (c) X_2O_3 (d) X_3O_2
72. Element X has atomic number of 48; element Y has atomic number of 7. The formula of compounds containing these elements is
 (a) XY (b) XY_2
 (c) XY_3 (d) X_3Y_2
73. The weight of pin pounds that can be obtained by heating 620 pounds of $Ca_3(PO_4)_2$ (M.W = 310) with sand and coke in an electric furnace is
 (a) 62 (b) 124
 (c) 93 (d) 31
74. Potato starch contains 0.086% P. Assuming one molecule of starch contains one atom of P ($P = 31$), what is the M.W. of starch ?
 (a) 36,000 (b) 18,000
 (c) 9000 (d) 72,000
75. Haemoglobin (M.W = 68,000) contains 0.33% of Fe. How many Fe atoms are in each molecule of haemoglobin ?
 (a) 4 (b) 2
 (c) 3 (d) 1
76. When one mole of octane is burnt in excess of O_2 , the number of moles of O_2 used is
 (a) 25 (b) 12.5
 (c) 8 (d) 16
77. The volume of O_2 in litres (at S.T.P.) to burn 5 litres of ethane is
 (a) 3.5 (b) 5.0
 (c) 35 (d) 17.5
78. The weight of $KClO_3$ (M.W. = 122.5) needed to produce 67.2 litres of O_2 at S.T.P. (on heating) is
 (a) 122.5 (b) 245
 (c) 12.5 (d) 2.45
79. How many grams of carbon are needed to reduce 7.0 g of Fe_3O_4 to Fe assuming that all the carbon is converted in the reaction to carbon monoxide ?
 (a) 28.0 (b) 14.0
 (c) 3.63 (d) 1.45
80. How many moles of CO_2 result from the reaction of 2.1 g of $NaHCO_3$ with 0.020 moles of H_2SO_4 ?
 (a) 0.025 (b) 0.050
 (c) 1.10 (d) 2.20
81. How many grams of MnO_2 (M.W. = 87) are needed to react with excess conc. HCl to produce 0.025 moles of Cl_2 ?
 (a) 4.35 (b) 0.0305
 (c) 2.17 (d) 1.085
82. If 1.6g of SO_2 and 1.5×10^{22} molecules of H_2S are mixed in a closed vessel until the reaction proceeds to completion. How many grams of sulphur are obtained ?
 (a) 2.40 (b) 0.96
 (c) 1.20 (d) none of these
83. If 6.02×10^{23} molecules of N_2 react completely with H_2 to give NH_3 , the number of molecules of NH_3 formed are
 (a) 6.02×10^{23} (b) $3 \times 6.02 \times 10^{23}$
 (c) $2 \times 6.02 \times 10^{23}$ (d) $\frac{1}{2} \times 6.02 \times 10^{23}$
84. What weight of $KMnO_4$ (M.W. = 158) is needed to prepare 15 moles of Cl_2 ?
 (a) 950 (b) 475
 (c) 1900 (d) 237.5
85. What weight of air (containing 23% O_2 by weight) is required to roast 20 tons FeS_2 ?
 (a) 62 (b) 31
 (c) 15.5 (d) 14.2
86. How many grams of 95% pure NaCl are needed to produce 2 pound (1 lb = 454 g) of HCl ?

- (a) 3.06×10^3 (b) 1.53×10^3
(c) 0.76×10^3 (d) 1.53×10^4
87. What weight of H_2SO_4 ($d = 1.45 \text{ g/ml}$) containing 55.1% H_2SO_4 by weight is used for the production of 50 g H_2 gas by reaction with Al ?
(a) 4.45 kg (b) 8.90 kg
(c) 2.225 kg (d) none of these
88. A manufacturer supplies 1-lb of CaC_2 of 85% purity. How many grams of C_2H_2 can be obtained from 1 lb of such CaC_2 ?
(a) 314 g (b) 157 g
(c) 78.5 g (d) none of these
89. What volume of HCl (36% HCl by weight, $d = 1.18 \text{ g/ml}$) and what weight of limestone (90% pure) are needed to produce 2 kg CO_2 by reaction
 $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$
(a) 7.8 litres; 5.05 kg CaCO_3
(b) 15.6 litres; 10.10 kg CaCO_3
(c) 3.9 litres; 2.525 kg CaCO_3
(d) none of these
90. What wt. of HNO_3 is obtained from 17 g of NH_3 by Ostwald's process ?
(a) 0.63 (b) 6.3
(c) 63 (d) 8.5
91. The equivalent weight of an element is always
(a) its atomic weight multiplied by the valency
(b) one-half of its molecular weight
(c) the weight of 22.4 litres (S.T.P.) of the gaseous element
(d) the weight of the element which combines with 8 parts by weight of oxygen
92. Which one of the following is false ?
(a) substances react in the ratio of their equivalent
(b) $\frac{g_1}{E_1} = \frac{g_2}{E_2}$
(c) $\frac{g_1}{g_2} = \frac{E_1}{E_2}$
(d) $\frac{g_1}{g_2} = \frac{M_1}{M_2}$
- where g = mass in grams, E = eq. Wt., M = mol. Wt.
93. 2.099 g of MgO contain 1.266 g of Mg. The gram eq. Wt. of Mg is
(a) 12.15 g (b) 24.32 g
(c) 6.08 g (d) none of these
94. The eq. Wt. of Sn (at. Wt 118) in SnCl_4 is
(a) 59 (b) 118
(c) 29.5 (d) none of these
95. The gram eq. Wt. of nitrogen is N_2O_5
(a) 14.0 (b) 7.0
(c) 4.67 (d) 2.8
96. How many electrons by 1.93 grams of Al and gained by 7.63 g of Cl_2 when the two elements react to give AlCl_3 ?
(a) 1.30×10^{23}
(b) 2.60×10^{23}
(c) 2.60×10^{23} and 3.90×10^{23}
(d) none of these
97. The g. eq. Wt. of $\text{Cu}_3(\text{PO}_4)_2$ is
(a) 31.77 (b) 15.88
(c) 63.54 (d) none of these
98. How many electrons are liberated by 1.0 g of Ca in forming Ca^{2+} ion ?
(a) 3.0×10^{22} (b) 4.9×10^{21}
(c) 6.7×10^{22} (d) none of these
99. How many grams of Mg would have to react in order to liberate 4N electrons ?
(a) 12 (b) 24
(c) 36 (d) 48
100. In acting as a reducing agent a piece of metal M weighing 16.0 g gives up 2.25×10^{23} electrons. What is the weight of one equivalent of metal ?
(a) 42.66 (b) 21.33
(c) 10.65 (d) none of these
101. When V_2O_5 (M.W. = 182) is
(a) 182/1 (b) 182/2
(c) 182/4 (d) 182/10
102. The eq. Wt. of $\text{K}_2\text{Cr}_2\text{O}_7$ (M.W. = 294) in acid solution according to the reaction
 $\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6\text{e}^- \rightarrow 2\text{Cr}^{3+} + 3\text{H}_2\text{O}$ is
(a) 294/6 (b) 294/3
(c) 294/1 (d) 294/12
103. The volume equivalent of hydrogen is 11.2 litres (S.T.P.), what is the volume equivalent of oxygen ?
(a) 22.41 (b) 11.21

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- (c) 5.61 (d) 2.81
104. The volume equivalent of CO_2 in the reaction
 $\text{NaHCO}_3 + \text{HCl} + \text{H}_2\text{O} + \text{CO}_2$ is
 (a) 1 mole of CO_2 (b) 44 g
 (c) 22.4 litres (d) 11.2 litres
105. The equivalent weights of KMnO_4 (M.W. = 158) in acid, neutral and alkaline medium are
 (a) 158/1, 158/5, 158/3
 (b) 158/5, 158/3, 158/1
 (c) 158/3, 158/1, 158/5
 (d) all of these
106. An element X is found to combine with O_2 to form a compound of formula X_4O_6 . If 8.40 g of the element X combine with 6.50 g of oxygen, the atomic weight of the element is
 (a) 24.0
 (b) 31.0
 (c) 50.4
 (d) 118.7
107. What wt. of P_4 (P = 31) is converted to H_3PO_4 by 21g of HNO_3 according to the equation
 $\text{P}_4 + \text{HNO}_3 \rightarrow \text{H}_3\text{PO}_4 + \text{NO}_2 + \text{H}_2\text{O}$
 (a) 2.1 (b) 4.2
 (c) 12.4 (d) 6.2
108. What wt. of HNO_3 is needed to convert 5g of I_2 (I = 127) into HIO_3 according to the reaction
 $\text{I}_2 + \text{HNO}_3 \rightarrow \text{HIO}_3 + \text{NO} + \text{H}_2\text{O}$
 (a) 8.2 (b) 4.1
 (c) 12.3 (d) 16.4
109. How many litres of Cl_2 (at S.T.P.) will be liberated by the oxidation of NaCl with 10 g of KMnO_4 ?
 (a) 3.54 (b) 1.77
 (c) 7.08 (d) none of these
110. How many grams of 3 percent H_2O_2 solution is required to oxidise 2 litres of SO_2 gas at S.T.P. in acidic medium ?
 (a) 51 (b) 102
 (c) 25.5 (d) 204
111. How many grams of NaOH will react with 0.2 equivalent of HCl ?
 (a) 4.0 (b) 8.0
 (c) 2.0 (d) 0.20
112. How many equivalents of NaCl will be required to react with 100 g AgNO_3 ?
 (a) 0.59 (b) 0.285
 (c) 1.18 (d) none of these
113. How many equivalents of H_2SO_4 are there in a litre of 77% solution of H_2SO_4 whose density is 1.7 g/ml ?
 (a) 53.4 (b) 26.7
 (c) 13.35 (d) none of these
114. How many grams of NaHCO_3 will be required to neutralise a solution containing 2 equivalents of HCl ?
 (a) 84 (b) 168
 (c) 53 (d) 106
115. How many grams of KClO_3 (M.W. = 122.5) will be required to react with 2 equivalents of HCl in the reaction
 $\text{KClO}_3 + 6\text{HCl} \rightarrow \text{KCl} + 3\text{H}_2\text{O} + 3\text{Cl}_2$
 (a) 10.2 (b) 20.4
 (c) 40.8 (d) 81.6
116. How many equivalents of NaOCl will react with 50 g of H_2SO_3 as
 $\text{NaOCl} + \text{H}_2\text{SO}_3 \rightarrow \text{NaCl} + \text{H}_2\text{SO}_4$
 (a) 2.4 (b) 1.2
 (c) 3.6 (d) 4.8
117. 5g of Cu are liberated by 9.53×10^{22} electrons as
 $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$, the eq. Wt. of Cu is
 (a) 63.5 (b) 31.75
 (c) 21.18 (d) 15.87
118. 0.596g of the chloroplatinate of aniline gave, upon ignition, 0.195 g of platinum. The M.W. of aniline is computed to be
 (a) 93 (b) 196
 (c) 46.5 (d) none of these
119. The silver salt of a monobasic acid contains 60% Ag. The M.W. of acid is found to be
 (a) 73 (b) 176
 (c) 63 (d) 126
120. 1 g of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ in solution gave 0.9330 g of BaSO_4 upon reaction with BaCl_2 . The eq. Wt. of Cu is formed to be
 (a) 16 (b) 8
 (c) 64 (d) 32
121. The M.W. of a protein is 900,000. The mass of 1 molecule of protein is
 (a) 1.5×10^{-18} g (b) 1×10^{-6} g

- (c) 9×10^{-5} g (d) none of these
122. In an attempt to prepare aniline (M.W. = 93) from nitrobenzene (M.W. = 123), 10 g nitrobenzene was reduced with tin and HCl. Eventually 7.0g of aniline were obtained. What is the percentage yield of aniline ?
- (a) 70 (b) $\frac{7.0}{93} \times 100$
 (c) $\frac{7.0 \times 123}{10.0 \times 93} \times 100$ (d) $\frac{7.0 \times 93}{10.0 \times 93} \times 100$
123. Insulin contains 3.4% S. Its minimum M.W. is
- (a) 941.6 (b) 340.6
 (c) 320.6 (d) 1882.0
124. Haemoglobin contains 0.33% Fe (Fe=56) and contains 4 iron atoms per molecule, its M.W. is estimated to be
- (a) 68,000 (b) 34,000
 (c) 17,000 (d) 85,000
125. When V_2O_5 is reduced to V, the eq. Wt. of V_2O_5 is computed to be
- (a) $\frac{M.W.}{4}$ (b) $\frac{M.W.}{2}$
 (c) $\frac{M.W.}{10}$ (d) $\frac{M.W.}{6}$
126. How many electrons are lost by 1 g Al in the reaction
- $$Al \rightarrow Al^{3+} + 3e^{-}$$
- (a) N/9 (b) N/27
 (c) 3N (d) N
127. The compound ferrocene contains 30% iron. What is its minimum molecular weight ?
- (a) 93 (b) 186
 (c) 372 (d) 390
128. Insulin contains 0.52% Zn, what would be its minimum M.W. ?
- (a) 12571 (b) 941.6
 (c) 6285 (d) none of these
129. The specific heat of an element is 0.113 cal per gram per degree. Its approximate at. Wt. is nearly
- (a) 56 (b) 28
 (c) 14 (d) 113
130. The carbonate of a metal is isomorphous with $MgCO_3$ and contains 6.091 percent of carbon. The atomic weight of metal is nearly
- (a) 40 (b) 80
 (c) 137 (d) none of these
131. The specific heat at constant volume and constant pressure for a gas (x) are respectively 0.095 and 0.120 cal per gram. The M.W. of gas is found to be
- (a) 20 (b) 71
 (c) 80 (d) 64
132. What volume of O_2 (S.T.P) shall combine with 48g Mg (at. Wt. = 24) to give MgO ?
- (a) 5.61 (b) 11.21
 (c) 22.41 (d) none of these
133. An element has eq. Wt. of 20 and 25. Its probable atomic wt. is
- (a) 50 (b) 100
 (c) 150 (d) 200
134. The maximum oxidation state is shown in
- (a) CrO_3 (b) Mn_2O_7
 (c) OsO_4 (d) SO_3
135. The chloride of an element contains 80% Cl_2 . Its eq. Wt. is
- (a) 9 (b) 18
 (c) 27 (d) 54
136. How many electrons are involved in the production of 16g of Cu from $CuSO_4$ solution ?
- (a) 6×10^{23} (b) 3×10^{23}
 (c) 1.5×10^{23} (d) none of these
137. The atomic weight of an element can be best determined by
- (a) x-ray analysis
 (b) mass spectrography
 (c) Wilson colour chamber
 (d) spectroscopy
138. The product of atomic weight and specific heat of an element is nearly 6.4. It is
- (a) Avogadro's law
 (b) Dalton's law
 (c) Cannizaro's law
 (d) Dulong – Petit's law
139. Which one of the following are not isomorphous ?
- (a) Potash alum and Chrome alum
 (b) $ZnSO_4 \cdot 7H_2O$ and $FeSO_4 \cdot 7H_2O$
 (c) K_2SO_4 and K_2CrO_4
 (d) $CuSO_4 \cdot 5H_2O$ and $MgSO_4 \cdot 7H_2O$

140. An element X forms two gaseous oxides containing respectively 36.3% and 53.3% O₂. At S.T.P., one gram of each of these oxides occupies 505 c.c. and 735 cc. Respectively. The at. Wt. of X is
 (a) 7 (b) 14
 (c) 21 (d) 28
141. The atomic weight of an element is 136.3, the specific heat of the elements in cal per gram is
 (a) 0.047 (b) 0.113
 (c) 0.80 (d) 0.40
142. The atom of He weighs 6.63×10^{-24} g. One atom of oxygen must weigh
 (a) 16.09 (b) 6.02×10^{-23} g
 (c) 2.66×10^{-23} g (d) 1.66×10^{-24} g
143. The maximum amount of Ag one would expect to recover from a kilogram of AgCl which is only 85% AgCl would be
 (a) $\frac{108}{143.5}$
 (b) $\frac{0.85 \times 108}{143.5}$
 (c) $0.85 \times \frac{143.5}{108}$
 (d) $0.85 \times \frac{108}{143.5} \times 1000$
144. Of the following, the compound in which oxygen shows oxidation state of +2 is
 (a) Cl₂O₆ (b) BrO₃
 (c) HClO₂ (d) OF₂
145. 0.128 g of O₂ combine with 0.190 g of metal M to give MO₄. What is the atomic weight of metal ?
 (a) 190 (b) 85
 (c) 201 (d) 31.0
146. 5g of the sodium salt of an organic acid, on strong heating, gave 3.955 g of Na₂CO₃. What is the eq. Wt. of the acid?
 (a) 45 (b) 90
 (c) 74 (d) 121
147. It is found that 0.709 g of iron combined with 1.350 g of Chlorine. Its atomic weight is nearly
 (a) 18.67 (b) 28.0
 (c) 56.0 (d) 112
148. Magnesium pyrophosphate contains 0.1086 g of Mg to 0.2501 g of oxygen. The atomic weight of Mg is calculated to be
 (a) 12 (b) 24
 (c) 24.32 (d) 48.64
149. The oxide of a metal contains 31.35% O₂. The heat capacity of metal is 0.100 cal per gram. What is the metal ?
 (a) Fe (b) Co
 (c) Ni (d) Cu
150. Boron trichloride (M.W. = 117.2) contains 90.8% Chlorine while HCl (M.W. = 36.5) contains 97.2% Chlorine. The weight of Chlorine per mole in the two chlorides is
 (a) 35.5, 71.0 (b) 35.5, 106.5
 (c) 71, 141.7 (d) none of these
151. Conc. HCl has a density of 1.20 g per ml and is 35.0% HCl by weight. What is the mole fraction composition of conc. HCl ?
 (a) 0.79 (b) 0.21
 (c) 0.42 (d) 36.5
152. The molarity of K₂CO₃ solution (d = 1.21 g/ml) containing 22% of the salt by weight is
 (a) 3.86 (b) 1.93
 (c) 0.965 (d) none of these
153. Refer to Q2, the molality is
 (a) 1.02 (b) 2.04
 (c) 3.16 (d) none of these
154. The molarity and normality of a solution containing 275 g KOH in 800 ml of solution ?
 (a) 6.13, 12.26 (b) 6.13, 6.13
 (c) 3.06, 3.06 (d) 12.26, 6.13
155. A five percent solution of H₃PO₄ has a density of 1.03 g per ml. Its normality is
 (a) 3.14 (b) 1.57
 (c) 4.71 (d) none of these
156. How many grams of KMnO₄ per liter of solution would be required to prepare 0.01N KMnO₄, KMnO₄ solution to be used as oxidant in acidic medium ?
 (a) 0.158 (b) 0.316
 (c) 3.16 (d) 31.6
157. What is the normality of K₂Cr₂O₇ (to be used as oxidant in acidic medium) 10g of which are dissolved per litre of solution ?
 M.W. of K₂Cr₂O₇ = 294

- (a) 0.204 (b) 0.102
(c) 1.224 (d) none of these
158. How many grams of KMnO_4 (M.W. = 158) per litre of solution are needed to prepare 0.01N solution, KMnO_4 is to be used as oxidant in alkaline medium ?
(a) 1.58 g (b) 0.316 g
(c) 3.16 g (d) none of these
159. What volume of H_2SO_4 (d = 1.84 g/ml) containing 98% H_2SO_4 by wt. would be required to prepare 1l of 6N solution ?
(a) 164 ml (b) 82 ml
(c) 16.4 ml (d) 8.2 ml
160. Conc. HCl has a density of 1.20 g per ml and is 39 per cent acid by weight. Its normality is
(a) 12.8 (b) 6.4
(c) 1.28 (d) 0.128
161. How many grams of Zn would react with 1.0 litre of 1.0N HCl ?
(a) 6.5 (b) 65
(c) 32.7 (d) 3.27
162. 0.63 g in 100 ml of a dibasic acid neutralise 50 ml of N/5 NaOH. Its M.W. is
(a) 63 (b) 6.3
(c) 126 (d) 252
163. A sample of marble weighing 1.750 g required 19.5 ml of 1.50 N HCl to react with CaCO_3 in the marble. What percent of the marble was CaCO_3 ?
(a) 74.1% (b) 41.70%
(c) 83.4% (d) none of these
164. A 564 g of sample of lye (principally NaOH) required 41.6 ml of 0.251 N H_2SO_4 to neutralise the NaOH it contained. Find percent of NaOH in the lye
(a) 37% (b) 3.7%
(c) 74.1% (d) 7.41%
165. With how many grams of Ca(OH)_2 will 250 ml of 6.0 N HCl react ?
(a) 74 (b) 7.4
(c) 55.6 (d) 73
166. 20 ml of H_2SO_4 when reacted with BaCl_2 solution, gave 0.233 g of BaSO_4 . What is the normality of H_2SO_4 ?
(a) 0.2 (b) 0.4
(c) 0.1 (d) 0.01
167. How many ml of 0.5N Ba(OH)_2 will be required to neutralise 0.60 g of oxalic acid (M.W. =90) ?
(a) 2.66 (b) 266
(c) 13.3 (d) 26.6
168. What volume of 0.3M H_3PO_4 solution be diluted with water to get 50 ml of 0.05 N solution?
(a) 27.8 ml (b) 1.39 ml
(c) 5.46 ml (d) 2.78 ml
169. What weight of HNO_3 is required to make one litre of 2N solution to be used as oxidant in the reaction
$$3\text{Cu} + 8\text{HNO}_3 \rightarrow 3\text{Cu}(\text{NO}_3)_2 + 2\text{N} + 2\text{H}_2\text{O}$$

(a) 21 g (b) 63 g
(c) 84 g (d) 42 g
170. What weight of FeSO_4 (M.W. =152) shall be oxidised by 200 ml of 0.2 M KMnO_4 solution in acid medium?
(a) 25.5 g (b) 35 g
(c) 40 g (d) 30.4 g
171. What volume of decinormal KMnO_4 would be needed to oxidise 100 milligrams of ferrous oxalate in acid solution ? M. W. of FeC_2O_4 is 144
(a) 2.1 ml (b) 42.0 ml
(c) 63.0 ml (d) 21.0 ml
172. How many litres of a 0.5N solution of an oxidising agent are reduced by 2 litres of a 2.0N solution of a reducing agent ?
(a) 2 (b) 4
(c) 6 (d) 8
173. What volume of decinormal $\text{K}_2\text{Cr}_2\text{O}_7$ shall oxidise 1g of Sn (at. Wt. 118) to Sn^{4+} state in acid solution ?
(a) 66.4 ml (b) 17.7 ml
(c) 16.7 ml (d) 33.4 ml
174. 25 ml of solution containing 5.0g NH_4Cl per litre was boiled with excess NaOH solution. NH_3 was evolved and was absorbed by passing it into 25 ml of 0.10M H_2SO_4 . What volume of 0.10 M NaOH solution would be needed to react with the excess H_2SO_4 ?
(a) 13.3 ml (b) 53.2 ml
(c) 2.66 ml (d) 26.6 ml
175. What volume of 0.40 M hypo would be required to react with the I_2 liberated by

- adding 0.04 moles of KI to 50 ml of 0.20 M CuSO_4 solution ?
 (a) 12.5 ml (b) 50 ml
 (c) 75 ml (d) 25 ml
176. The volume of 0.25M H_3PO_4 bwxwaaET RI BWYREkuaw 25 nk id 0.30 N $\text{Ca}(\text{OH})_2$ is
 (a) 8.3 ml (b) 20 ml
 (c) 40 ml (d) 50 ml
177. 500 ml of a 0.1N solution of AgNO_3 are mixed with 500 ml of a 0.1N solution of KCl . The concentration of nitrate ion in the resulting solution is
 (a) 0.05N (b) 0.1N
 (c) 0.01N (d) 0.2N
178. When the $\text{Cr}_2\text{O}_7^{2-}$ ion acts as oxidant in acidic aqueous solution, Cr^{3+} ion is formed. How many moles of Sn^{2+} ions to Sn^{4+} ions by 1 mole of $\text{Cr}_2\text{O}_7^{2-}$ ion ?
 (a) 2/3 (b) 3/2
 (c) 3 (d) 6
179. 25ml of a 0.1 M solution of a stable cation of a transition metal Z reacts exactly with 25 ml of 0.04M acidified KMnO_4 solution. Which of the following is mostly likely to represent the change in oxidation state correctly ?
 (a) $\text{Z}^+ \rightarrow \text{Z}^{2+}$ (b) $\text{Z}^{2+} \rightarrow \text{Z}^{3+}$
 (c) $\text{Z}^{3+} \rightarrow \text{Z}^{4+}$ (d) $\text{Z}^{2+} \rightarrow \text{Z}^{4+}$
180. Which one of the following is not used as primary standard ?
 (a) $\text{K}_2\text{Cr}_2\text{O}_7$ (b) KMnO_4
 (c) Mohr's salt (d) Oxalic acid
181. The number of moles of $\text{KHC}_2\text{O}_4 \cdot \text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ (M. W. =254) oxidised by 1 mole of KMnO_4 in acid solution is
 (a) 2/5 (b) 4/5
 (c) 5/4 (d) 5/2
182. What volume of 0.1N NaOH shall neutralise 2.54 g of tetra oxalate in Q181 ?
 (a) 300 ml (b) 150 ml
 (c) 450 ml (d) 1000 ml
183. Refer to Q 31, what volume of 0.1N KMnO_4 solution shall oxidise 2.54g of tetra oxalate ?
 (a) 400ml (b) 600 ml
 (c) 300 ml (d) 800 ml
184. 10 ml of N/2 HCl , 30 ml of N/10 HNO_3 , 75 ml of N/5 H_2SO_4 are mixed. The normality of resulting solution is
 (a) 0.4 N (b) 0.1 N
 (c) 0.5 N (d) 0.2N
185. 250 ml of 0.2 M H_2SO_4 are mixed with 250 ml of 0.1M $\text{Ba}(\text{OH})_2$, The normality of resulting solution is
 (a) 0.1 N (b) 0.2 N
 (c) 0.5 N (d) 0.4 N
186. 2g of the carbonate of a divalent metal are put in 50 ml of 1N HCl . Excess acid required 100 ml of N/10 NaOH the atomic weight of metal is
 (a) 12 (b) 24
 (c) 40 (d) 137
187. 1.40g of protein, when kjeldahlised evolved NH_3 which neturilised 16ml of 1N H_2SO_4 . The percentage of niturogen in the protein is
 (a) 8% (b) 16%
 (c) 14% (d) 3.2%
188. 1.923 g of $\text{KHC}_2\text{O}_4 \cdot \text{H}_2\text{C}_2\text{O}_4 \cdot x\text{H}_2\text{O}$ neutralised 22.7 ml of 1M NaOH using HPH as indicator. The value of x is
 (a) 2 (b) 3
 (c) 1 (d) 4
189. The ion x^{+n} is oxidised to XO_3^- by MnO_4^- going to Mn^{2+} in acid solution. Given that 2.60×10^{-3} moles of X^{+n} require 1.60×10^{-3} moles of MnO_4^- , what is the value of n ?
 (a) 0 (b) 1
 (c) 2 (d) 4
190. 0.5 g of bleaching powder are suspended in water and an excess of KI added. On acidifying and titrating with hypo, 50ml of N/10 hypo were required. The percentage available Cl_2 in the sample is
 (a) 35.5% (b) 30.5%
 (c) 43% (d) 48%
191. Which ion would be deflected most by the field in a spectrometer ?
 (a) $2\text{}^4\text{He}^{2+}$ (b) 7^{14}N^{2+}
 (c) 6^{14}C^{4+} (d) 1^3H^+
192. Atomic weights are fractional because
 (a) elements exist in the form of isotopes
 (b) different isotopes have different masses
 (c) different isotopes have different masses and different relative abundance

- (d) different isotopes have the same atomic number
193. How many germs – atoms of oxygen are there in 0.020 moles of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$?
 (a) 0.10 (b) 0.18
 (c) 0.08 (d) none
194. Loschmidt's number is
 (a) 6.0×10^{23} (b) 2.7×10^{19}
 (c) 1.67×10^{-24} (d) none
195. Which of the following has largest number of atoms?
 (a) 1 mole of hydrogen molecules
 (b) 1 mole of oxygen molecules
 (c) 1 mole of water molecules
 (d) 1 moles of ozone molecules
196. How many moles of H_2SO_4 would be contained in 230 ml of a 95% H_2SO_4 solution of density 1.84g/ml ?
 (a) 4.12 (b) 8.12
 (c) 2.06 (d) 1.03
197. A certain atom is 186/31-0 as heavy as an atom of carbon. What is its atomic weight ?
 (a) 72 (b) 36
 (c) 18 (d) 9
198. One pound is 454 g nearly. If the pound has been chosen instead of the gram to define a mole, how much larger would Avogadro's number be
 (a) $454 \times N$ (b) $n/454$
 (c) N (d) none
199. The number of electrons flowing in wire when one ampere is passed for one second is
 (a) 6×10^{18} (b) 6.0×10^{21}
 (c) 6.0×10^{23} (d) $1/965 \times 10^2$
200. If 9.03×10^{20} molecules of XeF_4 weigh 0.311 g, its M.W. is
 (a) 207 (b) 414
 (c) 103.5 (d) none
201. Element X (at.wt. =70) are to be mixed with element y (at. Wt. =120) in the ration of $1:10^{-7}$ by atoms. How many grams of y will be required for 35 g of X ?
 (a) 6.0×10^{-6} (b) 3.0×10^{-6}
 (c) 3.0×10^{23} (d) 1.25×10^{-6}
202. The energy associated with one Einstein corresponding to wave length of 8000\AA is (in Joules)
 (a) 1.5×10^5 (b) 1.5×10^{12}
 (c) 1.50×10^{19} (d) none
203. If a mole were to contain 1.0×10^{24} particles, what would be the mass of a single oxygen molecule ?
 (a) 1.0×10^{-24} (b) 3.2×10^{-23}
 (c) 1.6×10^{-23} (d) none
204. Measurements with a Geiger counter show that radium disintegrates at a rate of 8.15×10^{12} alpha particles per second during which 1.35×10^{-11} moles of helium are formed ? Avogadro's number is computed to be
 (a) $\frac{8.15 \times 10^{12}}{1.35 \times 10^{-11}}$
 (b) $\frac{1.35 \times 10^{-11}}{8.15 \times 10^{12}}$
 (c) $8.15 \times 10^{12} \times 1.35 \times 10^{-11}$
 (d) none
205. Ferrocene contains C = 64.4% ; H = 5.5% ; Fe =29.9% Its simple formula is
 (a) $\text{C}_5\text{H}_5\text{Fe}$ (b) $\text{C}_{10}\text{H}_{10}\text{Fe}$
 (c) $\text{C}_5\text{H}_8\text{Fe}$ (d) none
206. What weight of Cu in pounds can be obtained from one pound of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$?
 Cu =63.5
 (a) $\frac{63.5}{245.5}$ (b) $\frac{63.5}{245.5} \times 454$
 (c) $\frac{245.5}{63.5}$ (d) none
207. How many tons of $\text{Ca}_3(\text{PO}_4)_2$ (M.W. =310) must be treated with carbon and sand in an electric furnace to make one ton of phosphorous
 (a) 5 (b) 10
 (c) 7.5 (d) none
208. How many atoms of Fe are present in 5.0g of FeS_2 (Fool's gol(d) ?
 (a) 6×10^{23} (b) $\frac{6 \times 10^{23}}{120}$
 (c) $3 \times 6.0 \times 10^{23}$ (d) $\frac{5}{120} \times 6.0 \times 10^{23}$

209. How many kilograms of Glauber's salt $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$, could be obtained by heating NaCl with 1 kg of H_2SO_4 ?
 (a) 3 (b) 6
 (c) 9 (d) 1.5
210. Bantlett prepared a compound containing $\text{Xe} = 29.8\%$; $\text{Pt} = 44.3\%$; $\text{F}_2 = 25.9\%$ Its simplest formula is
 (a) $\text{XeF}_2 \cdot \text{PtF}_2$ (b) $\text{XeF}_4 \cdot \text{PtF}_2$
 (c) $[\text{PtF}_6]^- \text{Xe}^+$ (d) none
211. The oxidation states of most electronegative element in the products of the reaction, BaO_2 with dil. H_2SO_4 , are
 (a) 0 and -1 (b) -1 and -2
 (c) -2 and 0 (d) -2 and +1
212. The oxidation state of P in $\text{Ba}(\text{H}_2\text{PO}_2)_2$ is
 (a) +3 (b) +2
 (c) +1 (d) -1
213. The eq. Wt. of MnSO_4 is half the M.W. when it is converted to
 (a) Mn_2O_3 (b) MnO_2
 (c) MnO_4^- (d) MnO_4^{2-}
214. In the balanced equation
 $\text{I}_2 + \text{HNO}_3 \rightarrow \text{HIO}_3 + \text{NO} + \text{H}_2\text{O}$
 The co-efficient for HIO_3 is
 (a) 1 (b) 6
 (c) 3 (d) 10
215. Oxidation state of S in $\text{Na}_2\text{S}_4\text{O}_6$ is
 (a) +2 (b) +6
 (c) +4 (d) +2.5
216. In the reduction of Ferric salt by hydrazine
 $4\text{Fe}^{3+} + \text{N}_2\text{H}_4 \rightarrow 4\text{Fe}^{2+} + \text{N}_2 + 4\text{H}^+$
 the electron lost per mole of N_2H_4 is
 (a) 2 (b) 4
 (c) 6 (d) 0
217. What is the equivalent weight of NaBrO_3 in the reaction
 $\text{BrO}_3^- + 12\text{H}^+ + 10\text{e}^- \rightarrow \text{Br}_2 + 6\text{H}_2\text{O}$
 (a) $\frac{\text{M.W.}}{5}$ (b) $\frac{\text{M.W.}}{10}$
 (c) $\frac{\text{M.W.}}{6}$ (d) none
218. 1.325 g of a fertilizer, when kjeldahlised, evolved NH_3 which neutralised 51.36 ml of decinormal H_2SO_4 . The %N in the sample is
 (a) 10.8 (b) 5.136
 (c) 2.7 (d) 5.4
219. If % Fe in an ore is 36.82%, % Fe_3O_4 in the iron ore is
 (a) 49.1 (b) 18.42
 (c) 73.64 (d) none
220. 2.2257 g of As_2O_3 (M.W. =198) are dissolved in NaOH and the solution is made to 500 ml with water. This solution is used as a reducing agent in titration with I_2 solution. The normality of solution is
 (a) 0.0225 (b) 0.09
 (c) 0.045 (d) none
221. Suppose it takes 1.40×10^{-3} moles of an unknown oxidising agent to reduce 8.40×10^{-4} moles MnO_4^- to Mn^{2+} . How many electrons are lost per formula unit of the reducing agent ?
 (a) 2 (b) 5
 (c) 4 (d) 3
222. What is the eq. Wt. of $\text{KHC}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ as reducing agent and as acid is
 (a) $\frac{\text{M.W.}}{4}, \frac{\text{M.W.}}{3}$ (b) $\frac{\text{M.W.}}{3}, \frac{\text{M.W.}}{4}$
 (c) $\frac{\text{M.W.}}{2}, \frac{\text{M.W.}}{3}$ (d) $\frac{\text{M.W.}}{2}, \frac{\text{M.W.}}{1}$
223. A given volume of a solution of ferric sulphate when reduced by zinc required 30 ml of N/10 KMnO_4 for titration. When the same volume of the same solution of ferric sulphate was reduced by another metal, 45 ml of N/10 KMnO_4 were required ? what can be the metal ?
 (a) Ca (b) Al
 (c) Sn (d) Mg
224. Exactly 2g of a sample ore after conversion of all Fe^{3+} to Fe^{2+} , are titrated with $\text{K}_2\text{Cr}_2\text{O}_7$ in acid solution of 53.5 ml of 0.40 N $\text{K}_2\text{Cr}_2\text{O}_7$ are required, what is the percentage of iron in the ore ?
 (a) 59.5 (b) 29.75
 (c) 14.87 (d) none
225. Conc. H_2SO_4 has density of 1.84 g/ml and contains 98% of acid by weight . What volume of conc. Acid should be used to prepare 1000 liters of 0.5M H_2SO_4 ?
 (a) 54.34 liters (b) 27.17 liters
 (c) 13.58 liters (d) none

226. 1.578 g of $\text{Ba}(\text{OH})_2 \cdot x\text{H}_2\text{O}$ dissolved in water solution required 40 ml of N/4 HNO_3 for complete neutralisation. The value of x is
 (a) 2 (b) 4
 (c) 6 (d) 8
227. 0.5g of a sample of bleaching powder was suspended in water and an excess of KI added. On acidifying and titration with N/10 hyps, 50 ml of N/5 hypo solution were required. Ther percentage of Chlorine in the sample is
 (a) 35.5 (b) 7.5
 (c) 48 (d) none
228. The brown ring complex compound is formulated as
 $[\text{Fe}(\text{H}_2\text{O})_5\text{NO}]^+ \text{SO}_4^{2-}$
 The oxidation state of iron is
 (a) 1 (b) 2
 (c) 3 (d) 0
229. A 1.0 mole of C_3H_8
 (a) has a mass of 44g
 (b) contains 8.0 g of hydrogen
 (c) contains 6.0×10^{23} of C_3H_8
 (d) all of these
230. Which one of the following is the number of liters of 0.02 M KMnO_4 required to oxidise 0.1 mole of Vanadium(IV) under the conditions ?
 $\text{V}^{4+} + \text{MnO}_4^- + \text{H}^+ \rightarrow \text{V}^{5+} + \text{Mn}^{2+} + \text{H}_2\text{O}$
 (a) 0.1 (b) 0.5
 (c) 1.0 (d) 5.0
231. 0.90 g of a metal M dissolved in an acid form M^{3+} and liberated $1120 \text{ cm}^3 \text{ H}_2$ at S.T.P. The atomic weight of metal is closest to
 (a) 18 (b) 27
 (c) 54 (d) 36
232. NH_2OH reduces Fe^{3+} to Fe^{2+} in acid solution. If 2 moles of Fe^{3+} ion is reduced by 1 mole of hydroxy lamine , which of the following nitrogen compounds is formed in the reaction ?
 (a) NH_4^+ (b) N_2
 (c) N_2O (d) NO_2
233. If 27 g of Al (at. Wt. =27) are added to 1 litre of 3N CuSO_4 solution (Cu =64) the number of grams of copper displaced is
 (a) 32 (b) 64
 (c) 96 (d) 128
234. Equivalent weight of iron in Fe_2O_3
 (a) 28 (b) 18.67
 (c) 56 (d) 122.0
235. Commercial 20 volume H_2O_2 is solution with a percentage strength of
 (a) 30 (b) 3
 (c) 6 (d) 10
236. There is generally no oxidation-reduction reaction in
 (a) simple combination
 (b) single replacement
 (c) double replacement
 (d) simple decomposition
237. When NH_3 is passed over hot CuO , Cu is formed. This indicates that NH_3 is a
 (a) dehydrating agent (b) reducing agent
 (c) catalytic agent (d) nitrating agent
238. Bromide ions can reduce
 (a) iodine atoms (b) iodide ions
 (c) Chlorine atoms (d) Chloride ions
239. In the reaction
 $\text{Cr}_2\text{O}_7^{2-} + \text{H}^+ + \text{Br}^- \rightarrow 2\text{Cr}^{3+} + \text{Br}_2 + \text{H}_2\text{O}$
 THE REDUCING AGENT IS
 (a) Br_2 (b) Br^-
 (c) H^+ (d) $\text{Cr}_2\text{O}_7^{2-}$
240. The co-efficient of Cl^- in the balanced equation is
 $\text{MnO}_4^- + \text{H}^+ + \text{Cl}^- \rightarrow \text{Mn}^{2+} + \text{Cl}_2 + \text{H}_2\text{O}$
 (a) Cl_2 (b) Cl^-
 (c) H^+ (d) MnO_4^-