* SECTION - A [800]

1. 1 gram of sodium hydroxide was treated with $25\,\mathrm{mL}$ of $0.75\mathrm{MHCl}$ solution, the mass of sodium hydroxide left unreacted is equal to

   (A) $250\mathrm{mg}$ (B) 0 mg (C) $200\mathrm{mg}$ (D) $750\mathrm{mg}$

2. A compound X contains 32% of $A, 20\%$ of B and remaining percentage of C. Then, the empirical formula of X is :
   (Given atomic masses of $A = 64; B = 40; C = 32u$)

   (A) $\mathrm{ABC_3}$ (B) $\mathrm{AB_2C_2}$ (C) $\mathrm{ABC_4}$ (D) $\mathrm{A_2BC_2}$

3. The highest number of helium atoms is in

   (A) 4 u of helium (B) 4 g of helium

   (C) $2.271098\,\mathrm{L}$ of helium at STP (D) $4\,\mathrm{mol}$ of helium

4. The right option for the mass of CO_2 produced by heating $20g$ of 20% pure limestone is ..... g (Atomic mass of $Ca = 40$) $\left[CaCO_3 \xrightarrow{1200K} CaO + CO_2\right]$

   (A) 1.32 (B) 1.12 (C) 1.76 (D) 2.64

5. In one molal solution that contains 0.5 mole of a solute, there is

   (A) $500\,g$ of solvent (B) $100\,mL$ of solvent (C) $1000\,g$ of solvent (D) $500\,mL$ of solvent

6. What mass of $95\,\%$ pure $CaCO_3$ will be required to neutralise $50\,mL$ of $0.5\,M\,HCl$ solution according to the following reaction? (In g)
   $CaCO_{3(s)} + 2HCl_{(aq)} \rightarrow CaCl_{2(aq)} + CO_{2(g)} + 2H_2O_{(l)}$
   [Calculate upto second place of decimal point]

   (A) 1.32 (B) 3.65 (C) 9.50 (D) 1.25

7. An organic compound contains $78\,\%$ (by $wt.$) carbon and remaining percentage of hydrogen. The right option for the empirical formula of this compound is : [Atomic wt. of C is $12, \mathrm{H}$ is 1]

   (A) CH (B) $\mathrm{CH_2}$

   (C) $\mathrm{CH_3}$ (D) $\mathrm{CH_4}$

8. Which one of the following has maximum number of atoms?

   (A) $1g$ of $Li(s)$ [Atomic mass of $Li = 7$]

   (B) $1g$ of $Ag(s)$ [Atomic mass of $Ag = 108$]

   (C) $1g$ of $Mg(s)$ [Atomic mass of $Mg = 24$]

(D) $1g$ of $O_2(g)$ [Atomic mass of $O = 16$]

9. The density of $2\ \mathrm{M}$ aqueous solution of NaOH is $1.28\ \mathrm{g/cm^3}$. The molality of the solution is.....m [Given that molecular mass of $\mathrm{NaOH} = 40\ \mathrm{gmol^{-1}}$]

(A) 1.20 (B) 1.56 (C) 1.67 (D) 1.32

10. A mixture of $2.3\ \mathrm{g}$ formic acid and $4.5\ \mathrm{g}$ oxallic acid is treated with conc. $\mathrm{H_2SO_4}$. The evolved gaseous mixture is passed through KOH pellets. Weight of the remaining product at STP .....g

(A) 1.4 (B) 3 (C) 2.8 (D) 4.4

11. A hydrocarbon contains $85.7\%C$. If $42\,mg$ of the compound contains 3.01×10^{20} molecules, the molecular formula of the compound will be

(A) C_3H_6 (B) C_6H_{12} (C) $C_{12}H_{24}$ (D) C_2H_4

12. Suppose the elements X and Y combine to form two compounds XY_2 and X_3Y_2. When 0.1 mole of XY_2 weighs $10\,g$ and 0.05 mole of X_3Y_2 weighs $9\,g$, the atomic weights of X and Y are

(A) $40, 30$ (B) $60, 40$ (C) $20, 30$ (D) $30, 20$

13. What is the mass of the precipitate formed when $50\,mL$ of 16.9% solution of $AgNO_3$ is mixed with $50\,mL$ of 5.8% $NaCl$ solution ? ..... g $(Ag = 107.8, N = 14, O = 16, Na = 23, Cl = 35.5)$

(A) 3.5 (B) 7 (C) 14 (D) 28

14. If Avogadro number N_A, is changed from $6.022 \times 10^{23}\ mol^{-1}$ to $6.022 \times 10^{20}\ mol^{-1}$, this would change

(A) the mass of one mole of carbon

(B) the ratio of chemical species to each other in a balanced equation

(C) the ratio of elements to each other in a compound

(D) the definition of mass in units of grams.

15. A mixture of gases contains H_2 and O_2 gases in the ratio of $1:4\ (w/w)$. What is the molar ratio of the two gases in the mixture?

(A) $16:1$ (B) $2:1$ (C) $1:4$ (D) $4:1$

16. $1.0\,g$ of magnesium is burnt with $0.56\,g\ O_2$ in a closed vessel. Which reactant is left in excessand how much? (At. $wt.\ Mg = 24, O = 16$)

(A) Mg, $0.16\,g$ (B) O_2, $0.16\,g$

(C) Mg, $0.44\,g$ (D) O_2, $0.28\,g$

17. When 22.4 litres of $H_{2(g)}$ is mixed with 11.2 litres of $Cl_{2(g)}$, each at $S.T.P$, the moles of $HCl_{(g)}$ formed is equal to

(A) $1\ mol$ of $HCl_{(g)}$ (B) $2\ mol$ of $HCl_{(g)}$ (C) $0.5\ mol$ of $HCl_{(g)}$ (D) $1.5\ mol$ of $HCl_{(g)}$

18. In an experiment it showed that $10\,mL$ of $0.05\,M$ solution of chloride required $10\,mL$ of $0.1\,M$ solution of $AgNO_3$, which of the following will be the formula of the chloride (X stands for the symbol of the element other than chlorine)

(A) X_2Cl_2 (B) XCl_2 (C) XCl_4 (D) X_2Cl

19. 6.02×10^{20} molecules of urea are present in $100\,mL$ of its solution. The concentration of solution is.....M

(A) 0.001 (B) 0.1 (C) 0.02 (D) 0.01

20. The normality of $4\%\ (w/V)\ NaOH$ is

(A) 0.1 (B) 1 (C) 0.05 (D) 0.01

21. How much volume of $5\,M\ HNO_3$ is required to oxidise $16\,g\ Fe^{+2}$ if HNO_3 is converting into NO ..... ml

(A) 16 (B) 19.05 (C) 38.1 (D) 32

22. The number of ions present in $2\,L$ of a solution of $1.6\,M\ K_4[Fe(CN)_6]$ is

(A) 4.8×10^{22} (B) 4.8×10^{23}

(C) 9.6×10^{24} (D) 9.6×10^{22}

23. An aqueous solution of glucose is 10% in strength. The volume in which $1\,g-mole$ of it is dissolved will be L

(A) 18 (B) 9 (C) 0.9 (D) 1.8

24. The molality of $1\,M$ solution of $NaCl$ (specific gravity $1.0585\,g/ml$) is

(A) 1.0585 (B) 1 (C) 0.10 (D) 0.0585

25. How much volume of water is to be added to dilute $10\,ml$ of $10\,N\ HCl$ to make it decinormal? ..... ml

(A) 990 (B) 1010 (C) 100 (D) 1000

26. Which is the correct option for $0.1\,M, 500\,ml$ of $AgCl$?

(A) $0.05\,mole$ of $AgCl$ (B) $0.1\,mole$ of total ions

(C) $0.05\,N_A$ number of Cl^- ions (D) All of the above

27. $1\,gram$ equivalent of substance present in

(A) $1\,L$ of $0.5\,M\ H_2SO_4$ (B) $49\,gm$ of H_2SO_4

(C) $0.5\,mol$ of $H_2\ gas$ (D) All of the above

28. Volume of $0.6\ M\ NaOH$ required to neutralize $30\,cm^3$ of $0.4\ M\ HCl$ is ..... cm^3

(A) 30 (B) 20 (C) 50 (D) 45

29. The solution of sulphuric acid contains 80% by weight H_2SO_4. Specific gravity of this solution is 1.71. Its normality is about

(A) 18 (B) 27.9 (C) 1 (D) 10

30. $1.25\,g$ of a solid dibasic acid is completely neutralised by $25\,ml$ of 0.25 molar $Ba(OH)_2$ solution. Molecular mass of the acid is

(A) 100 (B) 150 (C) 120 (D) 200

31. What is the concentration of nitrate ions if equal volumes of $0.1\ M\ AgNO_3$ and $0.1\ M\ NaCl$ are mixed together.....M

(A) 0.1 (B) 0.2 (C) 0.05 (D) 0.25

32. The conversion of oxygen to ozone occurs to the extent of 15% only. The mass of ozone that can be prepared from $67.2\,L$ of oxygen at $1\,atm$ and $273\,K$ will be ..... gm

(A) 14.4 (B) 96

(C) 640 (D) 64

33. At $400\,K, 1\,mol$ of a hydrocarbon completely burned. It gives $132\,g$ of a gas along with $72\,g$ of water vapour then hydrocarbon may be

(A) CH_4 (B) C_3H_8 (C) C_2H_4 (D) C_4H_{10}

34. Consider the following data

Element	Atomic mass
A	12.01
B	35.5

A and B combine to form new substance X . If $4\,moles$ of B combine with $1\,mole$ of A to give $1\,mole$ of X, then weight of one mole of X is ..... g

(A) 154 (B) 74 (C) 47.5 (D) 166

35. For the reaction $2Al + 3MnO \xrightarrow{\Delta} Al_2O_3 + Mn;$ If $108\,g$ of Al and $213\,g$ of MnO are heated then which of the following is incorrect?

(A) Al is present in excess

(B) MnO is present as limiting reagent

(C) $54\,g$ of Al is required

(D) $159\,g$ of MnO is required

36. In the complete combustion of C_4H_{10} the number of oxygen moles required is

(A) $\frac{17}{2}O_2$ (B) $6O_2$ (C) $\frac{13}{2}O_2$ (D) $\frac{5}{2}O_2$

37. The mass of N_2F_4 produced by the reaction of $2.0\ mole$ of NH_3 and $8.0\ mole$ of F_2 is $0.5\ mole$. What is the per cent yield ?

$2NH_3 + 5F_2 \rightarrow N_2F_4 + 6HF$

(A) 79.0 (B) 71.2 (C) 84.6 (D) 50

38. Which statement is false for the balanced equation given below ?

$CS_2 + 3O_2 \rightarrow 2SO_2 + CO_2$

(A) One mole of CS_2 will produce one mole of CO_2

(B) The reaction of $16\,g$ of oxygen produces $7.33\,g$ of CO_2

(C) The reaction of one mole of O_2 will produce $2/3\,mole$ of SO_2

(D) Six molecules of oxygen requires three molecules of CS_2

39. $3O_2 + 2N_2 \rightarrow 2N_2O_3$
$9\,mol\ O_2$ and $14\,mol\ N_2$ here allowed to react. When $3\,mol\ O_2$ remains unreacted, till then how many moles of N_2O_3 would have been produced?

(A) 6 (B) 3 (C) 4 (D) 12

40. In the reaction $H_2 + O_2 \rightarrow H_2O$. If $6\,g$ of H_2 combines with $64\,g$ of O_2. Find mass of Excess reagent Left ? ..... g

(A) 32 (B) 48 (C) 16 (D) None

41. The mass of Mg_3N_2 produced if $48\,gm$ of Mg metal is reacted with $34\,gm\,NH_3$ gas is
$Mg + NH_3 \rightarrow Mg_3N_2 + H_2$

(A) $\frac{200}{3}\,gm$ (B) $\frac{100}{3}\,gm$ (C) $\frac{400}{3}\,gm$ (D) $\frac{150}{3}\,gm$

42. Volume of air required to completely burn 10 litres of C_2H_4 is ..... L (assume all volumes are measure at same temperature and pressure)

(A) 15 (B) 150 (C) 100 (D) 200

43. When $22.4\ litres$ of $H_2(g)$ is mixed with $11.2\ litres$ of $Cl_2(g)$, each at $S.T.P.$, the moles of $HCl(g)$ formed is equal to

(A) $1\ mol$ of $HCl\,(g)$ (B) $2\ mol$ of $HCl\,(g)$ (C) $0.5\ mol$ of $HCl\,(g)$ (D) $1.5\ mol$ of $HCl\,(g)$

44. Phosphine $[PH_3(g)]$ decomposes to produce vapours of phosphorus (P_4) and H_2 gas. What will be the change in volume when $100\,mL$ of phosphine is decomposed ? ..... mL

(A) $+50$ (B) 500 (C) $+75$ (D) -500

45. In alkaline condition $KMnO_4$, reacts as follows :
$2KMnO_4 + 2KOH \rightarrow 2K_2MnO_4 + H_2O + O$
Therefore its equivalent weight will be

(A) 31.5 (B) 52.7 (C) 72.0 (D) 158.0

46. In acidic medium potassium dichromate acts as an oxidant according to the equation, $Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$. What is the equivalent weight of $K_2Cr_2O_7$? (mol. Wt. $= M$)

(A) M (B) $M/2$ (C) $M/3$ (D) $M/6$

47. $56\,g$ of nitrogen and $8\,g$ hydrogen gas are heated in a closed vessel. At equilibrium $34\,g$ of ammonia are present. The equilibrium number of moles of

nitrogen, hydrogen and ammonia are respectively

(A) $1,2,2$

(B) $2,2,1$

(C) $1,1,2$

(D) $2,1,2$

48. $100\,g$ $CaCO_3$ reacts with 1 litre $1\,N$ HCl. On completion of reaction how much weight of CO_2 will be obtain ..... g

(A) 5.5 (B) 11 (C) 22 (D) 33

49. $Ca(OH)_2 + H_3PO_4 \rightarrow CaHPO_4 + 2H_2O$ the equivalent weight of H_3PO_4 in the above reaction is

(A) 21 (B) 27 (C) 38 (D) 49

50. If $1\frac{1}{2}$ moles of oxygen combine with Al to form Al_2O_3 the weight of Al used in the reaction is ..... g $(Al = 27)$

(A) 27 (B) 54 (C) 49.5 (D) 31

51. $2.76\,g$ of silver carbonate on being strongly heated yield a residue weighing ..... g

(A) 2.16 (B) 2.48 (C) 2.64 (D) 2.32

52. In a compound C,H,N atoms are present in $9:1:3.5$ by weight. Molecular weight of compound is 108 . Its molecular formula is

(A) $C_2H_6N_2$ (B) C_3H_4N (C) $C_6H_8N_2$ (D) $C_9H_{12}N_3$

53. In a compound the ratio of masses of H,C,O and N is $1:3:4:7$. The empirical formula is

(A) $HC_3O_4N_7$ (B) H_4CON_2 (C) $HC_4O_2N_2$ (D) None of these

54. Determine the empirical formula of Kelvar, used in making bullet proof vests, is $70.6\%\,C, 4.2\%\,H, 11.8\%\,N$ and $13.4\%\,O$

(A) $C_7H_5NO_2$ (B) $C_7H_5N_2O$ (C) C_7H_9NO (D) C_7H_5NO

55. A compound contains 69.5% oxygen and 30.5% nitrogen and its molecular weight is 92 . The formula of that compound is

(A) N_2O (B) NO_2 (C) N_2O_4 (D) N_2O_5

56. 3.0 molal $NaOH$ solution has a density of $1.110\ g/ml$. The molarity of the solution is :-

(A) 2.94 (B) 3.25 (C) 3.64 (D) 1.25

57. The simplest formula of a compound containing 50% of element X (atomic mass 10) and 50% of element Y (atomic mass 20) is

(A) XY (B) X_2Y (C) XY_3 (D) X_2Y_3

58. A hydrocarbon contains 86% carbon, $488\,ml$ of the hydrocarbon weight $1.68\,g$ at STP. Then the hydrocarbon is an

(A) Alkane (B) Alkene (C) Alkyne (D) Arene

59. The percentage of P_2O_5 in diammonium hydrogen phosphate $(NH_4)_2HPO_4$ is

(A) 23.48 (B) 46.96 (C) 53.78 (D) 714

60. In which of the following pairs of compounds the ratio of C, H and O is same

(A) Acetic acid and methyl alcohol (B) Glucose and acetic acid

(C) Fructose and sucrose (D) All of these

61. A compound $(60\,g)$ on analysis gave $C = 24\,g$, $H = 4\,g$, $O = 32\,g$. Its empirical formula is

(A) $C_2H_2O_2$ (B) C_2H_2O (C) CH_2O_2 (D) CH_2O

62. A $400\,mg$ iron capsule contains $100\,mg$ of ferrous fumarate, $(CHCOO)_2Fe$. The percentage of iron pasent in it is approximately ..... $\%$

(A) 33 (B) 25 (C) 14 (D) 8

63. The mass of carbon present in $0.5\,mole$ of $K_4[Fe(CN)_6]$ is ..... g

(A) 1.8 (B) 18 (C) 3.6 (D) 36

64. $N_2H_4 + IO_3^- + 2H^+ + Cl^- \rightarrow ICl + N_2 + 3H_2O$

The equivalent masses of N_2H_4 and KIO_3 respectively are

(A) 8 and 35.6 (B) 8 and 87

(C) 8 and 53.5 (D) 16 and 53.5

65. $74.5\,g$ of a metallic chloride contains $35.5\,g$ of chlorine. The equivalent mass of metal is

(A) 19.5 (B) 35.5 (C) 39 (D) 74.5

66. The equivalent weight of H_3PO_4 in following reaction is $H_3PO_4 + Ca(OH)_2 \rightarrow CaHPO_4 + 2H_2O$

(A) 98 (B) 49 (C) 32.66 (D) 40

67. The equivalent weight of H_3PO_4 in following reaction is $H_3PO_4 + Ca(OH)_2 \rightarrow CaHPO_4 + 2H_2O$

(A) 98 (B) 49 (C) 32.66 (D) 40

68. The precentage of Se in peroxidase enzyme is 0.5% by mass (atomic mass of $Se = 78.4\,amu$). Then, the minimum moleuclar mass of enzyme which contains not more than one Se atom is

(A) $1.568 \times 10^4\,amu$ (B) $1.568 \times 10^7\,amu$

(C) $1.568 \times 10^3\,amu$

(D) $1.568 \times 10^6\,amu$

69. At $NTP, 5.6\,litre$ of a gas weight $8\,gram$. The vapour density of gas is :-

(A) 32 (B) 40 (C) 16 (D) 8

70. Suppose two elements X and Y combine to form two compounds XY_2 and X_2Y_3. If 0.05 mole of XY_2 weighs $5\,g$ while 3.011×10^{23} molecules of X_2Y_3 weighs $85\,g$, then atomic masses of X and Y are respectively :

(A) $20, 30$ (B) $30, 40$ (C) $40, 30$ (D) $80, 60$

71. Equivalent weights of X_2Y and X_2Y_3 are 38 and 18 respectively. Find the atomic masses of X and Y:-

(A) $30, 8$ (B) $30, 16$ (C) $10, 16$ (D) None

72. Rearrange the following $(I\ to\ IV)$ in the order of increasing masses:

$(I) 0.5\ mole$ of O_3 $(II) 0.5\ gm$ atom of oxygen $(III) 3.011 \times 10^{23}$ molecules of O_2 $(IV) 5.6\ litre$ of CO_2 at STP

(A) $II < IV < III < I$ (B) $II < I < IV < III$

(C) $IV < II < III < I$ (D) $I < II < III < IV$

73. Isotope Relative abundance $(\%)$ Atomic mass (u)

12_C	98.8	12
13_C	1.18	13.1
14_C	0.02	14.1

From above data what is the molecular mass of CH_4 containing all isotopes of carbon but hydrogen on ^1_1H ..... u (Given that atomic mass of hydrogen $= 1.008$)

(A) 16.004 (B) 16.21 (C) 16.125 (D) 16.42

74. M is the molecular weight of $KMnO_4$. The equivalent weight of $KMnO_4$ when it is converted into K_2MnO_4 is

(A) M (B) $M/3$ (C) $M/5$ (D) $M/7$

75. The mass of $112\ cm^3$ of CH_4 gas at STP is ..... g

(A) 0.16 (B) 0.8 (C) 0.08 (D) 1.6

76. The volume occupied by $4.4\,g$ of CO_2 at STP is L

(A) 22.4 (B) 2.24 (C) 0.224 (D) 0.1

77. $12\,g$ of Mg (at. mass 24) on reacting completely with acid gives hydrogen gas, the volume of which at STP would be L

(A) 22.4 (B) 11.2 (C) 44.8 (D) 6.1

78. One gram of hydrogen is found to combine with $80\,g$ of bromine one gram of calcium valency $= 2$ combines with $4\,g$ of bromine the equivalent weight of calcium is

(A) 10 (B) 20 (C) 40 (D) 80

79. The number of gram atoms of oxygen present in 0.3 gram mole of $(COOH)_2.2H_2O$ is

(A) 0.6 (B) 1.8 (C) 1.2 (D) 3.6

80. The element whose a atom has mass of $10.86 \times 10^{-26}\ kg$ is

(A) Boron (B) Calcium (C) Silver (D) Zinc

81. Caffeine has a molecular weight of 194. If it contains 28.9% by mass of nitrogen, number of atoms of nitrogen in one molecule of caffeine is

(A) 4 (B) 6 (C) 2 (D) 3

82. Equivalent weight of crystalline oxalic acid is

(A) 30 (B) 63 (C) 53 (D) 45

83. The vapour density of a gas is 11.2. The volume occupied by $11.2\,g$ of the gas at STP will be.....L

(A) 11.2 (B) 22.4 (C) 1 (D) 44.8

84. One litre of a gas at STP weight $1.16\,g$ it can possible be

(A) C_2H_2 (B) CO (C) O_2 (D) CH_4

85. 7.5 grams of a gas occupy 5.8 litres of volume at STP the gas is

(A) NO (B) N_2O (C) CO (D) CO_2

86. $74.5\,g$ of a metallic chloride contain $35.5\,g$ of chlorine. The equivalent weight of the metal is

(A) 19.5 (B) 35.5 (C) 39 (D) 78

87. Sulphur forms the chlorides S_2Cl_2 and SCl_2. The equivalent mass of sulphur in SCl_2 is.....$g/mole$

(A) 8 (B) 16 (C) 64.8 (D) 32

88. 'A' sample of $[Cu(NH_3)_4]SO_4$ contains 2.4×10^{24} ammonia molecules. The moles of $[Cu(NH_3)_4]SO_4$ in given sample will be

(A) 6×10^{23} (B) 4 (C) 3 (D) 1

89. At STP the moles of oxygen in $2.8\,L$ of CO_2 gas is

(A) 1 (B) 0.5 (C) 0.25 (D) 0.125

90. Which of the following has minimum number of atoms

(A) $12\,g\,He$ (B) $1.8\,g\,water$

(C) $22\,g\,CO_2$ (D) $2.45\,g$ sulphuric acid

91. A sample of ammonium phosphate, $(NH_4)_3PO_4$, contains $6\,moles$ of hydrogen atoms. The number moles of oxygen atoms in the sample is

(A) 1 (B) 2 (C) 4 (D) 6

92. Number of atoms in $24\,g$ of He is ..... N_A

(A) 1 (B) 2 (C) 4 (D) 6

93. The number of moles of a gas in $1\,m^3$ of volume at NTP is

(A) 4.46 (B) 0.446 (C) 1.46 (D) 44.6

94. How many moles of $Mg_3[PO_4]_2$ will contain $0.50\,mole$ of oxygen atoms ?

(A) 6.025 (B) 0.625 (C) 0.0625 (D) 625

95. Which sample contains the largest number of atoms ?

(A) $1\,mg$ of C_4H_{10} (B) $1\,mg$ of N_2

(C) $1\,mg$ of Na (D) $1\,ml$ of H_2O

96. Which of the following contain maximum number of carbon atoms?

(A) $15\,gm$ ethane, C_2H_6 (B) $40.2\,gm$ sodium oxalate, $Na_2C_2O_4$

(C) $72\,gm$ glucose, $C_6H_{12}O_6$ (D) $35\,gm$ pentene, C_5H_{10}

97. Calculate the number of atoms of oxygen present in $176\,g$ of CO_2

(A) 2.408×10^{26} (B) 4.816×10^{23} (C) 1.204×10^{22} (D) 4.816×10^{24}

98. Which of the following has the smallest number of molecules

(A) $22.4 \times 10^3\,mL$ of $CO_2\,gas$ at STP

(B) $22\,g$ of $CO_2\,gas$

(C) $11.2\,L$ of $CO_2\,gas$ at STP

(D) $0.1\,mole$ of $CO_2\,gas$

99. $8\,g\,O_2$ has same number of atoms as that in

(A) $14g\,CO$ (B) $7g\,CO$ (C) $11g\,CO_2$ (D) $22g\,CO_2$

100. How many protons are present in $1.8\,g\,NH_4^+$ ..... N_A

(A) 1 (B) 1.2 (C) 1.1 (D) 11

101. The weight of a molecule of the compound $C_{60}H_{122}$ is

(A) $1.4 \times 10^{-21}\,g$ (B) $1.09 \times 10^{-21}\,g$

(C) $5.025 \times 10^{23}\,g$ (D) $16.023 \times 10^{23}\,g$

102. Find number of electrons present in $34\,g$ of $NH_3(g)$. .....N_A

(A) 2 (B) 1 (C) 20 (D) 10

103. The largest number of molecules is in

(A) $25g$ of CO_2 (B) $46g$ of C_2H_5OH (C) $36g$ of H_2O (D) $54g$ of N_2O_5

104. How many $H-$atoms are present in $0.046\,g$ of ethanol

(A) 6×10^{20} (B) 1.2×10^{21}

(C) 3×10^{21} (D) 3.6×10^{21}

105. The number of sodium atoms in 2 moles of sodium ferrocyanide is

(A) 12×10^{23} (B) 26×10^{23}

(C) 34×10^{23} (D) 48×10^{23}

106. $2\,g$ of oxygen contains number of atoms equal to that in

(A) $0.5\,g$ of hydrogen (B) $4\,g$ of sulphur (C) $7\,g$ of nitrogen (D) $2.3\,g$ of sodium

107. The number of moles of sodium oxide in $620\,g$ of it is ..... moles

(A) 1 (B) 10 (C) 18 (D) 100

108. The largest number of molecules is in

(A) $34\,g$ of water (B) $28\,g$ of CO_2

(C) $46\,g$ of CH_3OH (D) $54\,g$ of N_2O_5

109. The number of molecules in $4.25\,g$ of ammonia are

(A) 0.5×10^{23} (B) 1.5×10^{23} (C) 3.5×10^{23} (D) 1.8×10^{32}

110. Volume of a gas at STP is $1.12 \times 10^{-7}\,cc$. Calculate the number of molecules in it

(A) 3.01×10^{20} (B) 3.01×10^{12}

(C) 3.01×10^{23} (D) 3.01×10^{24}

111. How many mole of helium gas occupy $22.4\,L$ at 0^oC at 1 atm. pressure

(A) 0.11 (B) 0.9 (C) 1 (D) 1.11

112. Which of the following has least mass

(A) $2\,g$ atom of nitrogen (B) 3×10^{23} atoms of C

(C) 1 mole of S (D) $7.0\,g$ of Ag

113. Among the following pairs of compounds, the one that illustrates the law of multiple proportions is

(A) NH_3 and NCl_3 (B) H_2S and SO_2

(C) CuO and Cu_2O (D) CS_2 and $FeSO_4$

114. If the density of a solution is $3.12\,gm/ml$, the mass of $15\,ml$ solution in significant figures is ..... gm

(A) 4.7 (B) 4680×10^{-3} (C) 4.680 (D) 46.80

115. Which of the following units represents the largest amount of energy

(A) Electron volt (B) Erg (C) Joule (D) Calorie

116. A sample was weighted using two different balances. The result's were (i) $3.929\,g$ (ii) $4.0\,g$. How would the weight of the sample be reported.....g

(A) 3.929 (B) 3 (C) 3.9 (D) 3.93

117. Given $P = 0.0030\,m$, $Q = 2.40\,m$, $R = 3000\,m$, Significant figures in P, Q and R are respectively

(A) $2,3,4$ (B) $2,3,1$ (C) $4,2,1$ (D) $4,2,3$

118. Molarity (M) of an aqueous solution containing $\mathrm{x}g$ of anhyd. $\mathrm{CuSO_4}$ in $500\ \mathrm{mL}$ solution at $32^{\circ}\mathrm{C}$ is $2 \times 10^{-1}\mathrm{M}$. Its molality will be. . . . . $\times 10^{-3}\ \mathrm{m}$ (nearest integer). [Given density of the solution $= 1.25\ \mathrm{g/mL}$.]

(A) 160 (B) 164 (C) 167 (D) 168

119. A solution is prepared by adding 1 mole ethyl alcohol in 9 mole water. The mass percent of solute in the solution is. . . . . (Integer Answer)
(Given : Molar mass in $\mathrm{gmol^{-1}}$ Ethyl alcohol : 46,
water : 18)

(A) 20 (B) 22 (C) 30 (D) 35

120. Molality of an aqueous solution of urea is $4.44\ \mathrm{m}$. Mole fraction of urea in solution is $x \times 10^{-5}$. Value of x is. . . . . (integer answer)

(A) 70 (B) 73 (C) 74 (D) 80

121. Molality (m) of $3\mathrm{M}$ aqueous solution of NaCl is:
(Given : Density of solution $= 1.25\ \mathrm{g\ mL^{-1}}$, Molar mass in $\mathrm{gmol^{-1}} : \mathrm{Na} - 23, \mathrm{Cl} - 35.5$)

(A) $2.90\ \mathrm{m}$ (B) $2.79\ \mathrm{m}$ (C) $1.90\ \mathrm{m}$ (D) $3.85\ \mathrm{m}$

122. The density of ' x ' M solution (' x ' molar) of NaOH is $1.12\ \mathrm{g\ mL^{-1}}$. while in molality, the concentration of the solution is $3\ \mathrm{m}$ ($3\mathrm{molal}$). Then x is
(Given : Molar mass of NaOH is $40\ \mathrm{g/mol}$)

(A) 3.5 (B) 3.0 (C) 3.8 (D) 2.8

123. The Molarity (M) of an aqueous solution containing $5.85\ \mathrm{g}$ of NaCl in $500\ \mathrm{mL}$ water is :
(Given : Molar Mass $\mathrm{Na} : 23$ and $\mathrm{Cl} : 35.5\mathrm{gmol^{-1}}$)

(A) 20 (B) 0.2 (C) 2 (D) 4

124. The molarity of $1\ \mathrm{L}$ orthophosphoric acid $(\mathrm{H_3PO_4})$ having 70% purity by weight (specific gravity $1.54\ \mathrm{g\ cm^{-3}}$) is_____ M.
(Molar mass of $\mathrm{H_3PO_4} = 98\ \mathrm{g\ mol^{-1}}$)

(A) 9 (B) 10 (C) 11 (D) 12

125. A solution of $\mathrm{H_2SO_4}$ is $31.4\%\mathrm{H_2SO_4}$ by mass and has a density of $1.25\ \mathrm{g/mL}$. The molarity of the $\mathrm{H_2SO_4}$ solution is _____ M (nearest integer)[Given molar mass of $\mathrm{H_2SO_4} = 98\ \mathrm{g\ mol^{-1}}$]

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

126. Volume of $3\ \mathrm{M\ NaOH}$ (formula weight $40\ \mathrm{g\ mol^{-1}}$) which can be prepared from $84\ \mathrm{g}$ ofNaOH is_____ $\times 10^{-1}\ \mathrm{dm^3}$.

(A) 8 (B) 7 (C) 9 (D) 10

127. The quantity which changes with temperature is:

(A) Molarity (B) Mass percentage

(C) Molality (D) Mole fraction

128. Combustion of glucose $(C_6H_{12}O_6)$ produces CO_2 and water. The amount of oxygen (in g) required for the complete combustion of $900\ g$ of glucose is:

[Molar mass of glucose in $gmol^{-1} = 180$]

(A) 480 (B) 960 (C) 800 (D) 32

129. The number of moles of methane required to produce $11\ gCO_2(g)$ after complete combustion is:

(Given molar mass of methane in $gmol^{-1}$: 16)

(A) 0.75 (B) 0.25 (C) 0.35 (D) 0.5

130. $10\ mL$ of gaseous hydrocarbon on combustion gives $40\ mL$ of $CO_2(g)$ and $50\ mL$ of water vapour. Total number of carbon and hydrogen atoms in the hydrocarbon is.....

(A) 20 (B) 14 (C) 30 (D) 13

131. Consider the following reaction:

$3PbCl_2 + 2(NH_4)_3PO_4 \rightarrow Pb_3(PO_4)_2 + 6NH_4Cl$

If $72mmol$ of $PbCl_2$ is mixed with $50mmol$ of $(NH_4)_3PO_4$, then amount of $Pb_3(PO_4)_2$ formed is..... mmol. (nearest integer)

(A) 24 (B) 22 (C) 25 (D) 30

132. $2\,L$ of $0.2\,M\,H_2SO_4$ is reacted with $2\,L$ of $0.1\,M\ NaOH$ solution, the molarity of the resulting product Na_2SO_4 in the solution is millimolar. (Nearest integer).

(A) 24 (B) 23 (C) 22 (D) 25

133. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R)

Assertion (A) : At $10^{\circ}C$, the density of a $5\,M$ solution of KCl [atomic masses of K and Cl are 39 and $35.5\,g\,mol^{-1}$]. The solution is cooled to $-21^{\circ}C$. The molality of the solution will remain unchanged.

Reason (R) : The molality of a solution does not change with temperature as mass remains unaffected with temperature.

In the light of the above statements, choose the correct answer from the options given below

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

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

(C) (A) is true but (R) is false

(D) (A) is false but (R) is true

134. $4.5\,g$ of compound $A(MW=90)$ was used to make $250\,mL$ of its aqueous solution. The molarity of the solution in M is $x\times10^{-1}$. The value of x is ..... (Rounded off to the nearest integer)

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

135. Complete combustion of $1.80\,g$ of an oxygen containing compound $(C_xH_yO_2)$ gave $2.64\,g$ of CO_2 and $1.08\,g$ of H_2O. The percentage of oxygen in the organic compound is

(A) 51.63 (B) 63.53 (C) 53.33 (D) 50.33

136. The number of significant figures in 50000.020×10^{-3} is ..... .

(A) 5 (B) 8 (C) 2 (D) 10

137. If the concentration of glucose $(\mathrm{C_6H_{12}O_6})$ in blood is $0.72\ \mathrm{g\ L^{-1}}$, the molarity of glucose in blood is ..... $\times10^{-3}\mathrm{M}$. (Nearest integer)
(Given: Atomic mass of $\mathrm{C=12, H=1, O=16u}$)

(A) 4 (B) 7 (C) 9 (D) 11

138. The unit of the van der Waals gas equation parameter $'a'$ in $\left(\mathrm{P}+\frac{\mathrm{an^2}}{\mathrm{V^2}}\right)(\mathrm{V}-\mathrm{nb})=\mathrm{nRT}$ is :

(A) $\mathrm{kg\,m\,s^{-2}}$ (B) $\mathrm{dm^3\ mol^{-1}}$ (C) $\mathrm{kg\,m\,s^{-1}}$ (D) $\mathrm{atm\,dm^6\ mol^{-2}}$

139. $250\ \mathrm{mL}$ of $0.5\,\mathrm{M\,NaOH}$ was added to $500\ \mathrm{mL}$ of $1\,\mathrm{M\,HCl}$ The number of unreacted HCl molecules in the solution after complete reaction is ..... $\times10^{21}$. (Nearest integer) $\left(\mathrm{N_A}=6.022\times10^{23}\right)$

(A) 226 (B) 235 (C) 462 (D) 521

140. The molarity of the solution prepared by dissolving $6.3\ \mathrm{g}$ of oxalic acid $(\mathrm{H_2C_2O_4\cdot2H_2O})$ in $250\ \mathrm{mL}$ of water in $\mathrm{mol\,L^{-1}}$ is $\mathrm{x}\times10^{-2}$. The value of x is ..... . (Nearest integer)
[Atomic mass : $\mathrm{H:1.0, C:12.0, O:16.0}$]

(A) 0.20 (B) 2 (C) 200 (D) 20

141. The mole fraction of a solute in a 100 molal aqueous solution ..... $\times10^{-2}$
(Round off to the Nearest Integer).
[Given : Atomic masses : $H:1.0\,u, O:16.0\,u$]

(A) 64 (B) 52 (C) 44 (D) 62

142. The formula of a gaseous hydrocarbon which requires 6 times of its own volume of O_2 for complete oxidation and produces 4 times its own volume of CO_2 is C_xH_y. The value of y is ..... .

(A) 13 (B) 10 (C) 8 (D) 5

143. Complete combustion of $3\,g$ of ethane gives $x \times 10^{22}$ molecules of water. The value of x is ..... (Round off to the Nearest Integer). [Use: $N_A = 6.023 \times 10^{23}$; Atomic masses in u $C : 12.0; O : 16.0; H : 1.0$]

(A) 24 (B) 22 (C) 20 (D) 18

144. The number of atoms in $8\ \mathrm{g}$ of sodium is $\mathrm{x} \times 10^{23}$. The value of x is ..... .(Nearest integer)

[Given : $\mathrm{N_A} = 6.02 \times 10^{23}\ \mathrm{mol^{-1}}$, Atomic mass of $\mathrm{Na} = 23.0\,\mathrm{u}$]

(A) 6 (B) 8 (C) 2 (D) 34

145. The ratio of number of water molecules in Mohr's salt and potash alum is .... $\times 10^{-1}$

(A) 5 (B) 3 (C) 4 (D) 1

146. A solution of two components containing n_1 moles of the 1^{st} component and n_2 moles of the 2^{nd} component is prepared. M_1 and M_2 are the molecular weights of component 1 and 2 respectively. If d is the density of the solution in $g\,mL^{-1}$, C_2 is the molarity and x_2 is the mole fraction of the 2^{nd} component, then C_2 can be expressed as

(A) $C_2 = \frac{1000x_2}{M_1 + x_2(M_2 - M_1)}$ (B) $C_2 = \frac{dx_2}{M_2 + x_2(M_2 - M_1)}$

(C) $C_2 = \frac{dx_1}{M_2 + x_2(M_2 - M_1)}$ (D) $C_2 = \frac{1000dx_2}{M_1 + x_2(M_2 - M_1)}$

147. 6.023×10^{22} molecules are present in $10\,g$ of a substance $'x'$. The molarity of a solution containing $5\,g$ of substance $'x'$ in $2\,L$ solution is..... $\times 10^{-3}$

(A) 20 (B) 25 (C) 22 (D) 18

148. A $20.0\,mL$ solution containing $0.2\,g$ impure H_2O_2 reacts completely with $0.316\,g$ of $KMnO_4$ in acid solution. The purity of H_2O_2(in %) is..... (mol. wt. of $H_2O_2 = 34$; mol. wt. of $KMnO_4 = 158$)

(A) 90 (B) 95 (C) 85 (D) 80

149. The ratio of the mass percentages of $'C$ & H' and $'C$ & O' of a saturated acyclic organic compound $'X'$ are $4:1$ and $3:4$ respectively. Then, the moles of oxygen gas required for complete combustion of two moles of organic compound $'X'$ is

(A) 8 (B) 10 (C) 12 (D) 5

150. The volume (in mL) of $0.125\ \mathrm{M}\ \mathrm{AgNO_3}$ required to quantitatively precipitate chloride ions in $0.3\ \mathrm{g}$ of $[\mathrm{Co(NH_3)_6}]\mathrm{Cl_3}$ is ${}^{\mathrm{M}}[\mathrm{Co(NH_3)_6}]\mathrm{Cl_3} = 267.46\ \mathrm{g/mol}$ $\mathrm{M_{AgNO_3}} = 169.87\ \mathrm{g/mol}$

(A) 32.06 (B) 38.25 (C) 26.92 (D) 24.34

151. $A+2B+3C \rightleftharpoons AB_2C_3$ Reaction of $6.0\,g$ of A, 6.0×10^{23} atoms of B, and $0.036\,mol$ of C yields $4.8\,g$ of compound AB_2C_3 . If the atomic mass of A and C are 60 and $80\,amu$, respectively, the atomic mass of B is ..... amu (Avogadro no . $=6\times10^{23}$)

(A) 50 (B) 60 (C) 70 (D) 40

152. The treatment of an aqueous solution of $3.74g$ of $Cu(NO_3)_2$ with excess KI results in a brown solution along with the formation of a precipitate. Passing H_2S through this brown solution gives another precipitate X. The amount of X (in g) is. . . . . [Given : Atomic mass of $H=1, N=14, O=16, S=32, K=39, Cu=63, I=127$]

(A) 0.20 (B) 0.25 (C) 0.30 (D) 0.32

153. To check the principle of multiple proportions, a series of pure binary compounds (P_mQ_n) were analyzed and their composition is tabulated below. The correct option(s) is(are)

Compound	Weight % of P	Weight % of Q
1	50	50
2	44.4	55.6
3	40	60

(A) If empirical formula of compound 3 is P_3Q_4, then the empirical formula of compound 2 is P_3Q_5.

(B) If empirical formula of compound 3 is P_3Q_2 and atomic weight of element P is 20 , then the atomic weight of Q is 45 .

(C) If empirical formula of compound 2 is PQ, then the empirical formula of the compound 1 is P_5Q_4.

(D) If atomic weight of P and Q are 70 and 35 , respectively, then the empirical formula of compound 1 is P_2Q.

(A) A,B (B) A,C (C) A,D (D) B,C

154. The mole fraction of urea in an aqueous urea solution containing $900g$ of water is 0.05 . If the density of the solution is $1.2gcm^{-3}$, the molarity of urea solution is. . . . . (Given data : Molar masses of urea and water are $60gmol^{-1}$ and $18gmol^{-1}$, respectively)

(A) 2.50 (B) 2.55 (C) 2.60 (D) 2.98

155. In neutral or faintly alkaline solution, 8 moles of permanganate anion quantitatively oxidize thiosulphate anions to produce X moles of a sulphur containing product. The magnitude of X is

(A) 5 (B) 6 (C) 8 (D) 9

156. Given that the abundances of isotopes $^{54}Fe, ^{56}Fe$ and ^{57}Fe are $5\%, 90\%$ and 5%, respectively, the atomic mass of Fe is

(A) 55.85 (B) 55.95 (C) 55.75 (D) 56.05

157. An aqueous solution of $6.3\ g$ of oxalic acid dihydrate is made up of to $250\ ml$. The volume of $0.1\ N\ NaOH$ required to completely neutralise $10\ ml$ of this solution is ..... ml

(A) 40 (B) 20 (C) 10 (D) 4

158. $1.12\,ml$ of a gas is produced at STP by the action of $4.12\,mg$ of alcohol, with methyl magnesium iodide. The molecular mass of alcohol is

(A) 16 (B) 41.2 (C) 82.4 (D) 156

159. The weight of 1×10^{22} molecules of $CuSO_4.5H_2O$ is ..... g

(A) 41.59 (B) 415.9 (C) 4.159 (D) None of these

160. One calorie is equal to

(A) $0.4184\ Joule$ (B) $4.184\ Joule$ (C) $41.84\ Joule$ (D) $418.4\ \ Joule$

161. The number of significant figures in 6.02×10^{23} is

(A) 23 (B) 3 (C) 4 (D) 26

162. $81.4\,g$ sample of ethyl alcohol contains $0.002\,g$ of water. The amount of pure ethyl alcohol to the proper number of significant figures is

(A) $81.4\,g$ (B) $71.40\,g$ (C) $81.398\,g$ (D) $81\,g$

163. Find the moleculer weight of a solid containing 20% by mole of S atoms, whose $400\,g$ provides just sufficient S atoms to produce enough H_2SO_4 to neutralise $100\ g\ NaOH$

(A) 96 (B) 64 (C) 128 (D) 32

164. The moles of H^+ from H_2O alone in a $1\,l$, $\sqrt{5} \times 10^{-7}\ M\ HCL$ solution at $25\,^oC$ is ($\sqrt{5}$ = 2.23)

(A) 10^{-7} (B) 6.85×10^{-8} (C) 3.85×10^{-8} (D) 10^{-8}

165. The number of ions present in $2.0\ L$ of a solution of $0.8\ M\ K_4[Fe(CN)_6]$ is

(A) 4.8×10^{22} (B) 4.8×10^{24} (C) 9.6×10^{24} (D) 9.6×10^{22}

166. $4.3\,gm$ of an alkane is burnt in sufficient oxygen. The CO_2 formed reacts completely with $300\,ml$, $2\,N\ NaOH$ solution producing Na_2CO_3. The alkane should be

(A) C_3H_8 (B) $C_{12}H_{26}$ (C) C_6H_{14} (D) C_2H_6

167. The density of a solution containing 13% by mass of H_2SO_4 is $1.09\,gm/ml$. The molarity and normality of the solution are respectively :-

(A) $14.45\,M, 28.90\,N$ (B) $1.445\,M, 2.89\,N$ (C) $1.09\,M, 2.18\,N$ (D) None

168. A solution containing Na_2CO_3 and $NaOH$ requires $300\,ml$ of $0.1\,N$ HCl using phenolpthalein as an indicator. Methyl orange is then added to the above titrated solution when a further $25\,ml$ of $0.2\,N$ HCl is required. The amount of $NaOH$ present in solution is ..... g $(NaOH = 40, Na_2CO_3 = 106)$

(A) 0.6 (B) 1 (C) 1.5 (D) 2

169. $150\,g\,CaCO_3$ sample was taken. On its complete decomposition $56\,g\,CaO$ is produced. The % purity of sample is ..... %

(A) 33.33 (B) 37.33 (C) 50 (D) 75

170. One and a half mole of oxygen combine with aluminium to form Al_2O_3, then the weight of aluminium metal used in this reaction is ..... gms (Atomic weight of $Al = 27$)

(A) 27 (B) 81 (C) 108 (D) 54

171. $20\,mL$ of CO_2 gas are passed over excess of red hot coke. the volume of CO evolved is ..... mL

$CO_{2(g)} + C_{(s)} \rightarrow 2CO_{(g)}$

(A) 10 (B) 20 (C) 30 (D) 40

172. $18\,L$ mixture of N_2 and H_2 gives maximum $6\,L$ of NH_3 at same temperature and pressure then what will be ratio of N_2 and H_2 initially taken ?

(A) $1:5$ (B) $1:1$ (C) $1:2$ (D) (A) and (B) both

173. $5\,mole$ of A, $6\,moles$ of B and excess amount of C are mixed to produce a final product D, according to the reaction

$A + 2B \rightarrow I$

$I + C \rightarrow B + D$

What is the maximum moles of D can be produced assuming that the products formed can also be reused in the reactions ? ..... moles

(A) 3 (B) 4.5 (C) 5 (D) 6

174. If $0.5\,mol$ of $CaBr_2$ is mixed with $0.2\,mol$ of K_3PO_4 then the maximum number of moles of $Ca_3(PO_4)_2$ obtained will be

(A) 0.5 (B) 0.2 (C) 0.7 (D) 0.1

175. When $1\,L$ of CO_2 is heated with graphite, the volume of the gases collected is $1.8\,L$. What will be the number of moles of CO produced at STP ?

(A) 0.0357 (B) 0.0714 (C) 0.0803 (D) 14

176. What volume of CO_2 at STP is obtained by thermal decomposition of $20\,g\,KHCO_3$ ..... L [Atomic weight of $K = 39$]

$2KHCO_3(s) \rightarrow K_2O(s) + 2CO_2(g) + H_2O(g)$

(A) 44.8 (B) 4.48 (C) 22.4

(D) None of the above

177. $5\,L$ of a gaseous mixture of ethane and propane are burnt to produce total $11\,L$ of CO_2 . Volume percent of C_2H_6 in the initial mixture is

(A) 10 (B) 20 (C) 80 (D) 60

178. How many moles of lead (II) chloride will be formed from a reaction between $6.5\,g$ of PbO and $3.2\,g\,HCl$?

(A) 0.011 (B) 0.029 (C) 0.044 (D) 0.333

179. An element, X has the following isotopic composition :

^{200}X : 90% ^{199}X : 8.0% ^{202}X : 2.0%

The weighted average atomic mass of the naturally occurring element X is closest to.....amu

(A) 201 (B) 202 (C) 199 (D) 200

180. Which of the following has maximum number of molecules

(A) $16\,gm$ of O_2 (B) $16\,gm$ of NO_2 (C) $7\,gm$ of N_2 (D) $2\,gm$ of H_2

181. Molarity of liquid HCl with density equal to $1.17\,g/cc$ is

(A) 36.5 (B) 18.25 (C) 32.05 (D) 4.65

182. Haemoglobin contains 0.33% of iron by weight. The molecular weight of haemoglobin is approximately 67200. The number of iron atoms (At. wt. of $Fe = 56$) present in one molecule of haemoglobin is

(A) 6 (B) 1 (C) 4 (D) 2

183. The total number of valence electrons in $4.2\,gm$ of N_3^- ion is ..... $\mathrm{N_A}$ (N_A is the Avogadro's number)

(A) 1.6 (B) 3.2 (C) 2.1 (D) 4.2

184. Calculate .....M Molarity of a $63\%\ w/w\,HNO_3$ solution if density is $5.4\ g/mL$

(A) 54 (B) 12 (C) 10 (D) 8

185. Arrange the following in the order of increasing mass (atomic mass: $O = 16, Cu = 63, N = 14$)

I. one atom of oxygen

II. one atom of nitrogen

III. 1×10^{-10} mole of oxygen

IV. 1×10^{-10} mole of copper

(A) $II < I < III < IV$ (B) $I < II < III < IV$

(C) $III < II < IV < I$ (D) $IV < II < III < I$

186. Sulphur forms the chlorides S_2Cl_2 and SCl_2. The equivalent mass of sulphur in SCl_2 is.....g/mol

(A) 8 (B) 16 (C) 64.8 (D) 32

187. Which has the maximum number of molecules among the following ?

(A) $44\,g\,CO_2$ (B) $48\,g\,O_3$ (C) $8\,g\,H_2$ (D) $64\,g\,SO_2$

188. An aqueous solution of $6.3\,g$ of oxalic acid dihydrate is made up to $250\,ml$. The volume of $0.1\,N\,NaOH$ required to completely neutralise $10\,ml$ of this solution is.....ml

(A) 20 (B) 40 (C) 10 (D) 4

189. For preparing $0.1\,N$ solution of a compound from its impure sample of which the percentage purity is known, the weight of the substance required will be

(A) less than the theoretical weight

(B) more than the theoretical weight

(C) same as the theoretical weight

(D) none of these

190. Assertion : The normality of $0.3\,M$ aqueous solution of H_3PO_3 is equal to $0.6\,N$.

Reason : Equivalent weight of $H_3PO_3 = \frac{Molecular\ weight\ of\ H_3PO_3}{3}$

(A) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

(B) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

(C) If the Assertion is correct but Reason is incorrect.

(D) If both the Assertion and Reason are incorrect.

191. Calculate the millimoles of SeO_3^{2-} in solution on the basis of following data : $70\,ml$ of $\frac{M}{60}$ solution of $KBrO_3$ was added to SeO_3^{2-} solution. The bromine evolved was removed by boiling and excess of $KBrO_3$ was back titrated with $12.5\,mL$ of $\frac{M}{25}$ solution of $NaAsO_2$. The reactions are given below.

$I.\ SeO_3^{2-} + BrO_3^- + H^+ \rightarrow SeO_4^{2-} + Br_2 + H_2O$

$II.\ BrO_3^- + AsO_2^- + H_2O \rightarrow Br^- + AsO_4^{3-} + H^+$

(A) 1.6×10^{-3} (B) 1.25 (C) 2.5×10^{-3} (D) None of these

192. A compound possesses 8% sulphur by mass. The least molecular mass is

(A) 200 (B) 400 (C) 155 (D) 355

193. The maximum amount of $BaSO_4$ precipitated on mixing equal volumes of $BaCl_2$ $(0.5\ M)$ with H_2SO_4 $(1\ M)$ will correspond to .....M

(A) 0.5 (B) 1 (C) 1.5 (D) 2

194. Normality of $2\,M$ sulphuric acid is

(A) $2N$ (B) $4N$ (C) $\frac{N}{2}$ (D) $\frac{N}{4}$

195. An aqueous solution of oxalic acid dihydrate contains its $6.3\,g$ in $250\,ml$. The volume of $0.1\,N\,NaOH$ required to completely neutralize $10\,ml$ of this solution ..... ml

(A) 4 (B) 20 (C) 2 (D) 40

196. Density of a $2.05\,M$ solution of acetic acid in water is $1.02\,g/mL$. The molality of the solution is ..... mol kg^{-1}

(A) 2.28 (B) 0.44 (C) 1.14 (D) 3.28

197. How many moles of magnesium phosphate, $Mg_3(PO_4)_2$ will contain 0.25 mole of oxygen atoms ?

(A) 1.25×10^{-2} (B) 2.5×10^{-2} (C) 0.02 (D) 3.125×10^{-2}

198. If we consider that $1/6$, in place of $1/12$, mass of carbon atom is taken to be the relative atomic mass unit, the mass of one mole of a substance will

(A) Decrease twice

(B) Increase two fold

(C) Remain unchanged

(D) Be a function of the molecular mass of the substance

199. $16.25\,g$ metal chloride is obtained on complete conversion of $8\,g$ metal oxide into metal chloride then what will be the equivalent weight of metal

(A) 18.66 (B) 37.32 (C) 9.33 (D) 2.91

200. Which of the following is Loschmidt number

(A) 6×10^{23} (B) 2.69×10^{19} (C) 3×10^{23} (D) None of these

----- Life is like riding a bicycle. To keep your balance, you must keep moving -----