PRE-MEDICAL

PHYSICAL CHEMISTRY

ENTHUSIAST | LEADER | ACHIEVER

EXERCISE

Some Basic concept of chemistry

ENGLISH MEDIUM

EXERCISE-I (Conceptual Questions) — Build Up Your Understanding

QUESTIONS BASED ON MOLES

1. The number of atoms present in 16 g of oxygen is
(1) $6.02 \times 10^{11.5}$ (2) 3.01×10^{23}
(3) $3.01 \times 10^{11.5}$ (4) 6.02×10^{23}
MC0001

2. The number of atoms in 4.25 g of NH_3 is approx:-
(1) 1×10^{23} (2) 1.5×10^{23}
(3) 2×10^{23} (4) 6×10^{23}
MC0002

3. Which of the following contains maximum number of oxygen atoms ?
(1) 1 g of O
(2) 1 g of O_2
(3) 1 g of O_3
(4) all have the same number of atoms
MC0003

4. The number of atoms present in 0.5 g atom of nitrogen is same as the atoms in –
(1) 12 g of C (2) 32 g of S
(3) 8 g of oxygen (4) 24 g of Mg
MC0004

5. Which of the following contains maximum number of atoms ?
(1) 4 g of H_2 (2) 16 g of O_2
(3) 28 g of N_2 (4) 18 g of H_2O
MC0005

6. Number of neutrons present in 1.7 g of ammonia is -
(1) N_A (2) $(N_A/10) \times 4$
(3) $(N_A/10) \times 7$ (4) $N_A \times 10 \times 7$
MC0006

7. 5.6 L of oxygen at STP contains -
(1) 6.02×10^{23} atoms
(2) 3.01×10^{23} atoms
(3) 1.505×10^{23} atoms
(4) 0.7525×10^{23} atoms
MC0007

8. Number of oxygen atoms in 8 g of ozone is -
(1) 6.02×10^{23} (2) $\frac{6.02 \times 10^{23}}{2}$
(3) $\frac{6.02 \times 10^{23}}{3}$ (4) $\frac{6.02 \times 10^{23}}{6}$
MC0008

9. Sum of number of protons, electrons and neutrons in 12g of $^{12}_{6}C$ is :-
(1) 1.8 (2) 12.044×10^{23}
(3) 1.084×10^{25} (4) 10.84×10^{23}
MC0010

10. The weight of one atom of Uranium is 238 amu. Its actual weight is .... g.
(1) 1.43×10^{26} (2) 3.94×10^{-22}
(3) 6.99×10^{-23} (4) 1.53×10^{-22}
MC0011

11. The actual weight of a molecule of water is -
(1) 18 g
(2) 2.99×10^{-23} g
(3) both (1) & (2) are correct
(4) 1.66×10^{-24} g
MC0012

12. What is the mass of a molecule of CH_4 :–
(1) 16 g (2) 26.6×10^{22} g
(3) 2.66×10^{-23} g (4) 16 N_A g
MC0013

13. Which of the following has the highest mass ?
(1) 1 g atom of C
(2) 1/2 mole of CH_4
(3) 10 mL of water
(4) 3.011×10^{23} atoms of oxygen
MC0014

14. Which of the following contains the least number of molecules ?
(1) 4.4 g CO_2 (2) 3.4 g NH_3
(3) 1.6 g CH_4 (4) 3.2 g SO_2
MC0015

15. The number of molecule in 4.25 g of NH_3 is -
(1) 1.505×10^{23} (2) 3.01×10^{23}
(3) 6.02×10^{23} (4) None of these
MC0016

16. Elements A and B form two compounds B_2A_3 and B_2A. 0.05 moles of B_2A_3 weight 9.0 g and 0.10 mole of B_2A weight 10 g. Calculate the atomic weight of A and B :-
(1) 20 and 30 (2) 30 and 40
(3) 40 and 30 (4) 30 and 20
MC0017

17. 5.6 L of oxygen at NTP is equivalent to –

(1) 1 mol (2) 1/2 mol

(3) 1/4 mol (4) 1/8 mol

MC0018

18. 4.4 g of an unknown gas occupies 2.24 L of volume at STP. The gas may be :-

(1) N_2O (2) CO

(3) CO_2 (4) 1 & 3 both

MC0019

19. Which contains least number of molecules :–

(1) 1 g CO_2 (2) 1 g N_2

(3) 1 g O_2 (4) 1 g H_2

MC0020

20. If V mL of the vapours of substance at NTP weight W g. Then molecular weight of substance is:-

(1) (W/V) × 22400 (2) $\frac{V}{W} \times 22.4$

(3) (W - V) × 22400 (4) $\frac{W \times 1}{V \times 22400}$

MC0021

21. If 3.01×10^{20} molecules are removed from 98 mg of H_2SO_4, then the number of moles of H_2SO_4 left are :–

(1) 0.1×10^{-3} (2) 0.5×10^{-3}

(3) 1.66×10^{-3} (4) 9.95×10^{-2}

MC0022

22. A gas is found to have the formula $(CO)_x$. It's VD is 70. The value of x must be:-

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

MC0023

23. Vapour density of gas is 11.2. Volume occupied by 2.4 g of this at STP will be -

(1) 11.2 L (2) 2.24 L (3) 22.4 L (4) 2.4 L

MC0024

24. The volume of a gas in discharge tube is 1.12×10^{-7} mL at STP. Then the number of molecule of gas in the tube is -

(1) 3.01×10^4 (2) 3.01×10^{15}

(3) 3.01×10^{12} (4) 3.01×10^{16}

MC0025

25. The number of electron in 3.1 mg NO_3^- is ($N_A = 6 \times 10^{23}$)

(1) 32 (2) 1.6×10^{-3}

(3) 9.6×10^{20} (4) 9.6×10^{23}

MC0189

26. Given that one mole of N_2 at NTP occupies 22.4 L the density of N_2 is -

(1) 1.25 g L^{-1} (2) 0.80 g L^{-1}

(3) 2.5 g L^{-1} (4) 1.60 g L^{-1}

MC0029

27. The number of carbon atoms present in a signature, if a signature written by carbon pencil, weighing 1.2×10^{-3} g is

(1) 12.04×10^{20} (2) 6.02×10^{19}

(3) 3.01×10^{19} (4) 6.02×10^{20}

MC0190

QUESTIONS BASED ON PERCENTAGE, EMPIRICAL FORMULA & MOLECULAR FORMULA

28. A compound of X and Y has equal mass of them. If their atomic weights are 30 and 20 respectively. Molecular formula of the compound is :-

(1) X_2Y_2 (2) X_3Y_3 (3) X_2Y_3 (4) X_3Y_2

MC0031

29. An oxide of sulphur contains 50% of sulphur in it. Its empirical formula is -

(1) SO_2 (2) SO_3

(3) SO (4) S_2O

MC0032

30. A hydrocarbon contains 80% of carbon, then the hydrocarbon is -

(1) CH_4 (2) C_2H_4

(3) C_2H_6 (4) C_2H_2

MC0033

31. Empirical formula of glucose is -

(1) $C_6H_{12}O_6$ (2) $C_3H_6O_3$

(3) $C_2H_4O_2$ (4) CH_2O

MC0034

32. An oxide of metal M has 40% by mass of oxygen. Metal M has atomic mass of 24. The empirical formula of the oxide is :-

(1) M_2O (2) M_2O_3 (3) MO (4) M_3O_4

MC0035

33. A compound contains 38.8% C, 16.0% H and 45.2% N. The formula of the compound would be

(1) CH_3NH_2 (2) CH_3CN

(3) C_2H_5CN (4) $CH_2(NH)_2$

MC0036

34. The simplest formula of a compound containing 50%(w/w) of element X(at wt. = 10) and 50% of element Y(at wt. = 20) is:-

(1) XY (2) X_2Y (3) XY_2 (4) X_3Y

MC0037

35. Which of the following compound has same empirical formula as that of glucose:-

(1) CH_3CHO (2) CH_3COOH

(3) CH_3OH (4) C_2H_6

MC0038

36. 2.2 g of a compound of phosphorous and sulphur has 1.24 g of 'P' in it. Its empirical formula is -

(1) P_2S_3 (2) P_3S_2

(3) P_3S_4 (4) P_4S_3

MC0040

37. On analysis, a certain compound was found to contain iodine and oxygen in the mass ratio of 254:80. The formula of the compound is :

(At mass I = 127, O = 16)

(1) IO (2) I_2O

(3) I_5O_2 (4) I_2O_5

MC0041

38. The number of atoms of Cr and O are 4.8×10^{10} and 9.6×10^{10} respectively. Its empirical formula is –

(1) Cr_2O_3 (2) CrO_2

(3) Cr_2O_4 (4) CrO_5

MC0042

39. Insulin contains 3.4% sulphur by mass. The minimum molecular weight of insulin is :

(1) 941.176 (2) 944

(3) 945.27 (4) None

MC0043

40. Caffine has a molecular weight of 194. It contains 28.9% by mass of nitrogen Number of atoms of nitrogen in one molecule of it is :-

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

MC0045

QUESTIONS BASED ON STOICHIOMETRY

41. An organic compound contains carbon, hydrogen and oxygen. Its elemental analysis gives 38.71% of C and 9.67% of H. The empirical formula of the compound would be :-

(1) CHO (2) CH_4O

(3) CH_3O (4) CH_2O

MC0132

42. The amount of water (g) produced by combustion of 286 g of propane is

(1) 168 g (2) 200 g

(3) 468 g (4) 693 g

MC0191

43. In a gaseous reaction of the type

$aA + bB \longrightarrow cC + dD$,

which statement is wrong ?

(1) a litre of A combines with b litre of B to give C and D

(2) a mole of A combines with b moles of B to give C and D

(3) a g of A combines with b g of B to give C and D

(4) a molecules of A combines with b molecules of B to give C and D

MC0046

44. Assuming that petrol is octane (C_8H_{18}) and has density 0.8 g mL^{-1}. 1.425 L of petrol on complete combustion will consume.

(1) 50 mole of O_2

(2) 100 mole of O_2

(3) 125 mole of O_2

(4) 200 mole ofO_2

MC0047

45. In a given reaction, 9 g of Al will react with

$$2Al + \frac{3}{2} O_2 \rightarrow Al_2O_3$$

(1) 6 g O_2 (2) 8 g O_2

(3) 9 g O_2 (4) 4 g O_2

MC0048

46. The equation :

$2Al_{(s)} + \frac{3}{2} O_2(g) \rightarrow Al_2O_{3(s)}$ shows that :-

(1) 2 mol of Al reacts with $\frac{3}{2}$ mol of O_2 to produce $\frac{7}{2}$ mol of Al_2O_3

(2) 2 g of Al reacts with $\frac{3}{2}$ g of O_2 to produce one mol of Al_2O_3

(3) 2 g of Al reacts with $\frac{3}{2}$ L of O_2 to produce 1 mol of Al_2O_3

(4) 2 mol of Al reacts with $\frac{3}{2}$ mol of O_2 to produce 1 mol of Al_2O_3

MC0049

47. 1 L of CO_2 is passed over hot coke. When the volume of reaction mixture becomes 1.4 L, the composition of reaction mixture is–

(1) 0.6 L CO

(2) 0.8 L CO_2

(3) 0.6 L CO_2 and 0.8 L CO

(4) None

MC0050

48. 26 cc of CO_2 are passed over red hot coke. The volume of CO evolved is :–

(1) 15 cc (2) 10 cc

(3) 32 cc (4) 52 cc

MC0051

49. If 1/2 mol of oxygen combine with Aluminium to form Al_2O_3 then weight of Aluminium metal used in the reaction is (Al= 27) –

(1) 27 g (2) 18 g

(3) 54 g (4) 40.5 g

MC0052

50. If 0.5 mol of $BaCl_2$ is mixed with 0.2 mol of Na_3PO_4, the maximum number of moles of $Ba_3(PO_4)_2$ that can be formed is -

$3BaCl_2 + 2Na_3PO_4 \rightarrow Ba_3(PO_4)_2 + 6NaCl$

(1) 0.7 (2) 0.5

(3) 0.3 (4) 0.1

MC0054

51. If 8 mL of uncombined O_2 remain after exploding O_2 with 4 mL of hydrogen, the number of mL of O_2 originally were -

(1) 12 (2) 2

(3) 10 (4) 4

MC0055

52. 4 g of hydrogen are ignited with 4 g of oxygen. The weight of water formed is -

(1) 0.5 g (2) 3.5 g

(3) 4.5 g (4) 2.5 g

MC0056

53. For the reaction $A + 2B \longrightarrow C$,

5 mol of A and 8 mol of B will produce

(1) 5 mole of C

(2) 4 mole of C

(3) 8 mole of C

(4) 13 mole of C

MC0057

54. If 1.6 g of SO_2 and 1.5×10^{22} molecules of H_2S are mixed and allowed to remain in contact in a closed vessel until the reaction

$2H_2S + SO_2 \longrightarrow 3S + 2H_2O$,

proceeds to completion. Which of the following statement is true ?

(1) Only 'S' and 'H_2O' remain in the reaction vessel.

(2) 'H_2S' will remain in excess

(3) 'SO_2' will remain in excess

(4) None

MC0058

55. 12 L of H_2 and 11.2 L of Cl_2 are mixed and exploded. The composition by volume of mixture is–

(1) 24 L of HCl (g)

(2) 0.8 L Cl_2 and 20.8 L HCl (g)

(3) 0.8 L H_2 and 22.4 L HCl (g)

(4) 22.4 L HCl (g)

MC0059

56. 10 mL of gaseous hydrocarbon on combustion give 40 mL of CO_2(g) and 50 mL of H_2O (vap.). The hydrocarbon is -

(1) C_4H_5 (2) C_8H_{10}

(3) C_4H_8 (4) C_4H_{10}

MC0060

QUESTIONS BASED ON EQUIIVALENT WEIGHTS

57. Molecular weight of tribasic acid is W. Its equivalent weight will be :

(1) $\frac{W}{2}$ (2) $\frac{W}{3}$

(3) W (4) 3W

MC0062

58. A, E, M and n are the atomic weight, equivalent weight, molecular weight and valency of an element. The correct relation is :

(1) $A = E \times n$ (2) $A = \frac{M}{E}$

(3) $A = \frac{M}{n}$ (4) $M = A \times n$

MC0063

59. Sulphur forms two chlorides S_2Cl_2 and SCl_2. The equivalent mass of sulphur in SCl_2 is 16. The equivalent weight of sulphur in S_2Cl_2 is -

(1) 8 (2) 16 (3) 32 (4) 64

MC0064

60. If equivalent weight of S in SO_2 is 8 then equivalent weight of S in SO_3 is -

(1) $\frac{8\times2}{3}$ (2) $\frac{8\times3}{2}$

(3) $8\times2\times3$ (4) $\frac{2\times3}{8}$

MC0065

61. Which property of an element is not variable :

(1) Valency (2) Atomic weight
(3) Equivalent weight (4) None

MC0066

62. One g equivalent of a substance is present in -

(1) 0.25 mol of O_2 (2) 0.5 mol of O_2
(3) 1.00 mol of O_2 (4) 8.00 mol of O_2

MC0067

63. 0.45 g of acid (molecular wt. = 90) was exactly neutralised by 20 mL of 0.5 N NaOH. Basicity of the acid is -

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

MC0069

64. 0.5 g of a base was completely neutralised by 100 mL of 0.2 N acid. Equivalent weight of the base is

(1) 50 (2) 100 (3) 25 (4) 125

MC0070

65. 0.126 g of an acid requires 20 mL of 0.1 N NaOH for complete neutralisation. Equivalent weight of the acid is –

(1) 45 (2) 53 (3) 40 (4) 63

MC0071

66. 2g of a base whose equivalent weight is 40 reacts with 3 g of an acid. The equivalent weight of the acid is :

(1) 40 (2) 60
(3) 10 (4) 80

MC0072

67. Equivalent weight of a divalent metal is 24. The volume of hydrogen liberated at STP by 12 g of the same metal when added to excess of an acid solution is -

(1) 2.8 litres (2) 5.6 litres
(3) 11.2 litres (4) 22.4 litres

MC0073

68. 0.84 g of a metal carbonate reacts exactly with 40 mL of N/2 H_2SO_4. The equivalent weight of the metal carbonate is -

(1) 84 (2) 64
(3) 42 (4) 32

MC0074

69. 1.0 g of a metal combines with 8.89 g of Bromine. Equivalent weight of the metal is nearly :
(at.wt. of Br = 80)

(1) 8 (2) 9
(3) 10 (4) 7

MC0075

70. 0.84 g of metal hydride contains 0.04 g of hydrogen. The equivalent wt. of the metal is .....

(1) 80 (2) 40 (3) 20 (4) 60

MC0077

71. When an element forms an oxide in which oxygen is 20% of the oxide by mass, the equivalent mass of the element will be –

(1) 32 (2) 40

(3) 60 (4) 128

MC0079

72. 2.8 g of iron displaces 3.2 g of copper from a solution of copper sulphate. If the equivalent mass of iron is 28, then equivalent mass of copper will be –

(1) 16 (2) 32

(3) 48 (4) 64

MC0082

73. If m_1 g of a metal A displaces m_2 g of another metal B from its salt solution and if their equivalent weight are E_2 and E_1 respectively then the equivalent weight of A can be expressed by:-

(1) $\frac{m_1}{m_2} \times E_2$ (2) $\frac{m_2}{m_1} \times E_2$

(3) $\frac{m_1}{m_2} \times E_1$ (4) $\frac{m_2}{m_1} \times E_1$

MC0084

74. If 2.4 g of a metal displaces 1.12 L hydrogen at normal temperature and pressure. Equivalent weight of metal would be:-

(1) 12 (2) 24

(3) 1.2×11.2 (4) $1.2 \div 11.2$

MC0086

75. 45 g of acid of molecular weight 90 neutralised by 200 mL of 5 N caustic potash. The basicity of the acid is :-

(1) 1 (2) 2

(3) 3 (4) None

MC0087

76. The weights of two elements which combine with one another are in the ratio of their :–

(1) Atomic weight (2) Molecular weight

(3) Equivalent weight (4) None

MC0088

77. The oxide of a metal has 32% oxygen. Its equivalent weight would be:-

(1) 34 (2) 32 (3) 17 (4) 16

MC0089

78. 1.6 g of Ca and 2.60 g of Zn when treated with an acid in excess separately, produced the same amount of hydrogen. If the equivalent weight of Zn is 32.6, what is the equivalent weight of Ca:-

(1) 10 (2) 20

(3) 40 (4) 5

MC0090

79. 74.5 g of a metallic chloride contains 35.5 g of chlorine. The equivalent mass of the metal is –

(1) 19.5 (2) 35.5

(3) 39.0 (4) 78.0

MC0091

QUESTIONS BASED ON CALCULATION OF ATOMIC WEIGHTS AND MOLECULAR WEIGHTS

80. The equivalent weight of a metal is 4. If metal chloride has a vapour density of 59.25. Then the valency of metal is –

(1) 4 (2) 3

(3) 2 (4) 1

MC0092

81. Specific heat of a solid element is 0.1 Cal g^{-1} $°C^{-1}$ and its equivalent weight is 31.8. Its exact atomic weight is -

(1) 31.8 (2) 63.6

(3) 318 (4) 95.4

MC0094

82. The specific heat of an element is 0.214 Cal g^{-1} $°C^{-1}$. The approximate atomic weight is -

(1) 0.6 (2) 12

(3) 30 (4) 65

MC0095

83. A metal M forms a sulphate which is isomorphous with $MgSO_4.7H_2O$. If 0.6538 g of metal M displaced 2.16 g of silver from silver nitrate solution, then the atomic weight of the metal M is

(1) 32.61 (2) 56.82

(3) 65.38 (4) 74.58

MC0096

84. The carbonate of a metal is isomorphous with $MgCO_3$ and contains 6.091% of carbon. Atomic weight of the metal is nearly -

(1) 48 (2) 68.5

(3) 137 (4) 120

MC0097

85. 71 g of chlorine combines with a metal giving 111 g of its chloride. The chloride is isomorphous with $MgCl_2.6H_2O$. The atomic mass of the metal is:-
(1) 20 (2) 30 (3) 40 (4) 69
MC0098

86. The atomic weight of a metal (M) is 27 and its equivalent weight is 9, the formula of its chloride will be :-
(1) MCl (2) MCl_2
(3) M_3Cl (4) MCl_3
MC0099

87. The chloride of a metal contains 71% chlorine by weight. If vapour density of metal chloride is 50, the atomic weight of the metal will be :-
(1) 29 (2) 58 (3) 35.5 (4) 71
MC0100

88. The specific heat of a metal M is 0.25 Cal $g^{-1}℃^{-1}$. Its equivalent weight is 12. What is its correct atomic weight :–
(1) 25.6 (2) 36 (3) 24 (4) 12
MC0101

89. The density of air at STP is 0.001293 g ml^{-1}. Its vapour density is –
(1) 143 (2) 14.3 (3) 1.43 (4) 0.143
MC0102

90. Relative density of a volatile substance with respect to CH_4 is 4. Its molecular weight would be –
(1) 8 (2) 32 (3) 64 (4) 128
MC0103

91. Vapour density of a gas is 16. The ratio of specific heat at constant pressure to specific heat at constant volume is 1.4, then its atomic weight is -
(1) 8 (2) 16 (3) 24 (4) 32
MC0104

92. The weight of substance that displaces 22.4 L air at NTP is :
(1) Mol. wt. (2) At. wt.
(3) Eq. wt. (4) All
MC0105

93. 0.39 g of a liquid on vapourisation gave 112 mL of vapour at STP. Its molecular weight is -
(1) 39 (2) 18.5 (3) 78 (4) 112
MC0106

94. In Victor Mayer's method, 0.2 g of a volatile compound on volatilisation gave 56 mL of vapour at STP. Its molecular weight is -
(1) 40 (2) 60 (3) 80 (4) 120
MC0107

95. 510 mg of a liquid on vapourisation in Victor Mayer's apparatus displaces 67.2 cc of dry air (at NTP). The molecular weight of liquid is -
(1) 130 (2) 17 (3) 1700 (4) 170
MC0108

96. 5 L of gas at STP weighs 6.25 g. What is its gram molecular weight ?
(1) 1.25 (2) 14 (3) 28 (4) 56
MC0109

97. 0.44 g of a colourless oxide of nitrogen occupies 224 mL at STP. The compound is -
(1) N_2O (2) NO (3) N_2O_4 (4) NO_2
MC0110

98. One litre of a certain gas weighs 1.16 g at STP. The gas may be -
(1) C_2H_2 (2) CO (3) O_2 (4) NH_3
MC0111

99. Equivalent weight of bivalent metal is 32.7. Molecular weight of its chloride is :–
(1) 68.2 (2) 103.7 (3) 136.4 (4) 166.3
MC0112

100. The oxide of an element possess the molecular formula M_2O_3. If the equivalent mass of the metal is 9, the molecular mass of the oxide will be –
(1) 27 (2) 75 (3) 102 (4) 18
MC0113

QUESTIONS BASED ON LAWS OF CHEMICAL COMBINATION

101. The law of multiple proportion was proposed by :
(1) Lavoisier (2) Dalton
(3) Proust (4) Gaylussac
MC0114

102. Which one of the following pairs of compound illustrate the law of multiple proportions ?
(1) H_2O, Na_2O (2) MgO, Na_2O
(3) Na_2O, BaO (4) $SnCl_2$, $SnCl_4$
MC0115

103. In the reaction $N_2 + 3H_2 \longrightarrow 2\ NH_3$, ratio by volume of N_2, H_2 and NH_3 is 1 : 3 : 2. This illustrates law of -

(1) Definite proportion

(2) Multiple proportion

(3) Law of conservation of mass

(4) Gaseous volumes

MC0116

104. Different proportions of oxygen in the various oxides of nitrogen prove the law of -

(1) Equivalent proportion

(2) Multiple proportion

(3) Constant proportion

(4) Conservation of matter

MC0117

105. Oxygen combines with two isotopes of carbon ^{12}C and ^{14}C to form two sample of carbon dioxide. The data illustrates -

(1) Law of conservation of mass

(2) Law of multiple proportions

(3) Law of gaseous volume

(4) None of these

MC0118

106. The law of conservation of mass holds good for all of the following except -

(1) All chemical reactions

(2) Nuclear reactions

(3) Endothermic reactions

(4) Exothermic reactions

MC0119

107. Number of molecules in 100 mL of each of O_2, NH_3 and CO_2 at STP are –

(1) in the order $CO_2 < O_2 < NH_3$

(2) in the order $NH_3 < O_2 < CO_2$

(3) the same

(4) $NH_3 = CO_2 < O_2$

MC0120

108. The empirical formula of an organic compound containing carbon and hydrogen is CH_2. The mass of one litre of this organic gas is exactly equal to that of one litre of N_2 at same temperature and pressure. Therefore, the molecular formula of the organic gas is –

(1) C_2H_4 (2) C_3H_6

(3) C_6H_{12} (4) C_4H_8

MC0121

109. Four one litre flasks are seperately filled with the gases hydrogen, helium, oxygen and ozone at same room temperature and pressure. The ratio of total number of atoms of these gases present in the different flasks would be -

(1) 1 : 1 : 1 : 1 (2) 1 : 2 : 2 : 3

(3) 2 : 1 : 2 : 3 (4) 2 : 1 : 3 : 2

MC0122

110. A container of volume V, contains 0.28 g of N_2 gas. If same volume of an unknown gas under similar condition of temperature and pressure weighs 0.44 g, the molecular mass of the gas is

(1) 22 (2) 44 (3) 66 (4) 88

MC0123

111. When 100 g of ethylene polymerizes to polyethylene according to equation

$nCH_2 = CH_2 \rightarrow -(- CH_2 - CH_2 -)_n-$. The weight of polyethylene produced will be:-

(1) $\frac{n}{2}$ g (2) 100 g

(3) $\frac{100}{n}$ g (4) 100n g

MC0125

112. A chemical equation is balanced according to the law of –

(1) Multiple proportion

(2) Constant composition

(3) Gaseous volume

(4) Conservation of mass

MC0127

113. Two flasks A & B of equal capacity of volume contain NH_3 and SO_2 gas respectively under similar conditions. Which flask has more number of moles:-

(1) A

(2) B

(3) Both have same moles

(4) None

MC0128

EXERCISE-I (Conceptual Questions) ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	4	4	4	3	1	3	2	2	3	2	2	3	1	4	1
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	3	3	4	1	1	2	3	4	3	3	1	2	3	1	3
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	4	3	1	2	2	4	4	2	1	3	3	3	3	3	2
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	4	3	4	2	4	3	3	2	3	3	4	2	1	3	1
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	2	1	2	3	4	2	2	3	2	3	1	2	3	2	2
Que.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ans.	3	3	2	3	2	2	3	3	3	3	4	1	3	2	3
Que.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
Ans.	2	1	3	3	4	3	1	1	3	3	2	4	4	2	4
Que.	106	107	108	109	110	111	112	113							
Ans.	2	3	1	3	2	2	4	3							

EXERCISE-II (Previous Year Questions) AIPMT/NEET

AIPMT 2009

1. 10 g of hydrogen and 64 g of oxygen were filled in a steel vessel and exploded. Amount of water produced in this reaction will be :-
(1) 1 mol (2) 2 mol
(3) 3 mol (4) 4 mol

MC0133

AIPMT 2010

2. The number of atoms in 0.1 mol of a triatomic gas is :- ($N_A = 6.02 \times 10^{23}$ mol^{-1})
(1) 1.800×10^{22} (2) 6.026×10^{22}
(3) 1.806×10^{23} (4) 3.600×10^{23}

MC0134

AIPMT Mains 2011

3. Which has the maximum number of molecules among the following ?
(1) 64 g SO_2 (2) 44 g CO_2
(3) 48 g O_3 (4) 8 g H_2

MC0135

NEET UG 2013

4. An excess of $AgNO_3$ is added to 100 mL of a 0.01 M solution of dichlorotetraaquachromium(III) chloride. The number of moles of AgCl precipitated would be :-
(1) 0.01 (2) 0.001 (3) 0.002 (4) 0.003

MC0136

AIPMT 2014

5. Equal masses of H_2,O_2 and methane have been taken in a container of volume V at temeprature 27°C at identical conditions. The ratio of the volumes of gases H_2 : O_2 : CH_4 would be :
(1) 8 : 16 : 1 (2) 16 : 8 : 1
(3) 16 : 1 : 2 (4) 8 : 1 : 2

MC0137

6. When 22.4 L of H_2(g) is mixed with 11.2 L of Cl_2(g) at S.T.P., the moles of HCl(g) formed is equal to:-
(1) 1 mol of HCl (g) (2) 2 mol of HCl (g)
(3) 0.5 mol of HCl (g) (4) 1.5 mol of HCl (g)

MC0138

7. 1.0 g of magnesium is burnt with 0.56 g O_2 in a closed vessel. Which reactant is left in excess and by how much ?
(At. wt. Mg = 24 ; O = 16)
(1) Mg, 0.16 g (2) O_2, 0.16 g
(3) Mg, 0.44 g (4) O_2, 0.28 g

MC0139

AIPMT 2015

8. 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 ?
(1) 4 : 1 (2) 16 : 1 (3) 2 : 1 (4) 1 : 4

MC0140

Re-AIPMT 2015

9. The number of water molecules is maximum in :-
(1) 18 g of water
(2) 18 mol of water
(3) 18 molecules of water
(4) 1.8 g of water

MC0141

10. If avogadro number N_A, is changed from 6.022×10^{23} mol^{-1} to 6.022×10^{20} mol^{-1}, this would change :
(1) the ratio of chemical species to each other in a balanced equation
(2) the ratio of elements to each other in a compound
(3) the definition of mass in units of grams
(4) the mass of one mole of carbon

MC0142

11. 20.0 g of a magnesium carbonate sample decomposes on heating to give carbon dioxide and 8.0 g magnesium oxide. What will be the percentage purity of magnesium carbonate in the sample ?
(Atomic weight of Mg = 24)
(1) 60 (2) 84 (3) 75 (4) 96

MC0143

NEET-II 2016

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
(1) 20, 30 (2) 30, 20
(3) 40, 30 (4) 60, 40

MC0144

NEET(UG) 2018

13. A mixture of 2.3 g formic acid and 4.5 g oxalic acid is treated with conc. H_2SO_4. The evolved gaseous mixture is passed through KOH pellets. Weight (in g) of the remaining product at STP will be

$HCOOH(\ell) \xrightarrow{H_2SO_4} H_2O(\ell) + CO(g)$

$H_2C_2O_4(\ell) \xrightarrow{H_2SO_4} H_2O(\ell) + CO(g) + CO_2(g)$

(1) 1.4 (2) 3.0 (3) 2.8 (4) 4.4

MC0146

14. In which case is the number of molecules of water maximum?

(1) 18 mL of water
(2) 0.18 g of water
(3) 0.00224 L of water vapours at 1 atm and 273 K
(4) 10^{-3} mol of water

MC0147

NEET (UG) 2019

15. The number of moles of hydrogen molecules required to produce 20 moles of ammonia through Haber's process is :-

(1) 10 (2) 20
(3) 30 (4) 40

MC0192

NEET (UG) (Odisha) 2019

16. The volume occupied by 1.8 g of water vapour at 374 °C and 1 bar pressure will be :-
[Use R = 0.083 bar L $K^{-1}mol^{-1}$]

(1) 96.66 L (2) 55.87 L
(3) 3.10 L (4) 5.37 L

MC0193

NEET (UG) 2020

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

(1) 1g of Li(s) [Atomic mass of Li = 7]
(2) 1g of Ag(s) [Atomic mass of Ag = 108]
(3) 1g of Mg(s) [Atomic mass of Mg = 24]
(4) 1g of O_2(g) [Atomic mass of O = 16]

MC0224

NEET (UG) 2020 (COVID-19)

18. One mole of carbon atom weighs 12 g, the number of atoms in it is equal to,

(Mass of carbon – 12 is 1.9926×10^{-23} g)

(1) 1.2×10^{23} (2) 6.022×10^{22}
(3) 12×10^{22} (4) 6.022×10^{23}

MC0225

NEET (UG) 2021

19. An organic comopound 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, H is 1]

(1) CH (2) CH_2
(3) CH_3 (4) CH_4

MC0226

NEET (UG) 2021 (Paper-2)

20. An organic compound on analysis gave C = 54.5%, H = 9.1% by mass. Its empirical formula is

(1) CHO_2 (2) CH_2O
(3) C_2H_4O (4) C_3H_4O

MC0227

21. If 1 mL of water contains 20 drops then number of molecules in a drop of water is

(1) 6.023×10^{23} (2) 1.673×10^{21}
(3) 1.344×10^{18} (4) 4.346×10^{20}

MC0228

22. A sample of phosphorous trichloride (PCl_3) contains 1.4 moles of the substance. How many atoms are there in the sample?

(1) 4 (2) 5.6
(3) 8.431×10^{23} (4) 3.372×10^{24}

MC0229

NEET (UG) 2022

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

(1) 500 g of solvent
(2) 100 mL of solvent
(3) 1000 g of solvent
(4) 500 mL of solvent

MC0230

24. 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 ?

$CaCO_{3(s)} + 2HCl_{(aq)} \rightarrow CaCl_{2(aq)} + CO_{2(g)} + H_2O_{(l)}$

[Calculate upto second place of decimal point]

(1) 1.32 g (2) 3.65 g
(3) 9.50 g (4) 1.25 g

MC0231

NEET (UG) 2022 (OVERSEAS)

25. Match **List-I** with **List-II** :

List-I	**List-II**
(a) 4.48 litres of O_2 at STP	(i) 0.2 moles
(b) 12.022×10^{22} molecules of H_2O	(ii) 12.044×10^{23} molecules
(c) 96 g of O_2	(iii) 6.4 g
(d) 88 g of CO_2	(iv) 67.2 litres at STP

(Given – Molar volume of a gas at STP = 22.4 L)

Choose the **correct answer** from the options given below :

(1) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

(2) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

(3) (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

(4) (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

MC0232

Re-NEET (UG) 2022

26. The density of the solution is 2.15 g mL^{-1}, then mass of 2.5 mL solution in correct significant figures is

(1) 5375×10^{-3} g

(2) 5.4 g

(3) 5.38 g

(4) 53.75 g

MC0233

EXERCISE-II (Previous Year Questions) ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**4**	**3**	**4**	**2**	**3**	**1**	**1**	**1**	**2**	**4**	**2**	**3**	**3**	**1**	**3**
Que.	16	17	18	19	20	21	22	23	24	25	26				
Ans.	**4**	**1**	**4**	**3**	**3**	**2**	**4**	**1**	**1**	**1**	**2**				

EXERCISE-III (Analytical Questions) — Master Your Understanding

1. Number of HCl molecules present in 10 mL of 0.1 M solution is :
(1) 6.022×10^{23} (2) 6.023×10^{22}
(3) 6.022×10^{21} (4) 6.022×10^{20}
MC0150

2. The volume of a gas at 0°C and 700 mm pressure is 760 cc. The no. of molecules present in this volume is
(1) 1.88×10^{22} (2) 6.022×10^{23}
(3) 18.8×10^{23} (4) 18.8×10^{22}
MC0151

3. The number of moles of carbon dioxide which contain 8 g of oxygen is –
(1) 0.5 mole (2) 0.20 mole
(3) 0.40 mole (4) 0.25 mole
MC0153

4. If 224 mL of a triatomic gas has a mass of 1g at 273 K and 1 atm pressure, then the mass of one atom is –
(1) 8.30×10^{-23} g (2) 2.08×10^{-23} g
(3) 5.53×10^{-23} g (4) 6.24×10^{-23} g
MC0154

5. The maximum number of molecules are present in
(1) 5 L of N_2 gas at STP
(2) 0·5 g of H_2 gas
(3) 10 g of O_2 gas
(4) 15 L of H_2 gas at STP
MC0155

6. How many moles of magnesium phosphate, $Mg_3(PO_4)_2$ will contain 0.25 mol of oxygen atoms?
(1) 2.5×10^{-2} (2) 0.02
(3) 3.125×10^{-2} (4) 1.25×10^{-2}
MC0156

7. 22.4 L of water vapour at NTP, When condensed to water occupies an approximate volume of -
(1) 18 L (2) 1 L
(3) 1 mL (4) 18 mL
MC0158

8. 0.01 mol of iodoform (CHI_3) reacts with Ag to produce a gas whose volume at NTP is
$2CHI_3 + 6Ag \rightarrow C_2H_2 + 6AgI(s)$
(1) 224 mL (2) 112 mL
(3) 336 mL (4) None of these
MC0159

9. The minimum quantity in grams of H_2S needed to precipitate 63.5 g of Cu^{2+} will be nearly :
$Cu^{+2} + H_2S \rightarrow CuS + H_2$
(1) 63.5 g (2) 31.75 g
(3) 34 g (4) 20 g
MC0160

10. 2.76 g of silver carbonate on being strongly heated yields a residue weighing –
$Ag_2CO_3 \rightarrow 2Ag + CO_2 + \frac{1}{2} O_2$
(1) 2.16 g (2) 2.48 g (3) 2.32 g (4) 2.64 g
MC0161

11. The volume of gas at NTP produced by 100 g of CaC_2 with water is :-
$CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$
(1) 70 L (2) 35 L
(3) 17.5 L (4) 22.4 L
MC0162

12. Element 'A' reacts with oxygen to form a compound A_2O_3. If 0.359 g of 'A' reacts to give 0.559 g of the compound, then atomic weight of 'A' will be :–
(1) 51 (2) 43.08 (3) 49.7 (4) 47.9
MC0164

13. $CaCO_3$ is 90% pure. Volume of CO_2 collected at STP when 10 g of $CaCO_3$ is decomposed is -
(1) 2.016 L (2) 1.008 L
(3) 10.08 L (4) 20.16 L
MC0166

14. 50 g $CaCO_3$ will react with ..... g of 20% pure HCl by weight .
(1) 36.5 g (2) 73 g
(3) 109.5 g (4) 182.5 g
MC0167

15. Two oxides of a metal contains 50% and 40% of the metal respectively. The formula of the first oxide is MO. Then the formula of the second oxide is
(1) MO_2 (2) M_2O_3 (3) M_2O (4) M_2O_5
MC0168

16. A gas mixture of 3 L of propane and butane on complete combustion at 25°C produces 10 L of CO_2. Initial composition of the propane & butane in the gas mixture is –

(1) 66.67%, 33.33% (2) 33.33%, 66.67%
(3) 50%, 50% (4) 60%, 40%

MC0169

17. The atomic mass of an element is 27. If valency is 3, the vapour density of the volatile chloride will be:-

(1) 66.75 (2) 6.675 (3) 667.5 (4) 81

MC0170

18. 1 L of a hydrocarbon weighs as much as 1 Lof CO_2 under similar conditions. Then the molecular formula of the hydrocarbon is -

(1) C_3H_8 (2) C_2H_6
(3) C_2H_4 (4) C_3H_6

MC0171

19. There are two oxides of sulphur. They contain 50% and 60% of oxygen respectively by weight. The weight of sulphur which combine with 1 g of oxygen is in the ratio of -

(1) 1 : 1 (2) 2 : 1
(3) 2 : 3 (4) 3 : 2

MC0172

20. Perecentage composition of an organic compound is as follows :

C=10.06, H=0.84 , Cl=89.10

Which of the following corresponds to its molecular formula if the vapour density is 60.0

(1) CH_2Cl_2 (2) $CHCl_3$
(3) CH_3Cl (4) None

MC0175

21. The ratio of masses of oxygen and nitrogen in a particular gaseous mixture is 1 : 4. The ratio of number of molecules is :

(1) 1 : 8 (2) 3 : 16
(3) 1 : 4 (4) 7 : 32

MC0176

22. A gaseous hydrocarbon on combustion gives 0.72 g of water and 3.08 g of CO_2. The empirical formula of the hydrocarbon is

(1) C_2H_4 (2) C_3H_4
(3) C_6H_6 (4) C_7H_8

MC0177

23. What volume of oxygen gas (O_2) measured at 0°C and 1 atm, is needed to burn completely 1L of propane gas (C_3H_8) measured under the same conditions:-

(1) 5 L (2) 10 L
(3) 7 L (4) 6 L

MC0129

24. Volume occupied by one molecule of water (density =1 gcm^{-3}) is :-

(1) 3.0×10^{-23} cm^3 (2) 5.5×10^{-23} cm^3
(3 9.0×10^{-23} cm^3 (4) 6.023×10^{-23} cm^3

MC0130

25. How many moles of lead (II) chloride will be formed from a reaction between 6.5 g of PbO and 3.2 g of HCl ? (Atomic wt. of Pb=207)

(1) 0.011 (2) 0.029
(3) 0.044 (4) 0.333

MC0131

26. The percentage of oxygen in ethanol is

(1) 13.13% (2) 34.73%
(3) 60% (4) 75%

MC0194

27. Empirical formula of a compound is

(1) Whole number ratio of various atoms present in compound.
(2) Contain exact number of different types of atoms present in a molecule.
(3) Simplest whole number ratio of various atoms present in a compound.
(4) None of these

MC0195

28. A compound contains 6.72% hydrogen, 40% carbon and 53.28% oxygen, its molecular mass is 180.18 g mol^{-1} then molecular formula of compound is :-

(1) $C_2H_2O_4$ (2) $C_2H_4O_{12}$
(3) $C_6H_6O_{12}$ (4) $C_6H_{12}O_6$

MC0196

29. When gases combine or are produced in a chemical reaction they do so in a simple ratio by volume provided all gases are at same temperature and pressure. This law is known as -

(1) Dalton's Law (2) Gay Lussac's Law
(3) Avogadro's Law (4) Law of Lavoisier

MC0197

30. Which of the following reactions is not correct according to the law of conservation of mass?

(1) $2Mg(s) + O_2(g) \longrightarrow 2MgO(s)$

(2) $CH_4(g) + O_2(g) \longrightarrow CO_2(g) + H_2O(g)$

(3) $4Fe(s) + 3O_2(g) \longrightarrow 2Fe_2O_3(s)$

(4) $P_4(s) + 5O_2(g) \longrightarrow P_4O_{10}(s)$

MC0198

31. What will be molecular mass of glucose molecule?

(1) 342 g

(2) 180 amu

(3) Mass exactly equal to $\frac{1}{12^{th}}$ of mass of one C-12 atom

(4) Both (2) and (3)

MC0199

EXERCISE-III (Analytical Questions) ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**4**	**1**	**4**	**3**	**4**	**3**	**4**	**2**	**3**	**1**	**2**	**2**	**1**	**4**	**2**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**1**	**1**	**1**	**4**	**2**	**4**	**4**	**1**	**1**	**2**	**2**	**3**	**4**	**2**	**2**
Que.	31														
Ans.	**2**														