SOME BASIC CONCEPT OF CHEMISTRY

1. Which of the following is a chemical fertilizer?
   (a) Urea (b) Sodium nitrate
   (c) Ammonium sulphate (d) All of these
2. Which one of the following is not a mixture?
   (a) Brass (b) Air
   (c) 22 carat gold (d) Water
3. 1 mm Hg represents a pressure of
   (a) 101.3 N m^{-2} (b) 1013 N m^{-2}
   (c) 133.3 N m^{-2} (d) 1333 N m^{-2}
4. The number of significant figures in π are
   (a) 1 (b) 2
   (c) 3 (d) infinite
5. Two oxides of a metal contain 36.4% and 53.4% of oxygen by mas respectively. If the formula of first oxide is M_2O, then that of the second is
   (a) M_2O_3 (b) MO
   (c) MO_2 (d) M_2O_5
6. Which one of the following sets of compounds correctly illustrates the law of reciprocal proportions?
   (a) P_2O_3, PH_3, H_2O (b) P_2O_5, PH_3, H_2O
   (c) N_2O_5, NH_3, H_2O (c) N_2O, NH_3, H_2O
7. 116 mg of a compound on vaporisation in a Victor Meyer's apparatus displaces 44.8 ml of air measured at STP. The molecular weight of the compound is
   (a) 116 (b) 232
   (c) 58 (d) 44.8
8. 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 occuring element X is closest to:
   (a) 199 amu (b) 200 amu
   (c) 201 amu (d) 202 amu
9. One litre of a gas is at a pressure of 10^{-6} mm of Hg at 25^0C. How many molecules are present in the vessel?
   (a) 3.2×10^6 (b) 3.2×10^{13}
   (c) 3.2×10^{10} (d) 3×10^4
10. If 10^{21} molecules are removed from 200 mg of CO_2, then the number of moles of CO_2 left are
    (a) 2.88×10^{-3} (b) 1.66×10^{-3}
    (c) 4.54×10^{-3} (d) 1.66×10^{-2}
11. 10 dm^3 of N_2 gas and 10 dm^3 of gas X at the same temperature contain the same number of molecules. The gas X is
    (a) CO (b) CO_2
    (c) H_2 (d) NO
12. How many moles of electrons weight one kilogram?
    (a) 6.023×10^{23} (b) $\frac{1}{9.108} \times 10^{31}$
    (c) $\frac{6.023}{9.108} \times 10^{25}$ (d) $\frac{1}{9.108 \times 9.023} \times 10^{8}$
13. The total number of electrons in 18 mL of water (density = 1 g mL^{-1}) is
    (a) 6.02×10^{23} (b) 6.02×10^{25}
    (c) 6.02×10^{24} (d) $6.02 \times 18 \times 10^{23}$
14. A gas mixture contains 50% helium and 50% methane by volume. What is the percent by weight of methane in the mixture?
    (a) 19.97% (b) 20.05%
    (c) 50% (d) 80.03%
15. If we consider that $\frac{1}{6}$, in place of $\frac{1}{12}$, mass of carbon atom is taken to be relative atomic mass unit, the mass of one mole of a substance will
    (a) increase two fold
    (b) decrease twice
    (c) be a function of molecular mass of the substance
    (d) remain unchanged
16. A person has as many notes as number of oxygen atoms in 24.8 g N $Na_2S_2O_3.5H_2O$ (mol. wt. = 248). A note counting machine counts 48 million notes per day. How many days it would take to count these notes?
    (a) 10^{12} (b) 10^{14}
    (c) 10^{16} (d) 10^{18}
17. Volume occupied by one molecule of water (density = 1 g cm^{-3}) is
    (a) 9.0×10^{-23} cm^3 (b) 6.023×10^{-23} cm^3
    (c) 3.0×10^{-23} cm^3 (d) 5.5×10^{-23} cm^3
18. The mass of 2.24×10^{-3} m^3 of a gas is 4.4 g at 273.15 K and 101.325 kPa pressure. The gas may be
    (a) NO (b) NO_2
    (c) C_3H_8 (d) NH_3
19. The total number of atoms of all elements present in mole of ammonium dichromate is
    (a) 19 (b) 6.023×10^{23}
    (c) 114.473×10^{23} (b) 84.322×10^{23}
20. If 1 mL of water contains 20 drops, then number of molecules in a drop of water is
    (a) 6.023×10^{23} (b) 1.376×10^{26}
    (c) 1.673×10^{21} (d) 4.346×10^{20}
21. Which has the maximum number of molecules among the following?
    (a) 44 g of CO_2 (b) 48 g O_2
    (c) 8 g H_2 (d) 64 g SO_2
22. In which case is the number of molecules of water maximum?
    (a) 18 mL of water
    (b) 0.18 g of water
    (c) 0.00224 L of water vapour at 1 atm and 273 K
    (d) 10^{-3} mol of water

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23. Which one of the following is the lightest?
(a) 0.2 mole of hydrogen gas
(b) 6.023×10^{22} molecules of nitrogen
(c) 0.1 g of silver
(d) 0.1 mole of oxygen gas
(e) 1 g of water

24. 50 ml 10 N H_2SO_4, 25 ml 12 N HCl and 40 ml 5 N HNO_3 were mixed together and the volume of the mixture was made 1000 ml by adding water. The normality of the resultant solution will be:
(a) 1 N (b) 2 N
(c) 3 N (d) 4 N

25. A 0.1 M basic solution is required from $Ca(OH)_2$ which is 40% ionized. Analytical molarity of $Ca(OH)_2$ should be
(a) 0.125 M (b) 0.25 M
(c) 0.4 M (d) 0.5 M

26. 25.3 g of sodium carbonate, Na_2CO_3 is dissolved in enough water to make 250 mL of solution. If sodium carbonate dissociates completely, molar concentration of sodium ions, Na^+ and carbonate ions, CO_3^{2-} are respectively (Molar mass of Na_2CO_3 = 106 g mol^{-1})
(a) 0.477 M and 0.477 M (b) 0.955 M and 1.910 M
(c) 1.910 M and 0.955 M (d) 1.90 M and 1.910 M

27. The number of molecules in 100 ml of 0.02 N H_2SO_4 is
(a) 6.02×10^{22} (b) 6.02×10^{21}
(c) 6.02×10^{20} (d) 6.02×10^{18}

28. A 100 ml solution of 0.1 N HCl was titrated with 0.2 N NaOH solution. The titration was discontinued after adding 30 ml of NaOH solution. The remaining titration was completed by adding 0.25 N KOH solution. The volume of KOH required for completing the titration is
(a) 70 ml (b) 32 ml
(c) 35 ml (d) 16 ml

29. The ratio of masses of oxygen and nitrogen in a particular gaseous mixture is 1 : 4. The ratio of the number of their molecules is
(a) 3 : 16 (b) 1 : 4
(c) 7 : 32 (d) 1 : 8

30. 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

31. Suppose two elements X and Y combine to form two compounds XY_2 and X_3Y_2. When 0.1 mol of XY_2 weight 10 g and 0.05 mol 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

32. 5 moles of AB_2 weigh 125×10^{-3} kg and 10 moles of A_2B_2 weigh 300×10^{-3} kg
The molar mass of A(M_A) and molar mass of B(M_B) in kg mol^{-1} are
(a) $M_A = 10 \times 10^{-3}$ and $M_B = 5 \times 10^{-3}$
(b) $M_A = 25 \times 10^{-3}$ and $M_B = 50 \times 10^{-3}$
(c) $M_A = 50 \times 10^{-3}$ and $M_B = 25 \times 10^{-3}$
(d) $M_A = 5 \times 10^{-3}$ and $M_B = 10 \times 10^{-3}$

33. An organic compound made of C, H and N contains 20% nitrogen. Its minimum molecular weight is
(a) 70 (b) 140
(c) 100 (d) 65

34. The percentage of Se in peroxidase anhydrous enzyme is 0.5% by weight (atomic weight = 78.4). Then minimum molecular weight of peroxidase anhydrous enzyme is
(a) 1.568×10^4 (b) 1.568×10^3
(c) 15.68 (d) 3.136×10^4

35. The crystalline salt $Na_2SO_4 \cdot x\,H_2O$ on heating loses 55.9% of its weight. The formula of the crystalline salt is
(a) $Na_2SO_4 \cdot 5H_2O$ (b) $Na_2SO_4 \cdot 7H_2O$
(c) $Na_2SO_4 \cdot 2H_2O$ (d) $Na_2SO_4 \cdot 10H_2O$

36. 0.1 mole of a carbohydrate with empirical formula CH_2O contains 1 g of hydrogen. What is its molecular formula?
(a) $C_2H_{10}O_5$ (b) $C_6H_{12}O_6$
(c) $C_4H_8O_4$ (d) $C_3H_6O_3$

37. The most abundant elements by mass in the body of a healthy human adult are:
Oxygen (61.4%), Carbon (22.9%), Hydrogen (10.0%) and Nitrogen (2.6%)
The weight which a 75 kg person would gain if all the ^1H atoms are replaced ^2H atoms is
(a) 7.5 kg (b) 10 kg
(c) 15 kg (d) 37.5 kg

38. The ratio of mass percent of C and H of an organic compound ($C_XH_YO_Z$) is 6 : 1. If one molecule of the above compound ($C_XH_YO_z$) contains half as much oxygen as required to burn one molecule of compound C_XH_Y complete to CO_2 and H_2O, the empirical formula of the compound $C_XH_YO_Z$ is
(a) $C_3H_6O_3$ (b) C_2H_4O
(c) $C_3H_4O_2$ (d) $C_2H_4O_3$

39. In Haber process, 30 litres of dihydrogen and 30 litres of dinitrogen were taken for reaction which yielded only 50% of the expected product. What will be the composition of the gaseous mixture under the aforesaid condition in the end?
(a) 20 litres NH_3, 25 litres N_2, 20 litres H_2
(b) 10 litres NH_3, 25 litres N_2, 15 litres H_2
(c) 20 litres NH_3, 10 litres N_2, 30 litres H_2
(d) 20 litres NH_3, 25 litres N_2, 15 litres H_2

40. The number of moles of hydrogen molecules required to produce 20 moles of ammonia through Haber's process is
(a) 40 (b) 10
(c) 20 (d) 30

41. For the formation of 3.65 g of hydrogen chloride gas, what volumes of hydrogen gas and chlorine gas are required at N.T.P. conditions?
(a) 1.12 lit., 1.12 lit (b) 1.12 lit., 2.24 lit
(c) 3.65 lit., 1.83 lit (d) 1 lit., 1 lit.

42. The mass of carbon anode consumed (giving only carbon dioxide) in the production of 270 kg of aluminium metal from bauxide by the Hall process is:
(a) 90 kg (b) 540 kg
(c) 180 kg (d) 270 kg
(Atomic mass : Al = 27)

43. The dehydration yield of cyclohexanol to cyclohexene is 75%. The yield obtained when 100 g of cyclohexanol

is dehydrated will be
(a) 82.35 g (b) 61.76 g
(c) 38.34 g (d) 17.65 g

44. A mixture of CO_2 and CO is passed over red hot graphite when 1 mole of mixture changes to 33.6 L (converted to STP). Hence, mole fraction of CO_2 in the mixture is
(a) 0.25 (b) 0.33
(c) 0.50 (d) 0.66

45. 3.28 g of a sample of pure copper when heated in presence of oxygen for some time forms black copper oxide (CuO) which weighs 3.92 g. What approximate percent of copper remains unoxidized?
(a) 4.6% (b) 5.6%
(c) 6.6% (d) 7.6%

46. An ore contains 1.24% of the mineral argentite, Ag_2S by mass. How many grams of this ore would have to be processed in order to obtain 1.0 g of pure solid silver?
(a) 46.3 g (b) 92.6 g
(c) 69.45 g (d) 23.15 g

47. A mixture of $CaCl_2$ and NaCl weighing 4.44 g is treated with sodium carbonate solution to precipitate all the Ca^{2+} ions as calcium carbonate. The calcium carbonate so obtained is heated strongly to get 0.56 g of CaO. The percentage of NaCl in the mixture (atomic mass of Ca = 40) is
(a) 75 (b) 30.6
(c) 25 (d) 69.4

48. A mixture of ethane and ethene occupies 41 L at 1 atm and 500 K. The mixture reacts completely with 10/3 mole of oxygen to produce CO_2 and H_2O. The mole fraction of ethane and ethene in the mixture are (R = 0.0821 L atm K^{-1} mol^{-1}) respectively
(a) 0.50, 0.50 (b) 0.75, 0.25
(c) 0.67, 0.33 (d) 0.25, 0.75

49. Excess of carbon dioxide is passed through 50 mL of 0.5 M calcium hydroxide solution. After the completion of the reaction, the solution was evaporated to dryness. The solid calcium carbonate was completely neutralised with 0.1 N hydrochloric acid. The volume of hydrochloric acid required is (At. mass of carbon = 40)
(a) 200 mL (b) 500 mL
(c) 400 mL (d) 300 mL

50. 20 mL of methane is completely burnt using 50 mL of oxygen. The volume of the gas left after cooling to room temperature is
(a) 80 mL (b) 40 mL
(c) 60 mL (d) 30 mL

51. The number of Cl^- ions in 100 mL of 0.001 M HCl solution is
(a) 6.022×10^{23} (b) 6.022×10^{20}
(c) 6.022×10^{19} (d) 6.022×10^{24}

52. What is the mass of precipitate formed when 50 mL of 16.9% solution of silver nitrate is mixed with 50 mL of 5.8% NaCl solution?
(Ag = 107.8, N = 14, O = 16, Na = 23, Cl = 35.5)
(a) 7 g (b) 14 g
(c) 28 g (d) 3.5 g

53. 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?
(a) 0.044 (b) 0.333
(c) 0.011 (d) 0.029

54. 1 gram of a carbonate (M_2CO_3) on treatment with excess HCl produces 0.01186 mole of CO_2. The molar mass of M_2CO_3 in g mol^{-1} is
(a) 118.6 (b) 11.86
(c) 1186 (d) 84.3

55. In an experiment, 4 g of M_2O_x oxide was reduced to 2.8 g of the metal. If the atomic mass of the metal is 56 g mol^{-1}, the number of O atoms in the oxide is
(a) 1 (b) 2
(c) 3 (d) 4

56. 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)

57. 1.0 g of magnesium is burnt with 0.56 g O_2 in a closed vessel. Which reactant is left in excess and how much? (At. wt. of Mg = 2, O = 16)
(a) Mg, 0.16 g (b) O_2, 0.16 g
(c) Mg, 0.44 g (d) O_2, 0.28 g

58. The molecular formula of a commercial resin used for exchanging ions in water softening is $C_8H_7SO_3Na$ (mol. wt. 206). What would be the maximum uptake of Ca^{2+} ions by the resin when expressed in mole per gram resin?
(a) $\frac{1}{103}$ (b) $\frac{1}{206}$
(c) $\frac{2}{309}$ (d) $\frac{1}{412}$

59. A 100% pure sample of a divalent metal carbonate weighing 2g on complete thermal decomposition releases 448 cc of carbon dioxide at STP. The equivalent mass of the metal is
(a) 40 (b) 20
(c) 28 (d) 12

60. When a metal is burnt in oxygen, its weight is increased by 24 per cent. The equivalent weight of the metal will be
(a) 120 (b) 80
(c) 60 (d) 40

61. The percentage of an element M is 53 in its oxide of molecular formula M_2O_3. Its atomic mass is about
(c) 45 (b) 9
(c) 18 (d) 27

62. A metal M of equivalent mass E forms an oxide of molecular formula M_xO_y. The atomic mass of the metal is given by the correct equation
(a) 2 E (y/x) (b) xy/E
(c) E/y (d) y/E

63. Sucrose solution which is 40% by mass is heated till it becomes 50% by mass. Water lost form 100 g of the solution is
(a) 10 g (b) 15 g
(c) 20 g (d) 25 g

64. One gram of a mixture of Na_2CO_3 and $NaHCO_3$ consumes y gram equivalent of HCl for complete neutralization. One gram of the mixture is strongly heated, then cooled and the residue treated with HCl.

The gram equivalent of HCl now required for complete neutralization will be

(a) 2 y (b) 3 y
(c) y (d) $y/2$

65. The total ionic strength (total molarity of all the ions) containing 0.2 M $CuSO_4$ and 0.1 M $Al_2(SO_4)_3$ is
(a) 0.5 M (b) 0.7 M
(c) 0.9 M (d) 1.2 M

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

67. 375 mg of an alcohol reacts with required amount of methyl magnesium bromide and releases 140 mL of methane gas at STP. The alcohol is
(a) ethanol (b) *n*-butanol
(c) methanol (d) *n*-propanol

68. 100 mL of a water sample contains 0.81 g of calcium bicarbonate and 0.73 g of magnesium bicarbonate. The hardness of this water sample expressed in terms of equivalents of $CaCO_3$ is (Molar mass of calcium biacarbonate is 162 g mol^{-1} and magnesium bicarbonate is 146 g mol^{-1})
(a) 10^2 ppm (b) 10^4 ppm
(c) 10^6 ppm (d) 5×10^3 ppm

69. 8 g of O_2 has the same number of molecules as
(a) 7 g CO (b) 14 g N_2
(c) 11 g CO_2 (d) 16 g SO_2

70. A vessel contains 4.4 g of CO_2. It means that it contains
(a) 0.1 mol of CO_2
(b) 6.02×10^{22} molecules of CO_2
(c) 8.8 g atoms of oxygen
(d) 1120 mL of CO_2 at S.T.P.

71. 1 g Mg was burnt in a closed vessel containing 2g oxygen. Which of the following are not correct?
(a) 0.25 g of Mg will be left unburnt
(b) 1.33 of O_2 will be left unreacted
(c) 2.5 g of MgO will be formed
(d) The mixture at the end will weigh 3 g.

72. Which of the following methods of expressing concentration are independent of temperature?
(a) Molarity (b) Molality
(c) Normality (d) Mole fraction

COMPREHENSION

Based on the given Passage/Comprehension

The comprehension given below is followed by some multiple choice questions. Each question has one correct option. Choose the correct option.

Earlier the concept of equivalent weights was very common and the concentrations of the solutions were expressed in terms of normalities. The convenience was that the substances reacted in the ratio of their gram equivalents. So there was no need to write balanced equation to determine the amounts of the substances reacted. However, determination of equivalent weights posed difficulty in certain cases. Moreover, the equivalent weight of the same substance is not same in different reactions. For example, $KMnO_4$ has different equivalent weight in the basic medium than in the acidic medium. Hence, now a days, mole concept is mole common and the concentrations of the solutions are generally expressed in terms of molarities, though some other methods like molality, mole fraction etc. are also used.

73. The equivalent weight of Cu
(a) will be same in CuO and Cu_2O
(b) will be double in Cu_2O than in CuO
(c) will be double in CuO than in Cu_2O
(d) depends upon whether copper in pure or impure

74. The chloride of an element is found to contain 52.8% chlorine. The equivalent weight of the element is
(a) 63.4 (b) 31.7
(c) 47.2 (d) 18.7

75. A 40% hydrochloric acid is found to have a density of 1.20 g mL^{-1}. The molarity of the solution is nearly
(a) 11 M (b) 12 M
(c) 13 M (d) 14 M

76. The molality of the above solution will be nearly
(a) 15.3 m (b) 16.3 m
(c) 17.3 m (d) 18.3 m

77. The mole fraction of hydrochloric acid in the solution will be
(a) 0.25 (b) 0.30
(c) 0.35 (d) 0.40

78. The volume of the above solution required to make 1.0 L of 0.10 M HCl will be
(a) 5.6 mL (b) 6.6 mL
(c) 7.6 mL (d) 8.6 mL

Matching Type Questions

Match the entries of column I with appropriate entries of column II and choose the correct option out of the four options (a), (b), (c), (d) given at the end of each question.

79.

	Column I		Column II
(A)	German silver and gold jewellery	(p)	Elements
(B)	Antimony and Bismuth	(q)	Isomorphs
(C)	$ZnSO_4.7H_2O$ and $FeSO_4.7H_2O$	(r)	Polymorphs
(D)	Zinc blende and Wurtzite	(s)	Mixtures
(E)	Graphite and Diamond	(t)	Metalloids

(a) A-p, B-r, C-t, D-q, E-s (b) A-s, B-t, C-q, D-r, E-p
(c) A-q, B-r, C-p, D-t, E-s (d) A-t, B-s, C-r, D-q, E-p

80.

	Column I		Column II
(A)	femto	(p)	10^9
(B)	yotta	(q)	10^{-15}
(C)	giga	(r)	10^{-18}
(D)	atto	(s)	10^{24}

(a) A-q, B-p, C-r, D-s (b) A-s, B-q, C-p, D-r
(c) A-q, B-s, C-p, D-r (d) A-r, B-s, C-p, D-q

Matrix-Match Type Questions

Match the entries of column I with appropriate entries of column II. Each entry in column I may have one or more than one correct option from column II. If the correct matches are A-p, s; B-r; C-p, q; D-s, then the correctly bubbled 4 × 4 matrix should be as shown:

	p	q	r	s
A	p	q	r	s
B	p	q	r	s
C	p	q	r	s
D	p	q	r	s

81. **Column I (No. of significant figures)** | **Column II (Numbers)**

Column I (No. of significant figures)		Column II (Numbers)	
(A)	1	(p)	6.022×10^{23}
(B)	2	(q)	0.0085
(C)	3	(r)	2.850
(D)	4	(s)	0.0200

82.

Column I (No. of moles)		Column II (Amount)	
(A)	0.1 mole	(p)	4480 mL of CO_2 at STP
(B)	0.2 mole	(q)	0.1 g atom of iron
(C)	0.25 mole	(r)	1.5×10^{23} molecules of oxygen gas
(D)	0.5 mole	(s)	9 mL of water
		(t)	200 mg of hydrogen gas

Integer Type Questions

DIRECTION. The answer to each of the following questions is a single digit integer, ranging from 0 to 9. If the correct answers to the question numbers A, B, C and D (say) are 4, 0, 9 and 2 respectively, then the correct darkening of bubbles should be as shown on the side:

A	B	C	D
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

83. The number of metalloids present in the following elements is tin, lead, arsenic, palladium, antimony, tungsten, bismuth, osmium, lanthanum
84. A temperature of 41^0F when expressed in terms of degress centigrade will be
85. The prefix 'giga' represents 10^x where x is
86. The number of significant figures in the value 0.000524000 is
87. Copper reacts with nitric acid to form copper (II) nitrate, nitric oxide and water. The number of nitric acid molecules in the balanced equation is
88. Silver (atomic weight = 108 g mol^{-1}) has a density of 10.5 g cm^{-3}. The number of silver atoms on a surface of area 10^{-12} m^2 can be expressed in scientific notation as $y \times 10^x$. The value of x is:
89. Among the following, the number of elements showing only one non-zero oxidation sate is
    O, Cl, F, N, P, Sn, Tl, Na, Ti
90. The value of n in the molecular form $Be_nAl_2Si_6O_{18}$ is
91. A student performs a titration with different burettes and finds titre values of 25.2 mL, 25.25 mL,and 25.0 mL. The number of significant figures in the average titre value is
92. Reaction of Br_2 with Na_2CO_3 in aqueous solution gives sodium bromide and sodium bromate with evolution of CO_2 gas. The number of sodium bromide molecules involved in the balanced chemical equation is
93. If the value of Avogadro's number is 6.023×10^{23} mol^{-1} and the value of Boltzmann constant is 1.380×10^{-23} JK^{-1}, then the number of significant figures in the calculated value of the universal gas constant is
94. Three moles of B_2H_6 are completely reacted with methanol. The number of moles of boron containing product formed is

Numerical Value Type Questions (In Decimal Notation)

For the following question, enter the correct numerical value, (in decimal-notation, truncated/ rounded-off to the second decimal place, *e.g.*, 6.25, 7.00, -0.33, 30.27, -127.30) using the mouse and the onscreen virtual numeric keypad in the place designated to enter the answer.

95. The ammonia prepared by treating ammonium sulphate with calcium hydroxide is completely used by $NiCl_2.6H_2O$ to form a stable coordination compound. Assume that both the reactions are 100% complete. If 1584 g of ammonium sulphate and 952 g of $NiCl_2.6H_2O$ are used in the preparation, the combined weight (in grams) of gypsum and the nickel-ammonia coordination compound thus produced is (Atomic weights in g mol^{-1} H = 1, N = 14, O = 16, S = 32, Cl = 35.5, Ca = 40, Ni = 59)

Assertion-Reason Type Questions

TYPE I

DIRECTION. The questions given below contain STATEMENT-1 (Assertion) and STATEMENT-2 (Reason). Each question has four choice (a), (b), (c) and (d) out of which ONLY ONE is correct. Choose the correct option as under:

(a) Statement-1 is True, Statement-2 is True; Statement-2 is the correct explanation for Statement-1.
(b) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.
(c) Statement-1 is True, Statement-2 is False.
(d) Statement-1 is False, Statement-2 is True.

96. **Statement-1.** A single C^{12} atom has a mass exactly 12 amu and a mole of these atoms has a mass of exactly 12 grams.
    Statement-2. A mole of atoms of any element has a mass in grams equal to its atomic mass.
97. **Statement-1.** In a gaseous reaction, the ratio of volumes of reactants and gaseous prodeucts is in agreement with their molar ratio.
    Statement-2. Volume of gas is inversely proportional to its moles at particular temperature and pressure.

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98. **Statement-1.** The standard unit for expressing the mass of atoms is amu.
Statement-2. amu is also called as avogram.

99. **Statement-1.** Under identical conditions, 1 L of O_2 gas and 1 L of O_3 gas contain the same number of oxygen atoms.
Statement-2. 1 L of O_2 and 1 L of O_3 contain the same number of moles under identical conditions.

TYPE II

DIRECTION. In each of the following questions, a statement of Assertion (A) is given followed by a corresponding statement of Reason (R) just below it. Of the statements, mark the correct answer as

(a) If both assertion and reason are ture, and reason is the true explanation of the assertion.
(b) If both assertion and reason are true, but reason is not the true explanation of the assertion.
(c) If assertion is true, but reason is false.
(d) If both assertion and reason are false.

100 **Assertion.** Phenol is a disinfectant.
Reason. Disinfectants are used to stop infection of the wounds.

101 **Assertion.** Cinnabar is a chemical compound whereas brass is a mixture.
Reason. Cinnabar always contains 6.25 times as much mercury as sulphur by weight. Brass can be made with widely different ratios of copper and zinc.

102 **Assertion.** The size of a degree on Fahrenheit scale is smaller than that on celsius scale.
Reason. When temperature on celsius scale reads 0^0, it reads 32^0 on Fahrenheit scale.

103 **Assertion.** The number 14.56 ± 0.01 has three significant figures.
Reason. Number of significant figures is total number of digits except the last digit whose alue is uncertain.

104 **Assertion.** Gay Lussac's law does not follow from Dalton's atomic theory.
Reason. Dalton's atomic theory explains laws of chemical combination by mass only.

105 **Assertion.** Average atomic mass of an element depends mainly on the heavier isotope.
Reason. Average atomic mass is obtained by multiplyng the atomic mass of the heavier isotope with its fractional abundance.

106 **Assertion.** Both 106 g of sodium carbonate and 12 g of carbon have same number of carbon atoms.
Reason. Both contain 1 g atom of carbon which contains 6.023×10^{23} carbon atoms.

107 **Assertion.** Equivalent weight of a base

$$= \frac{\text{Molecular weight}}{\text{Acidity}}$$

Reason. Acidity is the number of replaceable hydrogen atoms in one molecule of the base.

108 **Assertion.** Equal moles of different substances contain same number of constituent particles.
Reason. Equal weights of different substances contain the same number of constituent particles.

109 **Assertion.** In a combustion reaction in the air, oxygen is the limiting reactant.
Reason. Oxygen is present in limited amount (only 21%) in the air.

ANSWER

1. (d)	2.(d)	3. (c)	4. (d)	5. (b)
6. (a)	7. (c)	8. (b)	9. (b)	10. (a)
11. (a)	12 (d)	13. (c)	14. (e)	15. (d)
16. (c)	17. (c)	18. (c)	19. (c)	20. (c)
21. (c)	22. (a)	23. (c)	24. (a)	25. (a)
26. (c)	27. (c)	28. (d)	29. (c)	30. (d)
31. (a)	32. (d)	33. (a)	34. (a)	35. (d)
36. (a)	37. (a)	38. (d)	39. (b)	40. (d)
41. (a)	42. (a)	43. (b)	44. (c)	45. (a)
46. (b)	47. (a)	48. (c)	49. (b)	50. (d)
51. (c)	52. (a)	53. (d)	54. (d)	55. (c)
56. (a)	57. (a)	58. (d)	59. (b)	60. (d)
61. (e)	62. (a)	63. (c)	64. (c)	65. (c)
66. (d)	67. (d)	68. (b)	69. (a, c, d)	70. (a, b)
71. (a, c)	72. (b,d)	73. (b)	74. (b)	75. (c)
76. (d)	77. (a)	78. (c)	79. (b)	80. (c)
81. (A-none; B-q; C-s; D-p, r)				
82. (A-q, t; B-p; C-r; D-s)				
83. (3)	84. (5)	85. (9)	86. (6)	87. (8)
88. (7)	89. (2)	90. (3)	91. (3)	92. (5)
93. (4)	94. (6)	95. (2992)	96. (a)	97. (c)
98. (b)	99. (d)	100 (c)	101 (a)	102 (b)
103 (d)	104 (a)	105 (d)	106 (a)	107 (c)
108 (c)	109 (d)			

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