

EXERCISE-I

Atomic, Molecular and Equivalent masses

- In the reaction $2\text{Na}_2\text{S}_2\text{O}_3 + \text{I}_2 \rightarrow \text{Na}_2\text{S}_4\text{O}_6 + 2\text{NaI}$, the equivalent weight of $\text{Na}_2\text{S}_2\text{O}_3$ (mol. wt. = M) is equal to
(A) M (B) $M/2$
(C) $M/3$ (D) $M/4$
- When potassium permanganate is titrated against ferrous ammonium sulphate, the equivalent weight of potassium permanganate is
(A) Molecular weight / 10
(B) Molecular weight / 5
(C) Molecular weight / 2
(D) Molecular weight
- Boron has two stable isotopes, ^{10}B (19%) and ^{11}B (81%). The atomic mass that should appear for boron in the periodic table is
(A) 10.8 (B) 10.2
(C) 11.2 (D) 10.0
- What is the concentration of nitrate ions if equal volumes of 0.1 M AgNO_3 and 0.1 M NaCl are mixed together
(A) 0.1 M (B) 0.2 M
(C) 0.05 M (D) 0.25 M
- Total number of atoms represented by the compound $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ is
(A) 27 (B) 21
(C) 5 (D) 8
- 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) 39.0 (D) 78.0
- 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
- The number of atoms in 4.25 g of NH_3 is approximately
(A) 1×10^{23} (B) 2×10^{23}
(C) 4×10^{23} (D) 6×10^{23}
- 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
- The vapour density of a gas is 11.2. The volume occupied by 11.2 g of the gas at ATP will be
(A) 11.2 L (B) 22.4 L
(C) 1 L (D) 44.8 L
- What should be the equivalent weight of phosphorous acid, if $P=31$; $O=16$; $H=1$
(A) 82 (B) 41
(C) 20.5 (D) None of these
- The number of molecule at NTP in 1 ml of an ideal gas will be
(A) 6×10^{23} (B) 2.69×10^{19}
(C) 2.69×10^{23} (D) None of these
- The specific heat of a metal is 0.16 its approximate atomic weight would be
(A) 32 (B) 16
(C) 40 (D) 64
- The weight of a molecule of the compound $\text{C}_{60}\text{H}_{122}$ is
(A) 1.4×10^{-21} g (B) 1.09×10^{-21} g
(C) 5.025×10^{23} g (D) 16.023×10^{23} g
- What is the weight of oxygen required for the complete combustion of 2.8 kg of ethylene
(A) 2.8 kg (B) 6.4 kg
(C) 9.6 kg (D) 96 kg
- The number of gram atoms of oxygen present in 0.3 gram mole of $(\text{COOH})_2 \cdot 2\text{H}_2\text{O}$ is
(A) 0.6 (B) 1.8
(C) 1.2 (D) 3.6

17. A gaseous mixture contains CH_4 and C_2H_6 in equimolecular proportion. The weight of 2.24 litres of this mixture at NTP is
 (A) 4.6 g (B) 1.6 g
 (C) 2.3 g (D) 23 g
18. Vapour density of a metal chloride is 66. Its oxide contains 53% metal. The atomic weight of the metal is
 (A) 21 (B) 54
 (C) 27.06 (D) 2.086
19. One gram of hydrogen is found to combine with 80g of bromine one gram of calcium valency=2 combines with 4g of bromine the equivalent weight of calcium is
 (A) 10 (B) 20
 (C) 40 (D) 80
20. The equivalent weight of MnSO_4 is half its molecular weight when it is converted to
 (A) Mn_2O_3 (B) MnO_2
 (C) MnO_4 (D) MnO_4^{2-}
21. 100 mL of PH_3 on decomposition produced phosphorus and hydrogen. The change in volume is
 (A) 50 mL increase (B) 500 mL decrease
 (C) 900 mL decrease (D) Nil.
22. 12g of Mg (at. mass 24) on reacting completely with acid gives hydrogen gas, the volume of which at STP would be
 (A) 22.4 L (B) 11.2 L
 (C) 44.8 L (D) 6.1 L
23. 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
24. How many mole of helium gas occupy 22.4 L at 0°C at 1 atm. pressure
 (A) 0.11 (B) 0.90
 (C) 1.0 (D) 1.11
25. Volume of a gas at STP is 1.12×10^{-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}

The mole concept

26. The volume occupied by 4.4 g of CO_2 at STP is
 (A) 22.4 L (B) 2.24 L
 (C) 0.224 L (D) 0.1 L
27. The number of water molecules present in a drop of water (volume 0.0018 mL) at room temperature is
 (A) 6.023×10^{19} (B) 1.084×10^{18}
 (C) 4.84×10^{17} (D) 6.023×10^{23}
28. One mole of calcium phosphide on reaction with excess of water gives
 (A) One mole of phosphine
 (B) Two moles of phosphoric acid
 (C) Two moles of phosphine
 (D) One mole of phosphorus pentoxide

Some Basic Concepts of Chemistry

29. 19.7 kg of gold was recovered from a smuggler. How many atoms of gold were recovered ($Au = 197$)
 (A) 100 (B) 6.02×10^{23}
 (C) 6.02×10^{24} (D) 6.02×10^{25}
30. The total number of protons in 10 g of calcium carbonate is ($N_0 = 6.023 \times 10^{23}$)
 (A) 1.5057×10^{24} (B) 2.0478×10^{24}
 (C) 3.0115×10^{24} (D) 4.0956×10^{24}
31. The number of molecules in 16 g of methane is
 (A) 3.0×10^{23} (B) 6.02×10^{23}
 (C) $\frac{16}{6.02} \times 10^{23}$ (D) $\frac{16}{3.0} \times 10^{23}$
32. Number of molecules in 100 ml of each of O_2 , NH_3 and CO_2 at STP are
 (A) In the order $CO_2 < O_2 < NH_3$
 (B) In the order $NH_3 < O_2 < CO_2$
 (C) The same
 (D) $NH_3 = CO_2 < O_2$
33. The molecular weight of hydrogen peroxide is 34. What is the unit of molecular weight
 (A) g (B) mol
 (C) $g\ mol^{-1}$ (D) $mol\ g^{-1}$
34. The number of water molecules in 1 litre of water is
 (A) 18 (B) 18×1000
 (C) N_A (D) $55.55 N_A$
35. The number of electrons in a mole of hydrogen molecule is
 (A) 6.02×10^{23} (B) 12.046×10^{23}
 (C) 3.0115×10^{23} (D) Indefinite
36. The number of moles of sodium oxide in 620g of it is
 (A) 1 mol (B) 10 moles
 (C) 18 moles (D) 100 moles
37. 2g of oxygen contains number of atoms equal to that in
 (A) 0.5g of hydrogen (B) 4g of sulphur
 (C) 7g of nitrogen (D) 2.3g of sodium
38. Molarity of liquid HCl with density equal to 1.17g/cc is
 (A) 36.5 (B) 18.25
 (C) 32.05 (D) 4.65
39. How many atoms are contained in one mole of sucrose ($C_{12}H_{22}O_{11}$)
 (A) $45 \times 6.02 \times 10^{23}$ atoms/mole
 (B) $5 \times 6.62 \times 10^{23}$ atoms/mole
 (C) $5 \times 6.02 \times 10^{23}$ atoms/mole
 (D) None of these
40. The number of molecules of CO_2 present in 44g of CO_2 is
 (A) 6.0×10^{23} (B) 3×10^{23}
 (C) 12×10^{23} (D) 3×10^{10}

Percentage composition & Molecular formula

41. The percentage of oxygen in $NaOH$ is
 (A) 40 (B) 60
 (C) 8 (D) 10
42. The percentage of nitrogen in urea is about
 (A) 46 (B) 85
 (C) 18 (D) 28

Some Basic Concepts of Chemistry

43. If two compounds have the same empirical formula but different molecular formula, they must have
 (A) Different percentage composition
 (B) Different molecular weights
 (C) Same viscosity
 (D) Same vapour density
44. A compound (80 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
45. The empirical formula of a compound is CH_2O . 0.0835 moles of the compound contains 1.0 g of hydrogen. Molecular formula of the compound is
 (A) $C_2H_{12}O_6$ (B) $C_5H_{10}O_5$
 (C) $C_4H_8O_8$ (D) $C_3H_6O_3$
50. How many g of a dibasic acid (Mol. wt. = 200) should be present in 100 ml of its aqueous solution to give decinormal strength
 (A) 1 g (B) 2 g
 (C) 10 g (D) 20 g
51. 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) 18.0 (B) 27.9
 (C) 1.0 (D) 10.0
52. Mohr's salt is dissolved in dil. H_2SO_4 instead of distilled water to
 (A) Enhance the rate of dissolution
 (B) Prevent cationic hydrolysis
 (C) Increase the rate of ionisation
 (D) Increase its reducing strength
53. Acidified potassium permanganate solution is decolourised by
 (A) Bleaching powder (B) White vitriol
 (C) Mohr's salt (D) Microcosmic salt

Chemical stoichiometry

46. What is the % of H_2O in $Fe(CNS)_3 \cdot 3H_2O$
 (A) 45 (B) 30
 (C) 19 (D) 25
47. What weight of SO_2 can be made by burning sulphur in 5.0 moles of oxygen
 (A) 640 grams (B) 160 grams
 (C) 80 grams (D) 320 grams
48. What is the normality of a 1 M solution of H_3PO_4
 (A) 0.5 N (B) 1.0 N
 (C) 2.0 N (D) 3.0 N
49. Normality of 2M sulphuric acid is
 (A) 2N (B) 4N
 (C) $\frac{N}{2}$ (D) $\frac{N}{4}$
54. Approximate atomic weight of an element is 26.89. If its equivalent weight is 8.9, the exact atomic weight of element would be
 (A) 26.89 (B) 8.9
 (C) 17.8 (D) 26.7
55. Vapour density of a gas is 22. What is its molecular mass
 (A) 33 (B) 22
 (C) 44 (D) 11
56. A solution containing Na_2CO_3 and $NaOH$ requires 300 ml of 0.1 N HCl using phenolphthalein 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 ($NaOH = 40$, $Na_2CO_3 = 106$)
 (A) 0.6 g (B) 1.0 g
 (C) 1.5 g (D) 2.0 g

- 57.** In the preceeding question, the amount of Na_2CO_3 present in the solution is
 (A) 2.650 g (B) 1.060 g
 (C) 0.530 g (D) 0.265 g
- 58.** How many *ml* of 1 (*M*) H_2SO_4 is required to neutralise 10 *ml* of 1 (*M*) NaOH solution
 (A) 2.5 (B) 5.0
 (C) 10.0 (D) 20.0
- 59.** Which of the following cannot give iodometric titrations
 (A) Fe^{3+} (B) Cu^{2+}
 (C) Pb^{2+} (D) Ag^+
- 60.** KMnO_4 reacts with ferrous ammonium sulphate according to the equation

$$\text{MnO}_4^- + 5\text{Fe}^{2+} + 8\text{H}^+ \rightarrow \text{Mn}^{2+} + 5\text{Fe}^{3+} + 4\text{H}_2\text{O}$$
 , here 10 *ml* of 0.1 *M* KMnO_4 is equivalent to
 (A) 20 *ml* of 0.1 *M* FeSO_4
 (B) 30 *ml* of 0.1 *M* FeSO_4
 (C) 40 *ml* of 0.1 *M* FeSO_4
 (D) 50 *ml* of 0.1 *M* FeSO_4
- 61.** $\text{Ca}(\text{OH})_2 + \text{H}_3\text{PO}_4 \rightarrow \text{CaHPO}_4 + 2\text{H}_2\text{O}$ the equivalent weight of H_3PO_4 in the above reaction is
 (A) 21 (B) 27
 (C) 38 (D) 49
- 62.** The mass of BaCO_3 produced when excess CO_2 is bubbled through a solution of 0.205 mol $\text{Ba}(\text{OH})_2$ is
 (A) 81 g (B) 40.5 g
 (C) 20.25 g (D) 162 g
- 63.** The amount of water that should be added to 500 *ml* of 0.5 *N* solution of NaOH to give a concentration of 10 *mg* per *ml* is
 (A) 100 (B) 200
 (C) 250 (D) 500
- 64.** Number of moles of KMnO_4 required to oxidize one mole of $\text{Fe}(\text{C}_2\text{O}_4)$ in acidic medium is
 (A) 0.6 (B) 0.167
 (C) 0.2 (D) 0.4
- 65.** A hydrocarbon contains 86% carbon, 488ml of the hydrocarbon weight 1.68 g at STP. Then the hydrocarbon is an
 (A) Alkane (B) Alkene
 (C) Alkyne (D) Arene
- 66.** 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) 16.0 (B) 41.2
 (C) 82.4 (D) 156.0
- 67.** 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
- 68.** A compound contains atoms of three elements in A, B and C. If the oxidation number of A is +2, B is +5 and that of C is -2, the possible formula of the compound is
 (A) $\text{A}_3(\text{BC}_4)_2$
 (B) $\text{A}_3(\text{B}_4\text{C})_2$
 (C) ABC_2
 (D) $\text{A}_2(\text{BC}_3)_2$

Some Basic Concepts of Chemistry

69. What will be the volume of CO_2 at NTP obtained on heating 10 grams of (90% pure) limestone
- (A) 22.4 litre
(B) 2.016 litre
(C) 2.24 litre
(D) 20.16 litre
70. The ratio of the molar amounts of H_2S needed to precipitate the metal ions from 20mL each of 1M $\text{Cd}(\text{NO}_3)_2$ and 0.5M CuSO_4 is
- (A) 1 : 1
(B) 2 : 1
(C) 1 : 2
(D) Indefinite