Chapter 01

Some Basic Concepts of Chemistry

Practice Section-01

Q.1 Which of the following gases contain the same number of molecules as that of 16 grams of oxygen?

(1) 16 g of O_3

(2) 32 grams of SO_2

(3) 16 g of SO_2

(4) All

Q.2 Which of the following will not have a mass of 10 g?

(1) 0.1 mol $CaCO_3$

(2) 1.51×10^{23} Ca^{2+} ions

(3) 0.16 mol of CO_3^{2-} ions

(4) 7.525×10^{22} Br atom

Q.3 x L of N_2 at S.T.P. contains 3×10^{22} molecules. The number of molecules in $\left(\dfrac{x}{2}\right)$ L of ozone at S.T.P will be:

(1) 3×10^{22}

(2) 1.5×10^{22}

(3) 1.5×10^{21}

(4) 1.5×10^{11}

Q.4 1 g-atom of nitrogen represent

(1) 6.02×10^{23} N_2 molecules

(2) 22.4 L of N_2 at S.T.P

(3) 11.2 L of N_2 at S.T.P

(4) 28 g of nitrogen

Q.5 Which is correct for 10 g of $CaCO_3$?

(1) It contains 1 g atom of carbon

(2) It contains 0.3 g atoms of oxygen

(3) It contains 12 g of calcium

(4) It refers to 0.1 g equivalent of $CaCO_3$

Q.6 The number of atoms are present in 14.6 g of magnesium

(1) 6 N_A

(2) 0.6 N_A

(3) N_A

(4) $\dfrac{N_A}{2}$

Q.7 Which of the following has the highest mass?

(1) 20 g of sulphur

(2) 4 mol of carbon dioxide

(3) 12×10^{24} atoms of hydrogen

(4) 11.2 L of helium at N.T.P.

Q.8 Which one contains maximum number of molecules?

(1) 2.5 g molecule of N_2

(2) 4 g atom of nitrogen

(3) 3.01×10^{24} atoms

(4) 82 g of dinitrogen

Q.9 The weight of 2.01×10^{23} molecules of CO is–

(1) 9.3 g (2) 7.2 g (3) 1.2 g (4) 3 g

Q.10 Which has maximum molecules?

(1) 7 g N_2

(2) 2 g H_2

(3) 16 g NO_2

(4) 16 g O_2

Practice Section-02

Q.1 A sample of aluminium has a mass of 54.0 g. What is the mass of the same number of magnesium atoms? (At. wt. Al = 27, Mg = 24)

(1) 12 g   (2) 24 g   (3) 48 g   (4) 96 g

Q.2 Find the total number of H, S and 'O' atoms in 98 g H_2SO_4

(1) 42×10^{23} (2) 44×10^{23}

(3) 46×10^{23} (4) 6×10^{23}

Q.3 Naturally occurring chlorine is 75.53% Cl^{35} which has an atomic mass of 34.969 amu and 24.47% Cl^{37} which has a mass of 36.966 amu. Calculate the average atomic mass of chlorine –

(1) 35.5 amu   (2) 36.5 amu

(3) 71 amu   (4) 72 amu

Q.4 Four 1-1 liter flasks are separately filled with the gases H_2, He, O_2 and O_3 at the same temperature and pressure. The ratio of total number of atoms of these gases present in different flask would be:

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

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

Q.5 The weight of 2.01×10^{23} molecules of CO is –

(1) 9.3 g   (2) 7.2 g   (3) 1.2 g   (4) 3 g

Q.6 The volume of phosgene formed at STP when 11.2 lit of chlorine reacts with carbon monoxide is

(1) 11.2 lit   (2) 22.4 lit   (3) 5.6 lit   (4) 44.8 lit

Q.7 The moles of O_2 required for reacting with 6.8 g ammonia ($NH_3 + O_2 \rightarrow NO + H_2O$) is :

(1) 5   (2) 2.5   (3) 1   (4) 0.5

Q.8 What mass of $CaCl_2$ in grams would be enough to produce 14.35 g of AgCl?

(1) 5.55 g (2) 8.29 g (3) 16.59 g (4) 10 g

Q.9 Number of gram equivalents of solute in 100 ml of 5N HCl solution is

(1) 50   (2) 500   (3) 5   (4) 0.5

Q.10 The number of moles of Fe_2O_3 formed when 0.5 moles of O_2 and 0.5 moles of Fe are allowed to react are

(1) 0.25   (2) 0.5   (3) 1/3   (4) 0.125

Q.11 The empirical formula of an acid is CH_2O_2, the probable molecular formula of acid may be

(1) CH_2O (2) CH_2O_2 (3) $C_2H_4O_2$(4) $C_3H_6O_4$

Q.12 The volume of a gas at 0° C and 700 mm pressure is 760 cc. The number of molecules present in this volume is:

Q.13 In an organic compound of molar mass 108 g mol^{-1} C, H and N atoms are present in 9 : 1 : 3.5 by weight. Molecular formula can be :

(1) $C_6H_8N_2$ (2) $C_7H_{10}N$

(3) $C_5H_6N_3$ (4) $C_4H_{18}N_3$

Practice Section-03

Q.1 H_2O_2 is sold as a solution of approximately 5.0 g H_2O_2 per 100 ml of the solution. The molarity of this solution is approximately

(1) 0.15 M (2) 1.5 M (3) 3.0 M (4) 3.4 M

Q.2 The molarity of pure water is

(1) 100 M (2) 55.6 M (3) 50 M (4) 18 M

Q.3 The mass of $CaCO_3$ required to react with 25 mL of 0.75 molar HCl is

(1) 0.94 g (2) 0.68 g (3) 0.76 g (4) 0.52 g

Q.4 If 1.26 grams of oxalic acid is dissolved in 250 ml of solution then its normality is

(1) 0.05 (2) 0.04 (3) 0.02 (4) 0.08

Q.5 Which of the following is/are not affected by temperature?

(1) Molarity (2) Molality

(3) Normality (4) None of these

Q.6 5.85 g of NaCl are dissolved in 90 g of water. The mole fraction of NaCl is-

(1) 0.1 (2) 0.01 (3) 0.2 (4) 0.0196

Q.7 The molality of 15% (wt./vol.) solution of H_2SO_4 of density 1.1 g/cm^3 is approximately-

(1) 1.2 (2) 1.4 (3) 1.8 (4) 1.6

Q.8 Dulong and Petit's law is valid only for

(1) metals (2) non-metals

(3) gaseous elements (4) solid elements

Q.9 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 the substance will :-

(1) be a function of the molecular mass of the substance

(2) remain unchanged

(3) increase twofold

(4) decrease twice

Q.10 How many moles of magnesium phosphate, $Mg_3(PO_4)_2$ will contain 0.25 mole of oxygen atoms?

(1) 3.125×10^{-2} (2) 1.25×10^{-2}

(3) 2.5×10^{-2} (4) 0.02

Practice Section-04

Q.1 In Haber's process, the volume at S.T.P of ammonia relative to the total volume of reactants at STP is :
(1) One fourth
(2) One half
(3) Same
(4) Three fourth

Q.2 6 g of carbon combines with 32 g of sulphur to form CS_2, 12 g of C also combine with 32 g oxygen to form CO_2. 10 g of sulphur combines with 10 g of oxygen to form Sulphur dioxide. Which law is illustrated by this?
(1) Law of multiple proportions
(2) Law of constant composition
(3) Law of reciprocal proportions
(4) Gay Lussac's law

Q.3 Which of the following data illustrates the law of conservation of mass?
(1) 56 g of C reacts with 32 g of Oxygen to produce 44 g of CO_2
(2) 1.70 g of $AgNO_3$ reacts with 100 ml of 0.1M HCl to produce 1.435 g of AgCl and 0.63 g of HNO_3
(3) 12 g of C is heated in vacuum and on cooling, there is no change in mass
(4) 36 g of S reacts with 16 g of O_2 to produce 48 g of SO_2

Q.4 One part of an element A combines with two parts of another element B, 6 parts of element C combines with 4 parts of B
If A and C combine together the ratio of their weights, will be governed by
(1) law of definite proportion
(2) law of multiple proportion
(3) law of reciprocal proportion
(4) law of conservation of mass

Q.5 The % of copper and oxygen in samples of CuO obtained by different methods were found to be the same. This proves the law of:
(1) Constant Proportion
(2) Reciprocal Proportion
(3) Multiple Proportion
(4) Conservation of mass.

Q.6 Two elements X and Y combine in gaseous state to form XY in the ratio 1:35.5 by mass. The mass of Y that will be required to react with 2 g of X is:
(1) 7.1 g (2) 3.55 g (3) 71 g (4) 35.5 g

Q.7 4.4 g of an oxide of nitrogen gives 2.24 L of nitrogen and 60 g of another oxide of nitrogen gives 22.4 L of nitrogen at S.T.P. The data illustrates:
(1) Law of conservation of mass
(2) Law of constant proportions
(3) Law of multiple proportions
(4) Law of reciprocal proportions

Q.8 One of the following combinations which illustrates the law of reciprocal proportion is :
(1) N_2O_3, N_2O_4, N_2O_5 (2) NaCl, NaBr, NaI
(3) CS_2, CO_2, SO_2 (4) PH_3, P_2O_3, P_2O_5

Q.9 A transition metal M forms a volatile chloride which has a vapour density of 94.8. If it contains 74.75% of chlorine the formula of the metal chloride will be
(1) MCl_2 (2) MCl_4 (3) MCl_5 (4) MCl_3

Q.10 The ratio of number of oxygen atoms (O) in 16.0g ozone (O_3), 28.0 g carbon monoxide (CO) and 16.0g oxygen (O_2) is :-
(Atomic mass : C = 12, O = 16 and Avogadro's constant $N_A = 6.0 \times 10^{23}$ mol^{-1})
(1) 3:1:1 (2) 1:1:2 (3) 3:1:2 (4) 1:1:1

ANSWER KEY

PRACTICE SECTION-01

Que.	1	2	3	4	5	6	7	8	9	10
Ans:	2	3	2	3	2	2	2	4	1	2

PRACTICE SECTION-02

Que.	1	2	3	4	5	6	7	8	9	10	11	13
Ans:	3	1	1	3	1	1	4	1	4	1	2	1

Q.12 1.8×10^{22}

PRACTICE SECTION-03

Que.	1	2	3	4	5	6	7	8	9	10
Ans:	2	2	1	4	2	4	4	4	2	1

PRACTICE SECTION-04

Que.	1	2	3	4	5	6	7	8	9	10
Ans:	2	3	2	3	1	3	3	3	2	4