Chemistry

Syllabus: Mole Concept

Q.51 Using the rules for significant figures, the correct answer for the expression $\frac{0.02858 \times 0.112}{0.5702}$ will be

(1) 0.005613 (2) 0.00561
(3) 0.0056 (4) 0.006

Q.52 The average molar mass of chlorine is 35.5 g mol^{-1}. The ratio of ^{35}Cl to ^{37}Cl in naturally occurring chlorine is close to

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

Q.53 Hemoglobin contains 0.34% of iron by mass. The number of Fe atoms in 3.3 g of hemoglobin is (Given: Atomic mass of Fe is 56u, N_A is 6.022×10^{23} mol^{-1})

(1) 1.21×10^5 (2) 12.0×10^{16}
(3) 1.21×10^{20} (4) 3.4×10^{22}

Q.54 $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

20 g 5 g

Consider the above reaction, the limiting reagent of the reaction and number of moles of NH_3 formed respectively are

(1) H_2,1.42 moles (2) H_2,0.71 moles
(3) N_2,1.42 moles (4) N_2,0.71 moles

Q.55 The ratio of masses of oxygen and nitrogen in a particular gaseous mixture is 1 : 4. The ratio of number of their molecule is

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

Q.56 The simplest formula of a compound containing 50% of element X (atomic mass 10) and 50% of element Y (atomic mass 20) is

(1) XY (2) X_2Y
(3) XY_3 (4) X_2Y_3

Q.57 A solution of sodium sulfate contains 92g of Na^+ ions per kilogarm of water. The molality of Na^+ ions in that solution in mol Kg^{-1} is

(1) 16 (2) 8
(3) 4 (4) 12

Q.58 In the reaction. $2Al_{(s)} + 6HCl_{(s)} \rightarrow 2Al^{3+}_{(aq)} + 6Cl^-_{(aq)} + 3H_{2(g)}$

(1) 6L $HCl_{(aq)}$ is consumed for every 3L $H_{2(g)}$ produced

(2) 33.6L $H_{2(g)}$ is produced regardless of temperature and pressure for every mole Al that reacts

(3) 67.2L $H_{2(g)}$ at STP is produced for every mole Al that reacts

(4) 11.2$H_{2(g)}$ at STP is produced for every mole $HCl_{(aq)}$ consumed

Q.59 1.5 mol of O_2 combine with Mg to form oxide MgO. The mass of Mg (At. mass 24) that has combined is

(1) 72 g (2) 36 g
(3) 48 g (4) 24 g

Q.60 The decomposition of a certain mass of $CaCO_3$ gave 11.2 dm^3 of CO_2 gas at STP.

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The mass of KOH required to completely neutralise the gas is

(1) 56 g (2) 28 g
(3) 42 g (4) 20 g

Q.61 Equivalent weight of $KMnO_4$ acting as an oxidant in acidic medium is

(1) The same as its molecular weight
(2) Half of its molecular weight
(3) One-third of its molecular weight
(4) One-fifth of its molecular weight

Q.62 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

Q.63 The number of oxygen atoms in 4.4 g of CO_2 is approx

(1) 1.2×10^{23} (2) 6×10^{22}
(3) 6×10^{23} (4) 12×10^{23}

Q.64 Molarity of liquid HCl with density equal to 1.17g/cc is

(1) 36.5 (2) 18.25
(3) 32.05 (4) 4.65

Q.65 In which case is the number of molecules of water minimum

(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

Q.66 The value of amu is which of the following is

(1) 1.57×10^{-24} kg (2) 1.66×10^{-24} kg
(3) 1.99×10^{-23} kg (4) 1.66×10^{-27} kg

Q.67 The mass of a molecule of water is

(1) 3×10^{-26} kg (2) 3×10^{-25} kg
(3) 1.5×10^{-26} kg (4) 2.5×10^{-26} kg

Q.68 The molarity of orthophosphoric acid having purity of 70% by weight and specific gravity 1.54 would be

(1) 11 M (2) 22 M
(3) 33 M (4) 44 M

Q.69 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

(1) II < I < III < IV
(2) I < II < III < IV
(3) III < II < IV < I
(4) IV < II < III < I

Q.70 **Assertion:** Atoms can neither be created nor destroyed.

Reason: Under similar condition of temperature and pressure, equal volume of gases does not contain equal number of atoms.

(1) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(2) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(3) If assertion is true but reason is false.
(4) If the assertion and reason both are false.

Q.71 Which is heaviest

(1) 25 gm of mercury
(2) 2 moles of water
(3) 2 moles of carbon dioxide
(4) 4 gm atoms of oxygen

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Q.72 When 6gm urea dissolve in 180 gm H_2O. The mole fraction of urea is

(1) $\frac{10}{10.1}$ (2) $\frac{10.1}{10}$

(3) $\frac{10.1}{0.1}$ (4) $\frac{0.1}{10.1}$

Q.73 1 M solution contains 0.5 moles of solute in-

(1) 500g solvent (2) 500 ml solution

(3) 1000g solvent (4) 1000 ml solvent

Q.74 In which ratio of volumes 0.4 M HCl and 0.9 M HCl are to be mixed such that the concentration of the resultant solution becomes 0.7 M

(1) 4:9 (2) 2:3

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

Q.75 Which of the following concentration factor is affected by change in temperature

(1) Molarity

(2) Molality

(3) Mole fraction

(4) Weight fraction

Q.76 The molar concentration of Cl^- ions in a solution obtained by mixing 300 mL of 0.3 M NaCl and 200 mL of 0.4 M $BaCl_2$ is

(1) 0.9 M (2) 1.5 M

(3) 0.25 M (4) 0.5 M

Q.77 What will be the molality of the solution containing 18.25 g of HCl gas in 500 g of water?

(1) 0.1 m (2) 1 M

(3) 0.5 m (4) 1 m

Q.78 Which of the following statements is correct about the given reaction: $4Fe_{(s)} + 3O_{2(g)} \rightarrow 2Fe_2O_{3(g)}$?

(1) Total mass of iron and oxygen in reactants = total mass of iron and oxygen in product; therefore, it follows law of conservation of mass.

(2) Total mass of reactants = total mass of product; therefore, law of multiple proportions is followed.

(3) Amount of Fe_2O_3 can be increased by taking any one of the reactants (iron or oxygen) in excess.

(4) Amount of Fe_2O_3 produced will decrease if the amount of any one of the reactants (iron or oxygen) is taken in excess.

Q.79 **Assertion:** The reactant which is present in larger amount limits the amount of product formed is called limiting reagent.

Reason: Amount of product formed does not depend upon the amount of reactants taken.

(1) If both assertion and reason are true and the reason is the correct explanation of the assertion.

(2) If both assertion and reason are true but reason is not the correct explanation of the assertion.

(3) If assertion is true but reason is false.

(4) If the assertion and reason both are false.

Q.80 **Assertion:** Matter can neither be created nor destroyed.

Reason: This is law of definite proportions.

(1) If both assertion and reason are true and the reason is the correct explanation of the assertion.

(2) If both assertion and reason are true but reason is not the correct explanation of the assertion.

(3) If assertion is true but reason is false.

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(4) If the assertion and reason both are false.

Q.81 What volume of dioxygen is required for complete combustion of 2 volumes of acetylene gas at NTP?
(1) 2 Volumes (2) 5 Volumes
(3) 10 Volumes (4) 4 Volumes

Q.82 An organic compound contains C = 40%, H = 13.33% and N = 46.67%. Its empirical formula is
(1) C_2H_2N (2) C_3H_7N
(3) CH_4N (4) CHN

Q.83 What will be the standard molar volume of He, if its density is 0.1784 g/L at STP?
(1) 11.2 L (2) 22.4 L
(3) 5.6 L (4) 2.8 L

Q.84 How many oxygen atoms will be present in 88 g of CO_2?
(1) 24.09×10^{23} (2) 6.023×10^{23}
(3) 44×10^{23} (4) 22×10^{24}

Q.85 The Statements for lows of chemical combinations are given below. Mark The option which is not correctly matched.
(1) matter can neither be created nor destroyed: Low of conservation of mass.
(2) A compound always contains exactly the same proportion of elements by weight: Law of definite proportions
(3) When gases combine they do so in a simple ratio by weight: Gay Lussac's Law
(4) Equal volumes of gases at same temperature and pressure contain same number of molecules: Avogadro's Law

Q.86 What mass of 95% pure $CaCO_3$ will be required to neutralize 50mL of 0.5M HCl solution according to the following reaction
$CaCO_{3(s)} + 2HCl_{(aq)} \rightarrow CaCl_{2(aq)} + CO_{2(g)} + H_2O_{(i)}$
[Calculate upto second place of decimal point]
(1) 3.65 g (2) 9.50 g
(3) 1.25 g (4) 1.32 g

Q.87 120 g of an organic compound that contains only carbon and hydrogen gives 330g of CO_2 and 270g of water on complete combustion. The percentage of carbon and hydrogen, respectively are
(1) 25 and 75 (2) 40 and 60
(3) 60 and 40 (4) 75 and 25

Q.88 12g of Mg (At. mass 24) will react completely with acid to give
(1) One mole of H_2
(2) 1/2 mole of H_2
(3) 2/3 mole of O_2
(4) Both 1/2 mol of H_2 and 1/2 mol of O_2

Q.89 What volume of oxygen gas (O_2) measured at 0°C and 1 atm, is needed to burn

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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

Q.90 The total number of protons in 10 g of calcium carbonate is ($N_0 = 6.023\times10^{23}$)
(1) 1.5057×10^{24} (2) 2.0478×10^{24}
(3) 3.0115×10^{24} (4) 4.0956×10^{24}

Q.91 Which one of the following is the heaviest
(1) 0.2 mole of hydrogen gas
(2) 6.023×10^{22} molecules of nitrogen
(3) 0.1g of silver
(4) 0.1 mole of oxygen gas

Q.92 If 1 ml of water contains 20 drops. Then no. of molecules in a drop of water is
(1) 6.023×10^{23} molecules
(2) 1.376×10^{26} molecules
(3) 1.344×10^{18} molecules
(4) 4.346×10^{20} molecules

Q.93 Number of atoms of He in 100 amu of He (atomic wt. of He is 4) are
(1) 25 (2) 100
(3) 50 (4) $100\times6\times10^{-23}$

Q.94 The weight of a molecule of the compound $C_{60}H_{122}$ is
(1) 1.4×10^{-21} g (2) 1.09×10^{-21} g
(3) 5.025×10^{23} g (4) 16.023×10^{23}g

Q.95 The number of significant figures in 60.0001 are
(1) 5 (2) 6
(3) 3 (4) 2

Q.96 How many grams of dibasic acid (mol. wt. 200) should be present in 100ml of its aqueous solution to give decinormal strength
(1) 1g (2) 2g
(3) 10g (4) 20g

Q.97 A 5.2 molal aqueous solution of methyl alcohol, CH_3OH, is supplied. What is the mole fraction of methyl alcohol in the solution
(1) 0.100 (2) 0.190
(3) 0.086 (4) 0.050

Q.98 The number of atoms in 16gm of methane is
(1) 30×10^{23}
(2) 6.02×10^{23}
(3) $\frac{16}{6.02}\times10^{23}$
(4) $\frac{16}{3.0}\times10^{23}$

Q.99 A solution contains 1.2046×10^{24} hydrochloric acid molecules in one dm^3 of the solution. The strength of the solution is
(1) 6 N (2) 2 N
(3) 4 N (4) 8 N

Q.100 What will be the value of molality for an aqueous solution of 10% w/w NaOH. (Na = 23, O = 16, H = 1)
(1) 2.778 (2) 5
(3) 10 (4) 2.5

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