Stoichiometry 1

[Mole Concept, Stoichiometry, Concentration terms, Atomic wt & Molecular weight]

1. Definition of Mole, Mole Vs Number

Q 1. Mass of atoms & molecules are not measured in g because
(A) They have very high mass
(B) They have very low mass
(C) Their mass can not be measured
(D) g is not S.I. unit of mass

Q 2. 1 amu is equal to
(A) $\frac{1}{14}\{O^{16}\}$ (B) $\frac{1}{12}\{C^{12}\}$
(C) 1 g of H_2 (D) $1.66\times10^{-27}Kg$

Q 3. The modern atomic mass scale is based on
(A) O^{16} (B) C^{12}
(C) H^1 (D) C^{13}

Q 4. 10 g in 'amu' is equal to
(A) $6.022\times10^{22}\,amu$
(B) $6.022\times10^{24}\,amu$
(C) $6.022\times10^{23}\,amu$
(D) None of these

Q 5. Avogadro's number value
(A) is always equal to 6.022×10^{23}
(B) depends on definition of 1 amu
(C) depends on definition of 1 mole
(D) Both B & C

Q 6. If the atomic weight of carbon were set at 100 amu, what would be the value of avogadro's no. [Given: mass of 1 mole of C-12 atoms 12 g]
(A) $0.12\times6.022\times10^{23}$
(B) $8.33\times6.022\times10^{23}$
(C) 6.022×10^{21}
(D) 6.022×10^{23}

Q 7. If a mole were assume to contain 1×10^{24} particles, what would be the mass of a single
(A) $32\times10^{-24}\,amu$ (B) 32 g
(C) 32 amu (D) $\frac{32\times6.022}{10}\,amu$

Q 8. If the atomic mass of oxygen were taken to be 100, the molecular mass of water would be **[IIT JEE 2006]**
(A) 6.25 (B) 112.5
(C) 102 (D) 106.25

Q 9. How many years it would take to spend avogadro's number of rupees at the rate of 10 lac rupees per second.
(A) $1.9\times10^{28}\,years$ (B) $1.9\times10^{24}\,years$
(C) $1.9\times10^{17}\,years$ (D) $1.9\times10^{12}\,years$

Q 10. No of electrons in 5 mole of electrons (N_A = Avogadro's number)
(A) $5N_A$ (B) $5/N_A$
(C) $N_A/5$ (D) None of these

Q 11. In 10^{24} molecules of Na_2CO_3, the mole of Na_2CO_3 is equal to
(A) $\frac{100}{6.022}$ (B) $\frac{10}{6.022}$
(C) $\frac{6.022}{10}$ (D) 6.022×10

Q 12. 1 mole of P_4 molecule contains
(A) 1 molecule (B) 4 molecule
(C) $0.25N_A$ atoms (D) $4N_A$ Atoms

Q 13. The number of Na atoms in 2 mole of $Na_4[Fe(CN)_6]$ is **[AIIMS 2013]**
(A) 2 (B) 6.022×10^{23}
(C) $8\times6.022\times10^{23}$ (D) $4\times6.022\times10^{23}$

Q 14. 1.5 mole of oxygen atom is present in
(A) 0.5 mole $BaCO_3$ (B) 1 mole $BaCO_3$
(C) 2 mole $BaCO_3$ (D) 0.25 mole $BaCO_3$

Q 15. 5 mole of Na_2SO_4 contains
(A) 20 Mole O-atom (B) 10 Mole O-atom
(C) 15 Mole O-atom (D) 4 Mole O-atom

2. Atomic Mass, Molecular Mass

Q 1. The unit of atomic mass will be
(A) g (B) amu
(C) g/mol (D) Unitless

Q 2. Mass of 1 atom of Ar is (Atomic Mass = 40)
(A) 40 g (B) 6.64×10^{-23} *amu*
(C) 3.01×10^{23} (D) None of these

Q 3. Mass of 1 mole of S-atom is (Atomic Mass = 32)
(A) 32 amu (B) 32 g
(C) 1.927×10^{25} *amu* (D) both B & C

Q 4. Given that the abundances of isotopes ^{54}Fe, ^{56}Fe and ^{57}Fe and 5% , 90% and 5% respectively, the atomic mass of Fe is **[JEE Main 2005]**
(A) 55.85 (B) 55.95
(C) 55.65 (D) None of these

Q 5. An element X has the following isotopic composition: **[CBSE PMT 2007]**
^{200}X = 90 %, ^{199}X = 8 % & ^{202}X = 2.0 %
The weighted average atomic mass of the naturally occurring element X is closest to
(A) 201 (B) 202
(C) 199 (D) 200

Q 6. The atomic masses of $_1^6Li$ and $_1^7Li$ are 6.0151 amu and 7.0160 amu, respectively. Calculate the natural abundances of the two isotopes. The average atomic mass of Li is 6.941
(A) 7.5 & 92.5 % (B) 5 & 95 %
(C) 10 & 90 % (D) 20 & 80 %

Q 7. Calculate the average atomic mass of Chlorine using the following data. **[NCERT]**

Isotopes	% abundance	Molar mass
^{35}Cl	75.77	34.9689
^{37}Cl	24.23	36.9659

Q 8. Using following data & calculate the molar mass naturally occurring Ar isotopes. **[NCERT]**

Isotopes	Isotopic molar mass	Abundance
^{36}Ar	35.96755	0.337 %
^{38}Ar	37.96272	0.063 %
^{40}Ar	39.9624	99.60 %

Q 9. The atomic weight of cu is 63.6. There are only two naturally occurring isotopes of copper, ^{63}Cu The atomic weight of cu is 63.6. There are only two naturally occurring isotopes of copper, ^{63}Cu
(A) 20 % (B) 70 %
(C) 30 % (D) 80 %

Q 10. The number of Ag-atoms in 54 g Ag is (Ag=108)
(A) $\frac{N_A}{10}$ (B) $\frac{N_A}{20}$
(C) $\frac{N_A}{40}$ (D) N_A

Q 11. The number of Fe-atoms in 560 amu of Fe (Atomic Mass of Fe = 56) is
(A) $10N_A$ (B) 100
(C) 10 (D) None of these

Q 12. The number of atoms in 0.004 g of Mg will be
(A) 4×10^{20} (B) 8×10^{20}
(C) 10^{20} (D) 6.02×10^{20}

Q 13. What is the molecular mass of Sodium carbonate?
(A) 10.6 (B) 53
(C) 106 (D) None of these

Q 14. Number of milimole in 1 g of water is
(A) 1 (B) 18
(C) 55.55 (D) 100

Q 15. The number of molecules of SO_2 in 16 g of SO_2?
(A) 3×10^{23} (B) 2.5×10^{23}
(C) 1.5×10^{23} (D) 4.5×10^{23}

Q 16. 8 g of O_2 has same no of molecules as
(A) 7 g CO (B) 14 g CO
(C) 22 g CO_2 (D) 44 g CO_2

Q 17. The gas having same no of molecules as 8 g of Oxygen is
(A) 16 g O_3 (B) 16 g SO_3
(C) 48 g SO_3 (D) 1 g H_2

Q 18. The least number of molecules is present in
(A) 11 g CO_2 (B) 32 g SO_2
(C) 2 g H_2 (D) 14 g N_2

Q 19. Which of the following has highest mass?
(A) 50 g Fe (B) 5 mole of N_2
(C) 1 g-atom of Ag (D) 5×10^{23} C-atoms

Q 20. The weight of a mixture containing 6.02×10^{23} N_2 molecules & 3.01×10^{23} SO_2 molecules is
(A) 46 g (B) 92 g
(C) 60 g (D) 30 g

Q 21. Which of the following contains highest no of atoms? **[NCERT Exemplar]**
(A) 4 g He (B) 46 g Na
(C) 0.40 g Ca (D) 12 g He

Q 22. Which of the following has largest no of atoms?
(A) 11 g CO_2 (B) 4 g H_2

(C) 5 g NH_3 (D) 8 g SO_2

Q 23. Out of 1 g O_2, 1 g O & 1 g O_3, the maximum no of O – atoms present in
(A) 1 g O (B) 1 g O_2
(C) 1 g O_3 (D) all has same no of atoms

Q 24. The mass of Carbon present in 0.5 mole of $K_4[Fe(CN)_6]$
(A) 1.8 g (B) 18 g
(C) 3.6 g (D) 36 g

Q 25. Number of moles of water in 488 g of $BaCl_2.2H_2O$ [Ba = 137, Cl = 35.5]
(A) 2 mole (B) 4 mole
(C) 3 mole (D) 1 mole

Q 26. Mass of H_2O in 1000 Kg $CuSO_4.5H_2O$ [Cu=63.5]
(A) 360.72 Kg (B) 36.072 Kg
(C) 3607 Kg (D) 3.6072 Kg

Q 27. If a sample of $(NH_4)_3PO_4$ has 3.18 mole H atoms. The no. mole of O atoms present in the sample is
(A) 0.265 (B) 0.795
(C) 1.06 (D) 3.18

Q 28. A sample of Al has mass 54 g. what is the mass of same number of Mg atoms? [Al = 27,Mg = 24]
(A) 12 g (B) 24 g
(C) 48 g (D) 96 g

Q 29. Suppose the elements X and Y combine to from two compounds XY_2 & 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 weight of X & Y are **[NEET 2016]**
(A) 40, 30 (B) 60, 40
(C) 20, 30 (D) 30, 20

Q 30. What is correct for 10 g of $CaCO_3$?
(A) It has 1 g-atom of carbon
(B) It has 0.3 g –atoms of oxygen
(C) It contains 12 g of Ca
(D) none of these

3. Ionic Mass, Molar mass

Q 1. The charge present on 1 g-ions of Al^{3+} is
(A) $\frac{1}{27}N_A.e$ Coul (B) $\frac{1}{3}N_A.e$ Coul
(C) $\frac{1}{9}N_A.e$ Coul (D) $3N_A.e$ Coul

Q 2. The total no of valence electrons in 4.2 g of N_3^- ion is **[CBSE PMT 1994]**
(A) 2.1 N_A (B) 4.2 N_A
(C) 1.6 N_A (D) 3.2 N_A

Q 3. If mass of 1 electorn is 9×10^{-28} g then weight of 1 mole of electron is
(A) 9×10^{-28} g (B) 6×10^{-23} g
(C) 1.008 g (D) 0.00054 g

Q 4. No of mole of electron in 1 kg of electron is $[m_e = 9.11\times10^{-28}\,g]$ **[IIT JEE 2002S]**
(A) 6.02×10^{23} (B) $\frac{1}{9.108}\times10^{31}$
(C) $\frac{6.022}{9.108}\times10^{54}$ (D) $\frac{1}{6.022\times9.108}\times10^{7}$

Q 5. Mass of a tons of X is 6.642×10^{-23} g. The number of moles contained in 40 Kg of X will be **[AIIMS 2009]**
(A) 10 mole (B) 100 mole
(C) 1000 mole (D) 10000 mole

Q 6. From 160 g of SO_2, 1.2044×10^{24} molecules of SO_2 was removed, then mole of SO_2 remained is
(A) 0.5 mole (B) 1 mole
(C) 2 mole (D) 2.5 mole

Q 7. 10^{21} molecules are removed from 200 mg of CO_2. The moles of CO_2 left are **[AIIMS 2007]**
(A) 2.88×10^{-3} (B) 28.8×10^{-4}
(C) 288×10^{-7} (D) 28.8×10^{3}

Q 8. Find the weight of O_2 having same no of O-atoms as no of Na atoms present in 82 g of Na_3PO_4
(A) 32 g (B) 24 g
(C) 48 g (D) None of these

Q 9. Specific volume of a cylindrical virus particle is 0.0602 cc/g whose radius and length are 7 A° and 10 A° respectively. Find the molar weight of Virus. **[CBSE PMT 2001]**
(A) 15.4 Kg/mol (B) 1.54×10^{4} Kg/mol
(C) 3.08×10^{4} Kg/mol (D) 3.08×10^{7} Kg/mol

4. Mole Vs Volume, Molar Volume

Q 1. Find the mass of O_2 kept in a vessel of 200 ml at 38 cm of Hg pressure at 27°C
(A) 3.2 g (B) 0.13 g
(C) 1.3 g (D) None of these

Q 2. Find the pressure exerted by 7 g of N_2 kept in 0.5 lit flask at 25°C
(A) 12.23 atm (B) 1.223 atm
(C) 2.3 atm (D) None of these

Q 3. Find the volume of 64 g of O_2 kept at 2×10^3 N / m^2 and at 127 °C
(A) 0.335 lit (B) 33.25 lit
(C) 3.325 lit (D) None of these

Q 4. Molar volume of O_3 at 25°C & 2 atm pressure is
(A) 22.4 lit. (B) 24.45 lit
(C) 12.225 lit. (D) None of these

Q 5. Find mole of H_2O in 18 ml of H_2O at NTP
(A) 18/22400 (B) 18
(C) 1 (D) None of these

Q 6. Calculate the volume of 71 g of Cl_2 gas at NTP.
(A) 11.2 lit. (B) 1.12 lit.
(C) 2.24 lit. (D) 22.4 lit.

Q 7. Calculate the volume of 16 g of Ozone at NTP
(A) 7.5 lit. (B) 22.4 lit.
(C) 11.2 lit. (D) None of these

Q 8. If weight of 5.6 lit gas at NTP is 11 g then gas is
(A) PH_3 (B) $COCl_2$
(C) NO (D) N_2O

Q 9. The weight of SO_2 if its volume is 2.24 lit at NTP
(A) 6.4 g (B) 3.2 g
(C) 1.6 g (D) 0.8 g

Q 10. 4.48 lit of CH_4 at NTP has
(A) 1.2×10^{22} CH_4 molecules
(B) 0.5 mole of CH_4
(C) 3.2 g of CH_4
(D) 0.1 mole of CH_4

Q 11. 1 CC N_2O at NTP contains **[CBSE PMT 1988]**
(A) $\frac{1.8}{22.4}\times10^{22}$ atoms
(B) $\frac{6.022}{22400}\times10^{23}$ molecules
(C) $\frac{1.32}{224}\times10^{22}$ electrons
(D) All of the above

Q 12. From 40 g of CH_4, 1.2044×10^{24} molecules of CH_4 was removed, then volume of CH_4 remained at NTP is
(A) 0.5 lit (B) 11.2 lit
(C) 5.6 lit (D) 22.4 lit

Q 13. 1 g mixture of O_2 & O_3 has volume 600 ml at NTP. Find the volume of O_2 in the mixture.
(A) 300 ml (B) 400 ml
(C) 600 ml (D) 200 ml

Q 14. Maximum no of atoms are present in
(A) 11.2 lit of SO_2 at NTP
(B) 22.4 lit of He at NTP
(C) 2 g of H_2
(D) 11.2 lit of Methane at NTP

Q 15. Maximum no of electrons are present in
(A) 2.24 lit of SO_2 at NTP
(B) 0.2 mole of NH_3
(C) 1.5 g-atoms of Oxygen
(D) 2 g-atoms of Sulphur

5. Density, Vapour Density, Percentage Composition, Empirical Formula

Q 1. The density of water at 4°C is 1 g/ml. The volume occupied by 1 molecule of water is approx
(A) 3.0×10^{-23} ml (B) 6.0×10^{-22} ml
(C) 3.0×10^{-21} ml (D) 9.0×10^{-23} ml

Q 2. The density of Fluorine nucleus (At. Mass = 19) if radius of Nucleus is 5×10^{-13} cm is
(A) 6.0288×10^{13} g / ml
(B) 3.63×10^{17} g / ml
(C) 3.155×10^{-23} g / ml
(D) None of these

Q 3. A 25 mm x 40 mm piece of gold foil is 0.25 mm thick. The density of gold is 19.32 g/cc. How many gold atoms are present in the sheet?
(A) 7.7×10^{23} (B) 1.5×10^{23}
(C) 4.3×10^{23} (D) 1.47×10^{22}

Q 4. The density of gas at NTP is 1.40 g/lit. The molecular weight of the gas is
(A) 28 (B) 30 (C) 31.36 (D) 35

Q 5. Density of ozone gas relative to methane under identical condition of T & P is
(A) 1 (B) 3 (C) 1.5 (D) 2.5

Q 6. The vapour density of gas A is twice to that of B. of the molecular weight of B is M, the molecular weight of A will be
(A) M (B) 2M (C) 3M (D) 0.5M

Q 7. The vapour density of gas is 11.2. The volume occupied by 11.2 g of the gas at NTP is (in lit.)
(A) 11.2 (B) 1.12 (C) 22.4 (D) 5.6

Q 8. The percentage composition of Nitrogen in Urea is about [Urea: $CO(NH_2)_2$]
(A) 38.4 (B) 46.6 (C) 59.1 (D) 61.3

Q 9. Calculate the mass percent of different elements present in sodium sulphate. **[NCERT]**

Q 10. Haemoglobin contains 0.33 % of iron by weight. The molecular weight of haemogolbin is approximately 67200 g. The number of iron atoms (At. Wt. 56) present in 1 molecule of haemoglobin atom **[CBSE PMT 1998]**
(A) 1 (B) 6 (C) 4 (D) 2

Q 11. Insulin contains 3.4 % by wt of Sulphur by mass. What will be the minimum molecular mass of insulin.
(A) 94.117 (B) 1884 (C) 941.17 (D) 976

Q 12. Sodium salt of methyl orange contains 7 % by wt of Na by mass. What will be the minimum molecular mass of the compound.
(A) 420 (B) 375 (C) 328.57 (D) 295

Q 13. Cortisone is a molecular substance containing 21 atoms of Carbon per molecule. The mass percentage of carbon in cortisone is 69.98 %. Its molar mass is
(A) 176.5 (B) 252.2 (C) 287.6 (D) 360.1

Q 14. The percentage of N in 66 % pure $(NH_4)_2SO_4$ is
(A) 32 (B) 28
(C) 14 (D) None of these

Q 15. If a pure compound X_2Y_3 consist of 60 % X by weight. What is the atomic weight of Y in terms of Atomic weight of X
(A) $\frac{9}{4}A_X$ (B) $\frac{4}{9}A_X$ (C) $\frac{3}{2}A_X$ (D) $\frac{2}{3}A_X$

Q 16. Two oxides of metals contain 27.586 % and 30.0 % of oxygen respectively. If formula of the first oxide is M_3O_4, then formula of second oxide is
(A) MO (B) M_2O_3 (C) M_2O_5 (D) M_2O

Q 17. Determine the empirical formula of iron oxide if it has 69.9 % Fe & 30.1 % dioxygen by mass. **[NCERT]**

Q 18. 60 g of an organic compounds on analysis gave following results: C = 24 g, H = 4 g and O = 32 g. The empirical formula of the compound is **[AIIMS 1999]**
(A) CH_2O (B) CH_2O_2
(C) C_2H_2O (D) $C_2H_2O_2$

Q 19. An organic compound contains 40 % by weight of Carbon, 13.35 % Hydrogen & 46.7 % Nitrogen. What is the empirical formula?
(A) CH_2N (B) C_2H_4N
(C) CH_4N (D) CH_2N_2

Q 20. A monobasic acid with molar mass 64 g/mol contains Nitrogen, Hydrogen & Oxygen. If percentage by weight of N is 22.22 % & of H is 1.59 % then determine the molecular formula of the acid
(A) HNO_2 (B) HNO_3
(C) HNO_4 (D) None of these

Q 21. The empirical formula of a compound is CH & its molecular weight is 78. The molecular formula of the compound is
(A) C_2H_2 (B) C_3H_3
(C) C_4H_4 (D) C_6H_6

Q 22. A organic compound of molar mass greater than 100 contains C, H & N, the percentage of C is 6 times the percentage of H while the sum of the percentage of C & H is 1.5 times the percentage of N. what is the least molecular mass?
(A) 175 (B) 140 (C) 105 (D) 210

Q 23. A compound contains 4.07 % hydrogen, 24.27 % carbon & 71.65 % chlorine. Its molar mass is 98.96. Find the molecular formula of the compound. **[NCERT]**

Q 24. A welding gas contains C & H only. Burning a small sample of it in oxygen gives 3.38 g of CO_2 & 0.690 g of H_2O with no other products. A volume of 10 lit (at STP) of this gas is found to weigh 11.6 g. Calculate **[NCERT]**
(1). Empirical formula
(2). Molar mass of gas
(3). Molecular formula

6. Stoichiometry, Balance reaction Method, POAC

Q 1. Calculate the mass of Fe which will be converted to its oxide Fe_3O_4 by the action of 18 g of steam.
$[3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2]$ **[AIIMS 2012]**
(A) 21 g (B) 42 g
(C) 64 g (D) 51 g

Q 2. Calculate the volume of CO_2 formed at NTP by heating 4.2 g of $NaHCO_3$
$[2NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2]$
(A) 0.28 lit (B) 0.112 lit.
(C) 1.12 lit (D) 0.56 lit.

Q 3. Calculate the amount of $CaCO_3$ required to be heated in order to collect 1.135 lit of CO_2 at STP
(A) 2 g (B) 3 g
(C) 4 g (D) 5 g

Q 4. Calculate the weight of residue obtained when $CaCO_3$ is heated and 5.6 lit of CO_2 gas is produced at NTP.
(A) 7 g (B) 21 g
(C) 14 g (D) 28 g

Q 5. How many gram of Fe_2O_3 is formed by heating 18 g of FeO with Oxygen.
$4FeO + O_2 \rightarrow 2Fe_2O_3$
(A) 20 g (B) 30 g
(C) 40 g (D) 50 g

Q 6. How many gram of NO_2 are required to prepare 25.2 g of HNO_3 from the reaction
$3NO_2 + H_2O \rightarrow 2HNO_3 + NO$
(A) 27.6 g (B) 13.8 g
(C) 55.2 g (D) None of these

Q 7. One gram of hydrated copper sulphate gave on heating 0.6393 g of anhydrous salt. Calculate the no of molecules of water of crystallization per molecule of hydrated salt. [Cu = 63.5 , S = 32]
$[CuSO_4.nH_2O \rightarrow CuSO_4 + nH_2O]$
(A) 3 (B) 10
(C) 6 (D) 5

Q 8. The mole of O_2 required to react with 6.8 g of Ammonia. $[4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O]$
(A) 5 (B) 2.5
(C) 1 (D) 0.5

Q 9. 12 g of alkaline earth metal gives 14.8 g of its nitride M_3N_2. Atomic weight of Metal is
(A) 12 (B) 20
(C) 40 (D) 14.8

Q 10. A sample of $KClO_3$ produces 448 ml of O_2 at NTP. The weight of $KClO_3$ used is
(A) 1.634 g (B) 1.124 g
(C) 1.745 g (D) None of these

Q 11. 27.6 g of K_2CO_3 (Mol. Wt. 138) is treated by a series of reagent and finally it converts into $K_2Zn_3[Fe(CN)_6]_2$. (Mol. Wt. 698) Calculate the weight of the product formed.
(A) 11.6 g (B) 23.2 g
(C) 5.8 g (D) 17.4 g

Q 12. A mixture of KBr & NaBr having weight 0.56 g was treated with quesous Ag^+ ion and converts all Br^- ion into AgBr, whose weight is 0.970 g. what is the fraction of KBr in the mixture.
(A) 0.135 g (B) 0.20 g
(C) 0.2378 g (D) None of these

Q 13. Calculate the volume of Cl2 gas obtained at NTP by decomposition of 50 g of NaCl according to the reaction
$NaCl + MnO_2 + H_2SO_4 \rightarrow MnSO_4 + NaHSO_4 + Cl_2 + H_2O$
(A) 9.575 lit (B) 4.8 lit
(C) 11.2 lit (D) None of these

Q 14. 25.4 of I_2 and 14.2 g of Cl_2 are made to react completely to yield a mixture of ICl & ICl_3. Calculate the mole of ICl & ICl_3 formed respectively
(A) 0.1, 0.1 (B) 0.1, 0.2
(C) 0.5, 0.5 (D) 0.2, 0.2

Q 15. What weight of P_4O_6 & P_4O_{10} will be produced by combustion of 31 g of P_4 with 32 g of O_2 leaving none of the reactant
(A) 2.75 g, 219.5 g (B) 27.5 g, 35.5 g
(C) 45 g, 18 g (D) 17.5 g, 45.5 g

Q 16. Calculate the amount of Water (g) produced by the combustion of 16 g of Methane. **[NCERT]**

Q 17. Chlorine is prepared in laboratory by treating HCl with MnO_2 according to the reaction.
$MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$
How many gram of HCl required to react with 5.0 g of Manganese oxide. **[NCERT]**

7. Percentage Purity, Percentage Yield, Limiting Reagent

Q 1. 5 g of $CaCO_3$ when heated, the CO_2 liberated was found 1 lit at NTP. Calculate the percentage purity of $CaCO_3$ sample.
(A) 88.1 % (B) 8.81 %
(C) 44.1 % (D) 4.41 %

Q 2. A sample of $CaCO_3$ is 80 % pure. 25 g of this sample is treated with excess of HCl. How much volume of CO_2 will be liberated at 1atm & 273 K? $CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$
(A) 2.24 lit (B) 4.48 lit
(C) 5.60 lit (D) 11.2 lit

Q 3. An ore of silver contains 1.34 % by weight of Ag_2S. How many gram of this ore would have to be processed in order to obtain 1.00 g of Pure Ag? (Ag = 108, S = 32)
(A) 74.6 g (B) 85.7 g
(C) 107.9 g (D) 134 g

Q 4. How many gram of 90 % pure Na_2SO_4 can be prepared from 250 g of 95 % pure NaCl ?
(A) 160.15 g (B) 80 g
(C) 320.30 g (D) 640.60 g

Q 5. Cylcohexanol is dehydrated to cyclohexane on heating with conc. H_2SO_4. If the yield of this reaction is 75 %, how much cyclohexane will be obtained from 100 g of cyclohexanol?

$$C_6H_{12}O \xrightarrow{\text{Conc. } H_2SO_4} C_6H_{10}$$

(A) 123 g (B) 61.5 g
(C) 82 g (D) None of these

Q 6. Find the weight of NH_3 formed by 20 g of N_2 with 80 % yield.
(A) 19.42 g (B) 9.714 g
(C) 24.28 g (D) None of these

Q 7. 2 mole of 50 % pure $Ca(HCO_3)_2$ on heating forms 1 mole of CO_2. The percentage yield of CO_2 is

$$Ca(HCO_3)_2 \rightarrow CaO + H_2O + CO_2$$

(A) 50 % (B) 75 %
(C) 80 % (D) 100 %

Q 8. For the reaction $2P + Q \rightarrow R$, 8 mole of P & 5 mol of Q will produce
(A) 8 mole of R (B) 5 mole of R
(C) 4 mole of R (D) 13 mole of R

Q 9. Potassium superoxide KO_2, is used in rebreathing gas mask to generate oxygen
$KO_2(s) + H_2O(l) \rightarrow KOH(s) + O_2(g)$
If a reaction vessel contains 0.158 mole of KO_2 and 0.10 mole of H_2O, how many moles of O_2 can be produced?
(A) 0.01185 (B) 0.1185
(C) 1.185 (D) 11.85

Q 10. A Chemist want to prepare diborane by the reaction : $6LiH + 8BF_3 \rightarrow 6LiBF_4 + B_2H_6$
If he use 2.0 mole each of LiH & BF_3, How many moles of B_2H_6 can be prepared.
(A) 0.25 (B) 0.5
(C) 2.0 (D) 2.5

Q 11. Carbon reacts with chlorine to form CCl_4. 36 g of Carbon was mixed with 142 g of Cl_2. Calculate the mass of CCl_4 produced and the remaining mass of reactant.
(A) 24 g, 72 g (B) 24 g, 154 g
(C) 12 g, 72 g (D) 12 g, 154 g

Q 12. Titanium, which is used to make air plane engine and frames can be obtained from titanium tetrachloride, which in turn is obtained from titanium oxide by the following process:
$3TiO_2 + 4C + 2H_2O \rightarrow 3TiCl_4 + 2CO_2 + 2CO$
A vessel contains 4.32 g of TiO_2, 5.76 g of C, 6.82 g of Cl_2, suppose the reaction goes to completion as written, how many gram of $TiCl_4$ can be produced? [Ti = 48, Cl = 35.5]
(A) 4.56 g (B) 9.12 g
(C) 18.24 g (D) None of these

Q 13. How many mole of $Zn(FeS_2)$ can be made from 2 mole fo Zn, 3 mole of Iron & 5 mole of Sulphur
(A) 2 mole (B) 3 mole
(C) 4 mole (D) 5 mole

Q 14. Equal weight of X(At.wt. = 36) & Y(At.wt. = 24) are reacted to form the compound X_2Y_3, then
(A) X is Limiting reagent
(B) Y is limiting reagent
(C) No reactant is left over
(D) Can't say

Q 15. Percentage yield of NH_3 in the reaction is 80 %
$NH_2CONH_2 + 2NaOH \xrightarrow{\Delta} Na_2CO_3 + 2NH_3$
The mass of NH_3 formed when 6 g of NH_2CONH_2 reacts with 8 g of NaOH is

(A) 2.72 g (B) 3.4 g
(C) 4.25 g (D) 11.2 g

Q 16. 50 Kg of N_2 & 10 kg of H_2 are mixed together to produce NH_3. Calculate the mass of NH_3 formed. Identify the Limiting Reagent. **[NCERT]**

Q 17. Which of the following statement is correct about the given reaction. **[NCERT Examplar]**

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

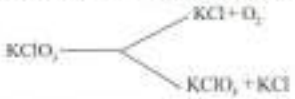
(A) Total mass of Fe & Oxygen in reactants = total mass of Fe & oxygen in product, therefore it follows laws of conservation of mass.
(B) Total mass in reactant = total mass in product, therefore it follows laws of conservation of mass.
(C) Amount of Fe_2O_3 can be increased by taking any one of the reactant in excess
(D) Amount of Fe_2O_3 can be decreased by taking any one of the reactant in excess

8. Parallel Reaction, Series Reaction

Q 1. 10 mole of A is reacted as given below

If after complete reaction 16 mole of D is formed, find the mole of C formed.
(A) 6 mole (B) 12 mole
(C) 18 mole (D) 24 mole

Q 2. $KClO_3$ is reacted in two parallel path



100 g of $KClO_3$ produces 16 g of O_2, find the weight of $KClO_4$ formed.
(A) 59.16 g (B) 50.16 g
(C) 44.38 g (D) None of these

Q 3. In previous problems, the weight of KCl formed
(A) 24.83 g (B) 43.83 g
(C) 33.83 g (D) None of these

Q 4. Sulphur trioxide may be prepared by the following two reactions:

$$S_8(s)+8O_2(g)\rightarrow 8SO_2(g)$$

$$2SO_2(g)+O_2(g)\rightarrow 2SO_3(g)$$

Find the mass of SO_3 produced from 1 mole S_8?
(A) 320 g (B) 640 g
(C) 1120 g (D) 1280 g

Q 5. From the following sequence of reactions, how much H_2SO_4 will be produced from 1146 g PbS?

$$2PbS+3O_2\rightarrow 2PbO+2SO_2$$

$$3SO_2+3HNO_3+2H_2O\rightarrow 3H_2SO_4+2NO$$

(A) 270 g (B) 360 g
(C) 400 g (D) 470 g

Q 6. NaOH is formed according to the reaction

$$2Na+\frac{1}{2}O_2\rightarrow Na_2O$$

$$Na_2O+H_2O\rightarrow 2NaOH$$

To form 4 g of NaOH, mass of Na required is
(A) 4.6 g (B) 4 g
(C) 2.3 g (D) 0.23 g

Q 7. Find the mass of oxygen that would be required to produce enough CO, which completely reduces 1.6 Kg of Fe_2O_3 [$Fe_2O_3+3CO\rightarrow 2Fe+3CO_2$]
(A) 240 g (B) 480 g
(C) 720 g (D) 960 g

Q 8. NX is produced by the following steps of reactions. Find the weight of Metal M consumed to produce 206 g of NX. [At.wt. M = 56, N = 23, X = 80]

$$M+X_2\rightarrow MX_2$$

$$2MX_2+X_2\rightarrow M_2X_4$$

$$M_2X_4+4N_2CO_3\rightarrow 8NX+4CO_2+M_2O_4$$

(A) 42 g (B) 56 g
(C) 4.667 g (D) 1.75 g

Q 9. H_3PO_4 is prepared in two steps given below

$$(1)P_4+5O_2\rightarrow P_4O_{10}$$

$$(2)P_4O_{10}+6H_2O\rightarrow 4H_3PO_4$$

when 62 g of phosphorous react with excess of Oxygen which form P_4O_{10} in 85 % yield. In the step (2) reaction 90 % yield of H_3PO_4 is obtained. Produced mass of H_3PO_4 is
(A) 37.485 g (B) 149.94 g

(C) 125.47 g (D) 564.48 g

Q 10. The chief ore of Zn is ZnS. The ore is concentrated by froth floatation process and then heated in air to conver ZnS to ZnO.

$(1)3D + 4E \xrightarrow{80\%} 5C + A$

$(2)3C + 5G \xrightarrow{50\%} 6B + F$

The mole of ZnS required to produce 2 mole of Zn will be

(A) 3.125 (B) 2
(C) 2.125 (D) 4

Q 11. Formation of polyethylene from calcium carbide take place as follows:

$2CaC_2 + 3H_2O \longrightarrow Ca(OH)_2 + C_2H_2$

$C_2H_2 \rightarrow C_2H_4$

$nC_2H_4 \longrightarrow (-CH_2 - CH_2-)_n$

The amount of polyethylene possibly obtainable from 64 Kg of CaC_2 can be

(A) 28 Kg (B) 14 Kg
(C) 21 Kg (D) 42 Kg

Q 12. 9 mole of D and 14 moles of E are allowed to ract in a closed vessel according to the reactions. Calculate the number of moles of B formed in the end of the reaction, if 4 moles of G are present in the reaction vessel.

$(1)3D + 4E \xrightarrow{80\%} 5C + A$

$(2)3C + 5G \xrightarrow{50\%} 6B + F$

(A) 2.4 (B) 30
(C) 4.8 (D) 1

Q 13. How many Kg of pure H_2SO_4 could be obtained from 2.00 kg of pure iron pyrites (FeS_2) according to the following reactions?

$FeS_2 + O_2 \rightarrow Fe_2O_3 + SO_2$

$SO_2 + O_2 \rightarrow 2SO_3$

$SO_3 + H_2O \rightarrow H_2SO_4$

(A) 2.36 Kg (B) 3.26 kg
(C) 5.6 Kg (D) None of these

Q 14. In Ostwald process the manufacture of Nitric acid, the first step involves the oxidation of NH_3 gas by O_2 gas to give nitric oxide & Steam. What is the minimum weight of Nitric oxide obtained starting only 10 g of NH_3 & 20 g O_2. **[NCERT]**

9. Inorganic Reaction based Problems

Q 1. An alloy of Al & Cu was treated with aquesous HCl. If 0.5 g of the alloy gives 560 cc of H2 measured at 273 K & 1 atm pressure, then % by weight of Al in the alloy is

(A) 85.3 % (B) 75.3 %
(C) 65.3 % (D) 90 %

Q 2. 1 g alloy of Al & Mg when heated with excess of HCl, the evolve H_2 has volume 1.12 lit at 273 K & 1 atm pressure. Calculate the composition of alloy?

(A) Al = 60 %, Mg = 40 %
(B) Al = 40 %, Mg = 60 %
(C) Al = 50 %, Mg = 60 %
(D) Al = 80 %, Mg = 20 %

Q 3. If a binary mixture of divalent metals A and B having mass 2 g with respective molecular weight 15 and 30 dissolves in HCl, evolves 2.24 lit. of H_2 at NTP, then the mass of A present in the mixture is **[AIIMS 2018]**

(A) 0.75 g (B) 0.5 g (C) 1 g (D) 1.5 g

Q 4. 3.90 g of mixture of Al & Mg when heated with excess of NaOH, 840 ml of H_2 gas is forming at NTP. Find the % by weight of Al in the mixture.

(A) 17.3 % (B) 82.7 %
(C) 27 % (D) None of these

Q 5. 10 g brass (Cu+Zn alloy) dissolves in NaOH solution & produces 1.2 lit of H2 gas at NTP. Find the % by weight of Cu in the mixture.

(A) 31.75 % (B) 68.25 %
(C) 41.5 % (D) None of these

Q 6. A sample of $CaCO_3$ & $MgCO_3$ on heating loss 50 % by its weight. Find the % of $CaCO_3$ in the mixture.

(A) 28.4 % (B) 71.6 %
(C) 88.4 % (D) 11.6 %

Q 7. A 4 g mixture of $NaHCO_3$ & NaCl is heated, 0.66 g CO_2 gas is formed. Determine the % by weight of NaCl in the mixture.

(A) 25 % (B) 75 % (C) 63 % (D) 37 %

Q 8. When 5 g mixture of $NaHCO_3$ & Na_2CO_3 was heated, 560 ml of CO_2 was collected at NTP. Calculate the % composition of $NaHCO_3$ in the mixture.

(A) 16 % (B) 76 % (C) 84 % (D) 24 %

Q 9. What will be the no. of mole of O_2 evolves when 66.2 gm lead nitrate (Mol. Wt. 331) decomposed. What will be the no. of mole of oxygen if same amount of mercuric nitrate is decomposed?
(A) 3.2 g O_2 , 0.1 mole $Hg(NO_3)_2$
(B) 1.6 g O_2 , 0.1 mole $Hg(NO_3)_2$
(C) 2.8 g O_2 , 0.5 mole $Hg(NO_3)_2$
(D) 3.0 g O_2 , 1 mole $Hg(NO_3)_2$

Q 10. A solid mixture (5.0g) consisting of lead nitrate and sodium nitrate was heated below 600°C until the weight of the residue was constant . If the loss in weight is 28.0 percent, find the amount of lead nitrate and sodium nitrate in the mixture.
(A) 2.324 g, 2.676 g (B) 3.324 g, 1.676 g
(C) 2.5 g, 1.5 g (D) None of these

Q 11. 2.5 g mixture of BaO & CaO when treated with excess of H_2SO_4 produces 4.713 g of mixed sulphate. The percentage by weight of BaO in the mixture is
(A) 60 % (B) 40 %
(C) 50 % (D) None of these

Q 12. A mixture of NaI & NaCl on reaction with H_2SO_4 produces same weight of Na_2SO_4 as the weight of mixture taken. The % by weight of NaI in the mixture is
(A) 61.15 % (B) 71.15 %
(C) 28.85 % (D) 38.85 %

Q 13. A piece of Fe gains 10 % by weight due to partial rusting into Fe_2O_3. The percentage of total Fe that is rusted is
(A) 23 % (B) 13 %
(C) 23.3 % (D) 25.67 %

Q 14. 1 mole of $KClO_3$ is thermally decomposed and excess of Al is brunt in the gaseous product. How many mole of Al_2O_3 are formed?
(A) 1 (B) 1.5 (C) 2 (D) 3

Q 15. A mixture of $CaCl_2$ & NaCl weighing 4.22 g was treated to precipitate all Ca into $CaCO_3$, which was then heated and quantitatively converted into 0.959 g of CaO. Calculate the percentage of $CaCl_2$ in the mixture.

Q 16. When 2.86 g of a mixture of 1-butene (C_4H_8), & Butane (C_4H_{10}). was burned in excess oxygen, 8.80 gm of CO_2 and 4.14 gm of H_2O were obtained. Calculate the % by mass of butane in the original mixture.

10. Concentration of Solution (%Concentration, Mole Fraction, Molality)

Q 1. A solution has 20 % by mass of H_2SO_4 in water. The solution concentration can be written in ppm as
(A) 20000 ppm (B) 200000 ppm
(C) 200 ppm (D) None of these

Q 2. The concentration of CH_3OH in C_2H_5OH solution is 500 ppm. The % by weight of CH_3OH in the solution is
(A) 0.05 % (B) 0.005 %
(C) 0.0005 % (D) None of these

Q 3. A sample of drinking water was found to be severely contaminated with chloroform $CHCl_3$, supposed to be carcinogenic in nature. The level of contamination was 15 ppm by mass
(1). Express this in % by mass
(2). Determine the molality of chloroform in the water sample. [NCERT]

Q 4. When 400 g of a 20 % solution was cooled, 50 g os solute precipitacted. What is the new % by weight of solute in the remaining solution is
(A) 7.5 % (B) 8.6 %
(C) 20 % (D) 10 %

Q 5. What is the percentage concentration of a solution formed by mixing 300 g of 25 % & 400 g of 40 % solution.
(A) 32.5 % (B) 35 %
(C) 33.6 % (D) None of these

Q 6. A solution of H_2SO_4 in H_2O has 49 % by weight of H_2SO_4. The mole fraction of H_2SO_4 in the solution is
(A) 0.25 (B) 0.45
(C) 0.85 (D) 0.15

Q 7. The mole fraction of benzene in Toluene is 0.4. the % by weight of Toluene is
(A) 63.88 % (B) 36.11 %
(C) 53.88 % (D) None of these

Q 8. A sugar syrup having weight of 214.2 g contains 34.2 g sugar($C_{12}H_{22}O_{11}$). Calculate the molality of the solution.
(A) 0.556 % (B) 0.444 %
(C) 0.656 % (D) 0.344 %

Q 9. The mole fraction of sugar in above problem is
(A) 0.001 (B) 0.02
(C) 0.10 (D) 0.01

Q 10. The mole fraction of a solute in an aqueous 4 m solution having density of solution 1 g/ml is
(A) 0.0564 (B) 0.0674
(C) 0.0337 (D) None of these

Q 11. Mole fraction of A in H_2O is 0.2. The molality of A in H_2O is
(A) 13.9 (B) 15.5
(C) 14.5 (D) 16.8

Q 12. The molality of sulfuric acid solution is 0.2. calculate the total weight of solution having 1000 g of solvent.
(A) 1000 g (B) 1098.6 g
(C) 980.4 g (D) 1019.6 g

Q 13. Mole fraction of ethyl alcohol in aqueous solution is 0.25. hence percentage of ethyl alcohol by weight is
(A) 54 % (B) 25 %
(C) 75 % (D) 46 %

Q 14. Which of the following concentration factor is affected by temperature.
(A) Molarity (B) molality
(C) mole fraction (D) weight fraction

Q 15. A solution of glucose received from some research laboratory has been marked mole fraction X and molality m at 10°C. when you will calculate molality and mole fraction at 24°C is
(A) x & m (B) 2x & 2m
(C) 0.5x & 0.5m (D) x & m ± dm

11. Molarity, Principle of Dilution

Q 1. Calculate the molarity of NaOH in solution prepared by dissolving 4 g of NaOH in enough water to make 250 ml solution. **[NCERT]**

Q 2. What is the concentration of Sugar ($C_{12}H_{22}O_{11}$) in water in Mole per litre if 20 g of sugar is dissolved in enough water to make 2 lit of solution. **[NCERT]**

Q 3. Calculate the mass percent of sodium acetate (CH_3COONa) (Molar wt. = 82 g/mol) required to make 500 ml of 0.375 M solution. **[NCERT]**

Q 4. 500 ml of a glucose solution contain 6.02×10^{22} molecules. The concentration of solution is
(A) 0.1 M (B) 1.0 M
(C) 0.2 M (D) 2.0 M

Q 5. What volume of 0.8 M solution contains 100 milimoles of solute?
(A) 100 ml (B) 125 ml
(C) 500 ml (D) 62.5 ml

Q 6. What is concentration of Chloride ion in molarity in a solution containing 10.56 g of $BaCl_2.2H_2O$ per lit of solution (Ba = 137)
(A) 0.06 M (B) 0.03 M
(C) 0.12 M (D) 0.18 M

Q 7. A Solution of $\frac{1}{30}$ M $FeCl_3$ solution has molarity of Chloride ion
(A) $\frac{1}{90}$ M (B) $\frac{1}{30}$ M
(C) $\frac{1}{10}$ M (D) $\frac{1}{5}$ M

Q 8. Density of a solution containing 14 % by mass of sulphuric acid is 1.05 g/mL. what is the molarity of solution?
(A) 0.5 M (B) 1.0 M
(C) 1.5 M (D) 2.0 M

Q 9. What is the molarity of H_2SO_4 solution that has density of 1.84 g/cc and contains 98 % by weight of H_2SO_4 ?
(A) 4.18 M (B) 8.14 M
(C) 18.4 M (D) 18 M

Q 10. Calculate the concentration (in Molarity) of Nitric acid (Molar mass = 63 g/mol) having density of 1.41 g/ml & % by wt of HNO_3 is 69 %. **[NCERT]**

Q 11. If the density of methanol is 0.793 kg/lit. what is its volume needed for making 2.5 lit. of 0.25 M solution. **[NCERT]**

Q 12. Calculate the molarity of ethanol in water in which mole fraction of ethanol is 0.040 (Density of solution is assumed to be 1) **[NCERT]**

Q 13. H_2A (Mol. Wt. = 98) is 98 % by mass of solution. If its density is 1.8 g/ml then molarity of H^+ ion (assuming complete ionization of the Acid) will be
(A) 54 M (B) 18 M
(C) 36 M (D) 5.4 M

Q 14. Density of 2.05 M solution of acetic acid in water is 1.02 g/ml. The molality of the solution is

(A) 0.44 mol/kg (B) 1.14 mol/kg
(C) 3.28 mol/kg (D) 2.28 mol/kg

Q 15. Molarity of H_2SO_4 is 18 M. if its density is 1.8 g/ml then molality is
(A) 18 (B) 100
(C) 36 (D) 500

Q 16. The density of 3 M solution of NaCl is 1.25 g/ml. calculate the molality of the solution. **[NCERT]**

Q 17. Solution containing 40 g of NaOH is/are
(A) 50 g of 80 %(w/w) NaOH
(B) 50 g of 80 % (w/v) NaOH(d_{sol} = 1.2 g/ml)
(C) 50 g of 20M NaOH (d_{sol} = 1 g/ml)
(D) 50 g of 5 m NaOH

Q 18. The molarity of Cl^- ion in an aqueous solution containing 2 % (w/v) NaCl, 4 % (w/v) $CaCl_2$ and 6 % NH_4Cl will be
(A) 0.342 M (B) 0.721 M
(C) 1.12 M (D) 2.18 M

Q 19. 2 M of 100 ml Na_2SO_4 is mixed with 3 M of 100 ml NaCl solution and 1 M of 200 ml of $CaCl_2$ solution. Then the ration of the concentration of cation & anion is
(A) 0.5 (B) 2
(C) 1.5 (D) 1

Q 20. What approximate volume of 0.40 M $Ba(OH)_2$ must be added to 50 ml of 0.30 M NaOH to get a solution having the molarity of OH^- ion is 0.50 M
(A) 33.33 ml (B) 66.67 ml
(C) 133.33 ml (D) 100 ml

Q 21. The molarity of pure water is
(A) 55.56 M (B) 100 M
(C) 18 M (D) None of these

Q 22. The molarity of pure C_6H_6 liquid (d = 0.88 g/ml)
(A) 22.56 M (B) 11.28 M
(C) 5.64 M (D) None of these

Q 23. A compound H_2X with molar weight 80 g/mol is dissolved in a solvent of density 0.4 g/ml. Assuming no change in volume on dissolution, the molality of 3.2 M solution is **[JEE adv 2014]**
(A) 8 (B) 4
(C) 6 (D) 10

Q 24. The volume of 0.1 M $AgNO_3$ required for complete precipitation of all chloride ions present in 30 ml of 0.01 M solution of $[Cr(H_2O)_5Cl]Cl_2$ as AgCl is **[JEE Adv 2011]**
(A) 4 ml (B) 6 ml
(C) 3 ml (D) 8 ml

Q 25. A solution of 2.675 g of $CoCl_3.6NH_3$ (Molar mass 267.5 g/ml) is passed through a cation exchanger. The chloride ions obtained in solution was treated with excess of $AgNO_3$ solution to give 4.78 g of AgCl (Molar mass = 143.5 g/mol). The formula of the complex is **[JEE Adv 2010]**
(A) $[Co(NH_3)_6]Cl_3$ (B) $[CoCl_2(NH_3)_4]Cl$
(C) $[Co\,Cl_3(NH_3)_3]$ (D) $[CoCl(NH_3)_5]Cl_2$

Q 26. A 250 ml sample of 0.20 M HCl solution is to be made by diluting concentrated solution of molarity 11.7 M. Find the volume of later solution used?
(A) 4.27 ml (B) 8.54 ml
(C) 17.08 ml (D) None of these

Q 27. Find the volume of H_2O needed to mix with 500 ml of 0.5 M solution to become 0.2 M Solution
(A) 1250 ml (B) 750 ml
(C) 250 ml (D) 1000 ml

Q 28. The volume of water needed to prepare 0.20 M solution from 16 ml of 0.5 M solution is
(A) 40 ml (B) 16 ml
(C) 50 ml (D) 24 ml

Q 29. The volume of water that must be added to a mixture of 250 ml of 0.6 M HCl & 750 ml of 0.2 M HCl solution to obtain 0.25 M solution of HCl is
(A) 750 ml (B) 100 ml
(C) 200 ml (D) 300 ml

12. Volume Strength, Percentage leveling of Oleum Sample

Q 1. The molarity of 10 ml of 22.4 V at NTP H_2O_2 solution is
(A) 1.79 (B) 2
(C) 60.86 (D) 6.086

Q 2. 500 ml of H_2O_2 solution on complete decomposition produces 2 moles of H_2O. Calculate the volume Strength of H_2O_2 solution.
(A) 11.2 V (B) 22.4 V
(C) 44.8 V (D) 67.2 V

Q 3. 35 ml of sample of H_2O_2 gives off 500 ml of O_2 at 27°C and 1 atm pressure. Volume strength of H_2O_2 sample under NTP condition is
(A) 10 V (B) 13 V
(C) 11 V (D) 12 V

Q 4. A sample of H_2O_2 solution is labeled as 56 V at NTP has density of 530 g/lit. Mark the correct options representing concentration of same solution in other units.
(A) $M_{H_2O_2} = 6$ (B) $\%\frac{w}{v} = 17$
(C) $X_{H_2O_2} = 0.25$ (D) $m_{H_2O_2} = \frac{1000}{72}$

Q 5. A mixture is prepared by mixing 40 g of SO_3 and 10 g of H_2SO_4. The percentage labeling of SO_3 will be
(A) 109 (B) 120
(C) 118 (D) 125

Q 6. An oleum sample is labeled as 109 %. The percentage by weight of SO_3 in the sample is
(A) 40 % (B) 60 %
(C) 50 % (D) 80 %

Q 7. The maximum percentage labeling of oleum sample is
(A) 112 % (B) 120 %
(C) 125 % (D) 122.5 %

Q 8. If 100 g mixture of HNO_3 and N_2O_5 has 50 % weight of N_2O_5 then % labeling of this mixture is
(A) 110 % (B) 108.33 %
(C) 116.67 % (D) None of these

Q 9. A mixture of P_2O_5 & H_3PO_4 is labeled as 120 % then % by weight of P_2O_5 in the mixture is
(A) 20 % (B) 52.6 %
(C) 17.53 % (D) None of these

Answer Key

1. Definition of Mole, Mole Vs Number

(1). B (2). B (3). B
(4). B (5). D (6). A
(7). D (8). B (9). B
(10). A (11). B (12). D
(13). C (14). A (15). A

2. Atomic Mass, Molecular Mass

(1). D (2). B (3). D
(4). C (5). D (6). A
(7). 35.4527 (8). 39.948 (9). B
(10). B (11). C (12). C
(13). C (14). C (15). C
(16). A (17). D (18). A
(19). B (20). C (21). D
(22). B (23). D (24). D
(25). B (26). A (27). C
(28). C (29). A (30). B

3. Ionic Mass & Molar mass

(1). D (2). C (3). D
(4). D (5). C (6). A
(7). A (8). B (9). A

4. Mole Vs Volume, Molar Volume

(1). B (2). A (3). B
(4). C (5). C (6). D
(7). A (8). D (9). A
(10). C (11). D (12). B
(13). B (14). D (15). D

5. Density, Vapour Density, Percentage, Composition, Empirical Formula

(1). A (2). A (3). D
(4). C (5). B (6). B
(7). A (8). B
(9). 32.39 % Na, 22.54 % S, 45.07 % O
(10). C (11). C (12). C
(13). D (14). C (15). B
(16). C (17). Fe_2O_3 (18). A
(19). C (20). B (21). D
(22). B (23). $C_2H_4Cl_2$
(24). CH, 26, C_2H_2

6. Stoichiometry, Balance reaction Method, POAC

(1). B (2). D (3). D
(4). C (5). A (6). A
(7). D (8). D (9). C
(10). A (11). A (12). C
(13). A (14). B (15). A
(16). 36 g (17). 8.39 g

7. Percentage Purity, Percentage Yield, Limiting Reagent

(1). A (2). B (3). B
(4). C (5). B (6). A
(7). A (8). C (9). B
(10). A (11). B (12). B
(13). A (14). C (15). A
(16). 56.1 Kg of NH_3 , H_2 is L.R
(17). D

8. Parallel Reaction, Series Reaction

(1). C (2). B (3).C
(4). B (5). D (6). C
(7). B (8). A (9). B
(10). A (11). A (12). A
(13). B (14). 15 g

9. Inorganic Reaction based Problems

(1). D (2). A (3). C
(4). A (5). B (6). A
(7). D (8). C (9). A
(10). A (11). B (12). C
(13). C (14). A (15). 45 %
(16). 39.2 % of C_4H_8 & 60.8 % of C_4H_{10}

10. Concentration of Solution (%Concentration, Mole Fraction, Molality)

(1). B (2). A

(3). 1. $1.5\times10^{-5}\%$

2. $1.266\times10^{-4}m$

(4). B (5). C (6). D
(7). A (8). A (9). D
(10). B (11).A (12). D
(13). D (14). A (15). A

11. Molarity, Principle of Dilution

(1). 0.4 M (2). 0.029 M (3). 15.380 g
(4). C (5). B (6). A
(7). C (8). C (9). C
(10). 15.44 M (11). 25.22 ml
(12). 2.31 M (13). A
(14). D (15). D (16). 2.79 m
(17). A,C (18). D (19). D
(20). A (21). A (22). B
(23). A (24). B (25). A
(26). A (27). B (28). D
(29). C

12. Volume Strength, Percentage leveling of Oleum Sample

(1). B (2). A (3). C
(4). D (5). C (6). A
(7). D (8). C (9). B