: 99672 40893

Jars Education

Shop no. 2,3,4 hendre pada Badlapur west thane

Time : 1 Hour 15 Minute

STD 11 Science Chemistry
Chapter Based Test

Total Marks : 40

SECTION A

*** Choose The Right Answer From The Given Options.[1 Marks Each]** **[6]**

1. A device for measuring temperatures at a distance is:
   (A) Gas thermometer
   (B) Mercury thermometer
   (C) Radiation pyrometer
   (D) Maximum-minimum thermometer

2. How many number of aluminium ions are present in 0.051g of aluminium oxide?
   (A) 6.023×10^{23} ions.
   (B) 3 ions.
   (C) 6.023×10^{20} ions.
   (D) 9 ions.

3. A gas is found to have the formula $(CO)_x$. Its vapour density is 70. The value of x will be:
   (A) 7 (B) 4 (C) 5 (D) 6

4. How many moles are present in 6.023×10^{22} molecules of CO_2?
   (A) 0.2 (B) 0.01 (C) 0.1 (D) 0.02

5. In the following reaction,
   MnO_2, + 4HCl → $MnCl_2$ + $2H_2O$ +Cl_2
   2 moles of MnO_2 react with 4 moles of HCl to form 11.2L Cl_2, at STP.
   Thus, percent yield of Cl_2 is:
   (A) 25% (B) 50% (C) 100% (D) 75%

6. Which of the following is the best example to demonstrate the law of conservation of mass?
   (A) 12gm of carbon combines with 32gm of oxygen to form 44gm of CO^2.
   (B) When 72gm of carbon is heated in a vacuum and no change in its mass takes place.
   (C) The weight of a piece of platinum is the same before and after heating in air.
   (D) None of these

*** Answer The Following Questions In One Sentence.[1 Marks Each]** **[5]**

7. Which one of the following will have the largest number of atoms?
   1g of $Cl_2(g)$

8. Convert the following into basic units:
   15.15pm

9. How many significant figure are there in,
   i. 3.070
   ii. 0.0025.

10. How many cm are there in 1 pm?

11. What is relationship between properties of compound and its constituting elements.

SECTION B

*** Given Section consists of questions of 2 marks each.** **[6]**

1. Calculate the number of molecules present in 22.0g of CO_2 [C = 12u, H = 14u]
2. The empirical formula and molecular mass of a compound are CH_2O and 180g respectively. What will be the molecular formula of the compound?
3. Calculate the average atomic mass of hydrogen using the following data:

Isotope	% Natural abundance	Molar mass
^1H	99.985	1
^2H	0.015	2

SECTION C

*** Given Section consists of questions of 3 marks each.** **[9]**

1. Dinitrogen and dihydrogen react with each other to produce ammonia according to the following chemical equation:
   $N_{2(g)} + H_{2(g)} \rightarrow 2NH_{3(g)}$
   Calculate the mass of ammonia produced if 2.00×10^3g dinitrogen reacts with 1.00×10^3g of dihydrogen.
2. Calculate the concentration of nitric acid in mol per litre in a sample which has a density 1.41g mL^{-1} and the mass percent of nitric acid in it being 69%.
3. The density of 3 molal solution of NaOH is 1.110g mL^{-1}. Calculate the molarity of the solution.

SECTION D

*** Case study based questions** **[4]**

1. Read the passage given below and answer the following questions from 1 to 5.
   After having some idea about the terms atomsand molecules, it is appropriate here tounderstand what do we mean by atomic andmolecular masses.One atomicmass unit is defined as a mass exactly equal to one-twelfth of the mass of one carbon – 12 atom.Molecular mass is the sum of atomic masses of the elements present in a molecule. It is obtained by multiplying the atomic mass of each element by the number of its atoms and adding them together. Some substances, such as sodium chloride, do not contain discrete molecules as their constituent units. In such compounds, positive (sodium ion) and negative (chloride ion) entities are arranged in a three dimensional structure. The mole, symbol mol, is the SI unit of amount of substance. One mole contains exactly 6.02214076×10^{23} elementary entities. This number is the fixed numerical value of the Avogadro constant, N_A , when expressed in the unit mol–1 and is called the Avogadro number. The amount of substance, symbol n, of a system is a measure of the number of specified elementary entities. An elementary entity may be an atom, a molecule, an ion, an electron, any other particle or specified group of particles. It may be emphasised that the mole of a substance always contains the same number of entities, no matter what the substance may be. In order to determine this

number precisely, the mass of a carbon–12 atom was determined by a mass spectrometer and found to be equal to 1.992648×10^{-23} g. Knowing that one mole of carbon weighs 12 g, the number of atoms in it is equal to:

$\frac{12 \text{ g /mol C-12}}{1.992648 \times 10^{23} \text{ g / C- 12 atom.}} = 6.0221367 \times 10^{23}$ atoms/mol.

The mass of one mole of a substance in grams is called its molar mass. the molar mass in grams is numerically equal to atomic molecular/formula mass in u.An empirical formula represents the simplestwhole number ratio of various atoms present ina compound, whereas, the molecular formulashows the exact number of different types ofatoms present in a molecule of a compound. If the mass per cent of variouselements present in a compound is known, its empiricalformula can be determined. Molecular formulacan further be obtained if the molar mass isknown.Many a time, reactions are carried out with the Amounts of reactants that are different than The amounts as required by a balanced chemical reaction. In such situations, one Reactant is in more amount than the amount required by balanced chemical reaction. The reactant which is present in the least amount Many a time, reactions are carried out with the amounts of reactants that are different than the amounts as required by a balanced chemical reaction. In such situations, one reactant is in more amount than the amount required by balanced chemical reaction. The reactant which is present in the least amount gets consumed after sometime and after that further reaction does not take place whatever be the amount of the other reactant. Hence, the reactant, which gets consumed first, limits the amount of product formed and is, therefore, called the limiting reagent.

i. One atomic mass unit (amu) is defined as a mass exactly equal to one-twelfth of the mass of one …atom.
   a. Hydrogen – 1
   b. Carbon – 12
   c. Oxygen -12
   d. Chlorine – 35

ii. The mass of one mole of a substance in grams is called its..
   a. Atomic mass
   b. Molecular Weight
   c. Molecular mass
   d. Molar mass.

iii. … is the sum of atomic massesof the elements present in a molecule.
   a. Atomic mass
   b. Molecular Weight
   c. Molecular mass
   d. Molar mass.

iv. One mole contains exactly …elementary entities.
   a. 02214076×10^{21}
   b. 02214076×10^{22}
   c. $6.02214076 \times 10^{23}$
   d. 02214076×10^{24}

v. For which of the following compound , formula mass is preferred instead of molecular mass?
   a. NaCl
   b. C2H6
   c. N2
   d. H2O

SECTION E

*** Given Section consists of questions of 5 marks each.** **[10]**

1. Pressure is determined as force per unit area of the surface. The SI unit of pressure, Pascal is as shown below:

   $1Pa = 1N\ m^{-2}$

   If mass of air at sea level is $1034g\ cm^{-2}$, calculate the pressure in Pascal.

2. The reactant which is entirely consumed in reaction is known as limiting reagent. In the reaction $2A + 4B \rightarrow 3C + 4D$, when 5 moles of A react with 6 moles of B, then
   i. Which is the limiting reagent?
   ii. Calculate the amount of C formed?

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