XI-UNIT-1- SOME BASIC CONCEPTS OF CHEMISTRY
ASSIGNEMENT MODULE- 2 & 3 /5

Sangeeta Sohni PGT (ss) AECS-4, Mumbai

Reference: NCERT XIth Chemistry Textbook- 1
New Course Chemistry XIth - Volume 1 Publishers- Pradeep
ABC of Chemistry XIth - Volume 1 Publishers- Modern
Conceptual Chemistry XIth - Volume 1 Publishers- S. Chand
ISC chemistry XIth - Publishers- Nageen prakashan

Problems based on Mole Concept

Type-1 a) Calculate the mass of i) An atom of silver ii) A molecule of CO_2

Type-2 a) How many atoms and molecules are present in 64g of sulphur(S_8)

b) Calculate the number of atoms of each constituent element in 53g of Na_2CO_3.

c) Calculate the number of molecules present in one litre of water assuming that the density of water is 1g/cm^3 and in one drop of water having mass 0.05g.

Type-3 a) Calculate the number of molecules present in 350cm^3 of NH_3 gas at 273 K and 2 atm. Pressure. (Hint- Use ideal gas equation)

Type-4 a) Calculate the number of moles in (i) 44.8 litres of CO_2 at STP (ii) 1 metric ton of Fe

(iii) 7.9mg of Ca b) Calculate mass of (i) 0.1 mole of KNO3 (ii) 1 x 10^{23} molecules of methane

Answers

Type-1 a) (i) 1.793 x 10^{-22g} (ii) 7.307 x 10^{-23}g

Type-2 a) Atoms= 1.2048 x 10^{24} molecules= 1.506 x 10^{23}

b) Na+ = 6.022 x 10^{23} ions, carbon atoms=3.011 x 10^{23},

Oxygen atoms= 9.033 x 10^{23}

c) 3.346 x 10^{25} molecules (Hint- find mass of water from given data) and

1.673 x 10^{21} molecules

Tpe-3 no. of moles= 0.0312 and no. of molecules= 1.88 x 10^{22}

Type-4 a) (i) 2moles (ii) Hint- 1 metric ton= 106g ans- 1.786 x10^4 moles

(iii) hint- convert mg to g ans- 1.975 x 10^{-4} mol

b) (i) 10.1 g (ii) 2.657g

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Numerical on Empirical and molecular formula

1. An inorganic salt on analysis gave the following percentage composition- Pb=62.6, N=8.4, O=29 (Atomic mass—Pb= 207, N=14, O=16) Determine the empirical formula of the compound and nae it.

2. A salt containing water of crystallisation gave following % composition- Mg=9.76, S= 13.01, O= 26.01 and water= 51.22. calculate the simplest formula. (Mg=24, S=32, O=16, H2O=18)

3. Calculate the empirical formula of a mineral having following composition-
   CaO = 48%, P2O5=41.3%, CaCl2= 10.7% (Hint—Use full compound itself and its molar mass)

4. On analysis, a substance was found to have the following composition- K=31.84, Cl= 28.98 and rest is oxygen. Calculate the molecular formula if molecular mass is 122.5

5. An organic acid contains C, H and O. A 4.24mg sample of acid is completely burnt to give 8.45mg of CO_2 and 3.46mg of H_2O. The molecular mass of acid is determined experimentally to be 88 amu. What is the molecular formula f the acid?
   Hint- Use % of element=
   at. mass /molar mass x Mass of compound/ molar mass of compound x 100

Answers
1.- PbN2O6= Pb $(NO_3)_2$ Lead Nitrate
2. $MgSO_4.7H_2O$
3. 9 CaO. $3P_2O_5.CaCl_2$
4. $KClO_3$
5. $C_4H_8O_2$

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Numerical based on Stoichiometry

1. 1.5g of an impure sample of sodium sulphate dissolved in water and was treated with excess of barium chloride. 1.74g of barium sulphate was obtained as dry precipitate. Calculate the % purity of sample.
   (Hint- First find mass of pure sodium sulphate in given impure sample and then calculate purity of sample in 100g)

2. Calculate the amount of lime, required to remove hardness of 50,000 litres of well water which has been found to contain 1.62g of calcium bicarbonate per10litre.
   Hint- write balanced equation

3. Calculate the mass of 60% H_2SO_4 required to decompose 50g of chalk.
   Hint- write balanced equation

4. 10mL of liquid CS_2(sp.gravity=2.63) is burnt in oxygen. Find the volume of the resulting gases measured at STP. Hint- write balanced equation

5. 5.6 litres of methane gas are ignited in oxygen. Calculate the number of moles of CO_2 formed.

Answers

1. i) 1.06g ii) 70.67%

2. i) 8100g ii) 3.7kg

3. 81.67g

4. 23.25L

5.0.25 mol