SHIKSHA CLASSES

Sub : Science **ANSWER PAPER** **Total Marks : 30**
Class : IX **3. Atoms And Molecules**

Section A(Each 1 marks)

Q.1) Which of the following has maximum number of atoms.

Ans : b) 18 gm of CH_4

OR

Which of the following would weigh the highest?

Ans : d) 2 mole $CaCO_3$

Q.2) Who formulated the law of constant compostion.

Ans : b) Proust

OR

Write atomicity of the following : a) Sulphur b) Phosphrous

Ans : a) Sulphur - Polyatomic b) Phosphrous - Tetraatomic

Q.3) Assertion (A) : An atom is the smallest particle in an element that has the properties of the element.

Reason (R) : Molecules are formed by the combination of two or more atoms.

Ans : b) Both A and R are true, but R is not the correct explanation of the assertion

Q.4) Assertion(A): Atomicity of ozone is three while that of oxygen is two.

Reason(R): Atomicity is the number of atoms constituting a molecule.

Ans : a)Both A and R are true, and R is correct explanation of the assertion.

Q.5) Assertion(A): The number of particles present in one mole of a substance is fixed.

Reason(R): The mass of one mole of a substance is equal to its relative atomic mass in grams.

Ans : a) Both A and R are true, and R is correct explanation of the assertion.

Q.6) Give an example of polyatomic ion.

Ans : $\overset{\oplus}{N}H_4, NO_3^-, HCO_3^-, CO_3^{2-}, SO_3^{2-}, SO_4^{2-} PO_4^{3-}$ any one is the Answer

OR

Define law of conservation of mass.

Ans : It states that, 'Mass is neither created nor destroyed in a chemical reaction.' In other-words, the mass of the reactants must be equal to the mass of products

Q.7) Read the following paragraph and answer any two question from 5(i) to 5(iii) **(2)**

Raunak took 5 moles of carbon atoms in a container and Krish also took 5 moles of sodium atoms in another container of same weight.

i) Whose container is heavier?

Ans : b) Krish

ii) Whose container has more number of atoms?

Ans : c) Both a and b

iii) Mass of sodium atoms carried by Krish is

Ans : a) 115g

Q.8) Which of the following statements is not true about an atom?

Ans : d) Atoms aggregate in large numbers to form the matter that we can see, feel or touch.

Q.9) 1 u or 1 amu means

Ans : a) 1/12th mass of C-12 atoms

Q.10) Laws which explain the formation of many oxides by nitrogen is

Ans : b) Law of multiple proportions

Q.11) What would be the gram molecular mass of solid sulphur?

Ans : a) 256 g

Q.12) How many moles are present in 560 g of iron?

Ans : a) 1 mole

Q.13) According to the law of definite proportions, _____.

Ans : c) a chemical compound is always made up of the same element combined together in the same fixed proportion matter remains constant

Q.14) When alpha-particles are sent through a thin metal foil, most of them go straight through the foil because, _____.

Ans : c) most part of the atom is empty space

Section B (Each 2 marks)

Q.15) Give the names of the elements present in the following compounds:

a) Quicklime **b) Hydrogen bromide**

c) Baking powder **d) Potassium sulphate.**

Ans : a) Quicklime [CaO] $\rightarrow$ Elements [Calcium and oxygen]

b) Hydrogen bromide [HBr] $\rightarrow$ Elements [Hydrogen and bromide]

c) Baking powder [$NaHCO_3$] $\rightarrow$ Elements [Sodium, hydrogen, carbon and oxygen]

d) Potassium sulphate [K_2SO_4] $\rightarrow$ Elements [Potassium, suiphur and oxygen]

Q.16) What are polyatomic ions ?

Ans : Polyatomic ions: Two or more different atoms unite to form a charged particle is called polyatomic ions.

OR

Write down the formulae of

i) sodium oxide ii) aluminium chloride

iii) sodium sulphide iv) magnesium hydroxide

Ans : The following are the formulae :

i) sodium oxide – Na_2O ii) aluminium chloride – $AlCl_3$

iii) sodium sulphide – Na_2S iv) magnesium hydroxide – $Mg(OH)_2$

Section C(Each 3 marks)

Q.17) Calculate the relative molecular mass of water and molecular mass of HNO_3 ?

Ans : Relative molecular mass of water (H_2O)

= Atomic Mass of Hydrogen = 1u

Atomic Mass of Oxygen = 16u

So the molecular mass of water which consists of two atoms of Hydrogen and one Atom of oxygen is $2 \times 1 + 1 \times 16 = 18$ u

The molecular mass of HNO_3 = Atomic Mass of H + The Atomic Mass of N + 3 x Atomic Mass of O.

$= 1+14+16\times3$

$= 1 + 14 + 48 = 63$u

OR

Write down the names of A] $CaCl_2$ B] KNO_3 C] $CaCO_3$

Ans. : A) **$CaCl_2$:** Calcium Chloride

B) **KNO_3 :** Potassium Nitrate

C) **$CaCO_3$:** Calcium Carbonate

Q.18) Calculate the mass of the following

A] 0.5 Mole of N_2 Gas [Mass from mole of molecule]

Ans : Mass = Molar mass x number of Moles

m = M x n = 28 x 0.5 = 14g

B] 0.5 Mole of N atoms (Mass from mole of atom]

Ans : Mass = Molar Mass x Number of Moles

m = M x n = 14 x 0.5 = 7g

C] 3.011×10^{23} Number of N-ATOMS [Mass from Number of atoms]

Ans. : The Number of Moles, $n = \frac{\text{Given No. of Particles}}{\text{Avogadro Number}}$

$$n = \frac{N}{N_0} = \frac{3.011\times10^{23}}{6.022\times10^{23}} \quad m = M \times n = 14 \times \frac{3.011\times10^{23}}{6.022\times10^{23}} = 14 \times 0.5 = 7g$$

Section D (5 mark)

Q.19) Give the postulates of Dalton's atomic theory.

Ans :

1. Every element is composed of extremely small particles called atoms.
2. Atoms of a given element are identical, both in mass and properties. Different chemical elements have different kinds of atoms; in particular, their atoms have different masses.
3. Atoms cannot be created, destroyed or transformed into atoms of other elements.
4. Compounds are formed when atoms of different elements combine with each other in small whole number ratios.
5. The relative number and kinds of atoms in a given compound are constant.

OR

: **The reaction between aluminium carbide and water takes place according to the following equation :** $Al_4C_3 + 12H_2O \rightarrow 3CH_4 + 4Al(OH)_3$

Calculate the volume of CH_4 released from 14.4 g of Al_4C_3 by excess water at S.T.P. (C = 12, Al = 27)

Ans : Molecular weight of Al_4C_3 is $(27 \times 4) + (12 \times 3) = 144$

144 g of Al_4C_3 produces 3×22.4 litres of CH_4 at S.T.P.

$\therefore$ 14.4 g Al_4C_3 produces $\frac{3\times22.4}{144} = 14.4 = \frac{967.7}{144} = 6.72$ litres

***