Class 9 CBSE Test paper Solved Chapter 3: Atoms and Molecules-7

1. Q. Elaborate the basic difference between the formula unit mass and the molecular mass.

Ans: The molecular mass of a substance is the sum of the atomic masses of all the atoms in a molecule of the substance. It is therefore the relative mass of a molecule expressed in atomic mass units (u).

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2. Q. Write the formulae for calcium chloride, potassium nitrate and magnesium hydroxide and compute their molecular masses.

(Atomic masses Ca= 40 u, Cl = 35.5 u, K = 39 u, N = 14 u, O = 16 u, H = 1u Mg = 24u

Ans: calcium chloride ---> $CaCl_2$ = 40 + 2 x 35.5 =

Potassium nitrate ---> KNO_3 = 39 + 14 + 3x16 =

And magnesium hydroxide --> $Mg(OH)_2$ = 24 + 2(16 +1)

Q. Write two points of difference between an atom and an ion . Explain by giving examples of two types of ions present in the compound composed of metals and non-metals. [3]

An Atom can take part in a chemical reaction whereas the Ions are not capable of taking part in chemical reactions.

Atoms may or may not be able to exist independently whereas Ions can exist independently in a solution

In NaCl there is cation Na^{+1} (metal) and Anion Cl^{-1}(non metal)

3. Q. (a) When 10g of sulphur is burnt in 10g of oxygen 20g of sulphur dioxide is produced ? Find the mass of sulphur dioxide formed on burning 20g of sulphur in 30g of oxygen ? Justify your answer by stating the law which governs your answer.

(b) State the postulate of Dalton's atomic theory which explains the above law.

Ans: (a) According to law of the conservation of mass : Total mass of reactant = total mass of product

So, the mass of sulphur dioxide formed on burning 20g of sulphur in 30g of oxygen = 50gm

(b) Postulate (ii) which states that "Atoms are indivisible particles, which cannot be created or destroyed in a chemical reaction."

4. Q. Calcium carbonate decomposes on heating to form calcium oxide and carbon dioxide. When 10g of calcium carbonate is decomposed completely then 5.6g of calcium oxide is formed ?

Calculate the mass of carbon dioxide formed. Which law of chemical combination will you use in solving this problem ? State the law.

Answer: Law of conservation of mass states that mass can neither be created nor destroyed in a chemical reaction.

So, The mass of carbon dioxide formed = 10 – 5.6 = 4.4g

5. Q. Sodium is represented as $_{11}^{23}Na$ (a) What is its atomic mass ? (b) Write its gram atomic mass. (c) How many atoms of Na will be there in 11.5 g of the sample ?

Ans: (a) atomic mass = 23 amu (b) The gram atomic mass = 23 gm

(c) 23 gm of Na has 6.22x10^23 atoms

$\Rightarrow$ 11.5 gm of Na has (6.22x10^23)x11.5/23 atoms = 3.11 x 10^23 atoms

6. Q. What is the major drawback of Dalton's atomic theory?

Ans: The major drawback of Dalton's atomic theory was that, it considered atom as indivisible particle but now it has been established that an atom can further be divided into electrons, protons and neutrons.

7. Q. Write the names of the following compounds:

(a) $Ca_3(PO_4)_2$ (b) $KHCO_3$ (c) NH_4Cl (d) $Fe(OH)_2$ (e) CuS

Ans: (a) Calcium phosphate   (b) potassium hydrogen carbonate

 (c) Ammonium chloride   (d) Iron hydroxide   (e) copper sulphide

8. Q. What are the difference between atoms and Molecules?

Ans:

- Atom may be defined as the smallest particle of an element which does not exist free in nature but takes part directly in chemical combinations.
- Atom of any element is represented by the symbol of that element.
- For example, hydrogen atom is represented by H, sodium atom is represented by Na, etc.

- Molecule may be defined as the smallest particle of an element or compound which exists free in nature but does not participate directly in chemical combinations.
- Molecule of any substance is represented by their molecular formula.
- For example, water molecule is represented by H_2O. It tells that each water molecule contains two atoms of hydrogen and one atom of oxygen.

9. Q. How does Berzelius assign symbol to the element?

Ans: Berzilius suggested that the symbols of elements will be one or two letters of the name of the element in English. The first letter of a symbol is always written as a capital letter (uppercase) and the second letter as a small letter (lowercase)..

10.Q. Write chemical formula and find the ratio by mass of the combining elements in each of them. Methane, carbon dioxide and hydrogen sulphide

Ans: Methane, CH_4 , 12/4 = 3:1   Carbon dioxide CO_2 , 12:32 = 3:8

Hydrogen sulphide H_2S = 2:32=1:16

11. Q. (a) which kind of elements have tendency to lose electron? Give example.   (b) What are nucleons ?

Ans: (a) Metals eg, Na, Mg,   (b) Nucleons are the particles that make nucleus of an atom. Nucleon is of two different types i.e. neutrons and protons.

12. Q. Describe how mass of an atom measured?

Ans: According to Dalton, each element had a characteristic atomic mass. But determining the mass of an individual atom was a relatively difficult task. Relative atomic masses were determined using the laws of chemical combinations and the compounds formed.

Relative Atomic Mass : It is defined as the number of times a given atom is heavier than 1/12th of mass of 1 atom of carbon-12 (C-12).