

Class 9 CBSE Test paper Solved Chapter 3: Atoms and Molecules-6

1. Q. Write the name of triatomic molecule of oxygen.

Ans: O_3 – ozone

2. Q. If the valency of an element 'X' is 3, write the chemical formula of its Sulphide and Chloride.

Ans: $X_2(SO_4)_3$ and XCl_3

3. Q. Which the unit is used to measure the atomic radius ? Convert this unit in metre.

Ans: Atomic radius is measured in nanometres.

1 m = 10^9 nm

4. Q. As per the law of definite proportional carbon and oxygen combine in ratio 3 : 8. Compute the mass of oxygen gas that would be required to react completely with 6 gm carbon.

Solution: As per the law of definite proportional : The composition of a compound always remains fixed and it is independent to the source from which the compound is obtained.

Let the mass of oxygen gas that would be required to react completely with 6 gm carbon = x

$\Rightarrow 3 : 8 = 6 : x \Rightarrow x = 48/3 = 16\text{gm}$

5. Q. An uncharged particle found in the nucleus of atom. Identify this particle.

Ans; Neutron

6. Q. Name the gas produces when glucose molecules break down using oxygen?

Ans: CO_2

7. Q. Write the chemical formulae of the compounds formed by the following ions : 3

(a) Mg^{2+} and S^{2-} (b) Cu^{2+} and OH^{-1} (c) Al^{3+} and Br^{-1}

Name the compounds formed in each case.

Ans:

(a) Mg^{2+} and S^{2-} : MgS : Magnesium sulphide

(b) Cu^{2+} and OH^{-1} : $Cu(OH)_2$: Copper hydroxide

(c) Al^{3+} and Br^{-1} : Al_2Br_6 : Aluminium bromide

8. Q. (a) How do we know the presence of atoms if they do not exist independently for most of the elements ? (b) Write full form of IUPAC.

Ans: Atoms do not exist independently for most of the elements but form molecules and ions.

These molecules or ions grouped in large numbers to form the matter that we can see, feel or touch. IUPAC stands for International Union of Pure and Applied Chemistry

9. Q. A 0.48g sample of compound of oxygen and boron was found by analysis to contain 0.192 g of boron and 0.288 g of oxygen. Calculate the percentage composition of the compound by weight.

Ans: Mass of boron as given = 0.096 g

Mass of oxygen as given = 0.144 g

Mass of sample as given = 0.24 g

∴ Percentage of boron by weight in the compound = $(0.096 \div 0.24) \times 100 = 40\%$

∴ Percentage of oxygen by weight in the compound = $(0.144 \div 0.24) \times 100 = 60\%$

10. Q. State three points of difference between anion and cation ?

Ans:

- A negatively charged ion is called an 'anion' and the positively charged ion, a 'cation'.
- Anions are formed by gain of electrons where as cations are formed by lose of electrons.
- Cl^{-1} , O^{-2} are some example of anions where as Mg^{+2} , H^{+1} are some examples of cations.

11. Q (a) State the law of conservation of mass and the law of constant proportions. How did Dalton's atomic theory support these laws ?

(b) 28 g of nitrogen reacted with 6 g of hydrogen completely as per the given equation to form ammonia. How much will be the mass of ammonia formed ? Which law of chemical combination justifies your answer ? $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$

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

The law of constant proportions stated that *In a chemical substance the elements are always present in definite proportions by mass*".

Dalton's atomic theory States that Atoms are indivisible particles, which cannot be created or destroyed in a chemical reaction that support Law of conservation of mass

Dalton's atomic theory States that the relative number and kinds of atoms are constant in a given compound that support the law of constant proportions.

(b) According to Law of conservation of mass

The mass of ammonia formed = mass of reactant = $28+6 = 34\text{gm}$

12. Q. (i) Write the difference between 2O and O_2

(ii) Give one example of Mono, Di, Tri and Tetra atomic molecules.

Answer: (i) 2O represent 2 separate atom and O₂ represent 1 molecules containing 2 atoms

(ii) He, O₂, O₃ and P₄ are examples of Mono, Di, Tri and Tetra atomic molecules

13. Q. Write the chemical formulae of compound formed by using these ions: Ca²⁺, K⁺, Fe³⁺, Cl⁻¹, SO₄⁻²

Molar mass of nitrogen is 14 unit. What will be the mass of one atom nitrogen in gram.[3]

Ans: CaCl₂, CaSO₄, FeCl₃, Fe₂(SO₄)₃, KCl, K₂SO₄

The mass of one atom nitrogen in gram = $\frac{6.22 \times 10^{23}}{14} = 4.44 \times 10^{22} \text{ gm}$

14. Q. (a) Carbon and oxygen combine in a ratio of 3 : 8 by mass to form carbon dioxide. Deduce the ratio by number of atoms in the compound.

(b) While searching for various atomic mass units, scientists initially took 1/16 of the mass of an atom of naturally occurring oxygen as the unit. State two reasons.

(atomic masses O = 16, C = 12)

Ans: (a) In carbon dioxide C:O = 3 : 8 (by mass) \Rightarrow Amount of C = 3x and Amount of O = 8x

So Amount of C = $\frac{3x}{12}$ gram atom and Amount of O = $\frac{8x}{16}$ gram atom

1 gram atom contains 6.022 × 10²³ number of atom

Number of C = $\left(\frac{3x}{12}\right) \times 6.022 \times 10^{23}$ Number of O = $\left(\frac{8x}{16}\right) \times 6.022 \times 10^{23}$

So number ratio of carbon and oxygen is = $\left(\frac{3x}{12}\right) \div \left(\frac{8x}{16}\right) = 1 : 2$

(b) Scientists initially took 1/16 of the mass of an atom of naturally occurring oxygen as the unit because of following two reasons

- Oxygen reacted with a large number of elements and formed compounds.
- This atomic mass unit gave masses of most of the elements as whole numbers.

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

Ans: The only difference is that we use the word formula unit for those substances whose constituent particles are ions.