Chemistry Study Materials for Class 9
(NCERT Questions –Answers of Chapter -03)
Ganesh Kumar Date:- 03/07/2021

Atoms and Molecules

EXERCISE QUESTIONS PAGE NO. 43, 44

Q1. A 0.24 g sample of compound of oxygen and boron was found by analysis to contain 0.096 g of boron and 0.144 g of oxygen. Calculate the percentage composition of the compound by weight.

Answer:

Mass of boron = 0.096 g (Given)

Mass of oxygen = 0.144 g (Given)

Mass of sample = 0.24 g (Given)

Thus, percentage of boron by weight in the compound = $\frac{0.096}{\mathbf{0.24}}$ **X100 = 40%**

And, percentage of oxygen by weight in the compound = $\frac{0.144}{0.24}$ X 100 = 60%

Q 2. When 3.0 g of carbon is burnt in 8.00 g oxygen, 11.00 g of carbon dioxide is produced. What mass of carbon dioxide will be formed when 3.00 g of carbon is burnt in 50.00 g of oxygen? Which law of chemical combination will govern your answer?

Answer: Carbon + Oxygen → Carbon dioxide

3 g of carbon reacts with 8 g of oxygen to produce 11 g of carbon dioxide.

If 3 g of carbon is burnt in 50 g of oxygen, then 3 g of carbon will react with 8 g of oxygen.

The remaining 42 g of oxygen will be left un-reactive.

In this case also, only 11 g of carbon dioxide will be formed.

The above answer is governed by the law of constant proportions.

Q 3. What are polyatomic ions? Give examples.

Answer:

A polyatomic ion is a group of atoms carrying a charge (positive or negative).

For example, ammonium ion (NH_4^+), hydroxide ion (OH^-), carbonate ion (CO_3^{2-}), sulphate ion (SO_4^{2-})

Q 4. Write the chemical formulae of the following.

(a) Magnesium chloride (b) Calcium oxide (c) Copper nitrate

(d) Aluminium chloride (e) Calcium carbonate.

Answer:

(a) Magnesium chloride → $MgCl_2$ **(b)** Calcium oxide → CaO

(c) Copper nitrate → $Cu(NO_3)_2$ **(d)** Aluminium chloride → $AlCl_3$

(e) Calcium carbonate → $CaCO_3$

Q 5. Give the names of the elements present in the following compounds.

(a) Quick lime (b) Hydrogen bromide

(c) Baking powder (d) Potassium sulphate.

Answer:

(a) Quick lime, Chemical formula: CaO, Elements present: Calcium, Oxygen

(b) Hydrogen bromide, Chemical formula : HBr,

Elements present: Hydrogen, Bromine

(c) Baking powder, Chemical formula : NaHCO3

Elements present: Sodium, Hydrogen, Carbon, Oxygen

(d) Potassium sulphate. Chemical formula: K_2SO_4

Elements present: Potassium, Sulphur, Oxygen

Q 6. Calculate the molar mass of the following substances.

(a) Ethyne, C_2H_2 (b) Sulphur molecule, S_8 (c) Phosphorus molecule, P_4

(d) Hydrochloric acid, HCl (e) Nitric acid, HNO_3

Answer: (a) Molar mass of Ethyne, $C_2H_2 = 2 \times 12 + 2 \times 1 = 26$ g

(b) Molar mass of sulphur molecule, $S_8 = 8 \times 32 = 256$ g

(c) Molar mass of phosphorus molecule, $P_4 = 4 \times 31 = 124$ g

(d) Molar mass of hydrochloric acid, HCl = 1 + 35.5 = 36.5 g

(e) Molar mass of nitric acid, $HNO_3 = 1 + 14 + 3 \times 16 = 63$ g

Q 7. What is the mass of :

(a) 1 mole of nitrogen atoms?

(b) 4 moles of aluminium atoms (Atomic mass of aluminium = 27)?

(c) 10 moles of sodium sulphite Na_2SO_3)?

Answer: (a) The mass of 1 mole of nitrogen atoms is 14 g.

(b) The mass of 4 moles of aluminium atoms is (4×27) g = 108 g

(c) The mass of 10 moles of sodium sulphite (Na_2SO_3) is $10 \times [2 \times 23 + 32 + 3 \times 16]$ g

$= 10 \times 126$ g = 1260 g

****