

# Chemistry Study Materials for Class 11 (NCERT Based Numericals of Chapter- 01)

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## Some Basic Concept of Chemistry

**Q.19:** Calculate the number of moles of Ca, C and oxygen atoms and its mass in 200 g of  $\text{CaCO}_3$ .

Solution:

Molar mass of  $\text{CaCO}_3 = 40 + 12 + 16 \times 3 = 100 \text{ g}$

No. mole of  $\text{CaCO}_3 = 200\text{g} / 100\text{g} = 2 \text{ moles}$

Number of Moles of Ca = 2 moles

Number of Moles of C = 2 moles

Number of Moles of O = 6 moles

**Q. 20:** Calculate the total number of electrons present in 3.2 g of  $\text{CH}_4$ .

Solution:

Molar mass of  $\text{CH}_4 = 12 + 4 \times 1 = 16 \text{ g}$

Moles of  $\text{CH}_4 = 3.2 / 16 = 0.2 \text{ moles}$

No. of electron in 1 molecule of  $\text{CH}_4 = 6 + 4 = 10 \text{ electrons}$

Total no. of electrons =  $0.2 \times 6.022 \times 10^{23} \times 10$

$= 12.044 \times 10^{23} \text{ electrons.}$

**Q. 21:** How much Calcium is in the amount of  $\text{Ca}(\text{NO}_3)_2$  that contains 20g of Nitrogen?

Solution:

Number of Moles of Nitrogen =  $20 / 14 = 1.428 \text{ moles}$

From the Molecular formula, it is apparent that, the number of Moles Ca will be half number of Number of Nitrogen

So, number of Moles of Ca =  $1.428 / 2$

$= .714 \text{ moles}$

So mass of Ca =  $.714 \times 40$

$= 28.56 \text{ g}$

**Q. 22:** State the number of atoms in 1 g - atom of Aluminium?

Solution:

1 gm - atom = atomic weight

So number of atoms will be Avogadro number =  $6.022 \times 10^{23}$

**Q. 23:** If the components of the air are N<sub>2</sub>, 78%; O<sub>2</sub>, 21%; Ar, 0.9% and CO<sub>2</sub>, 0.1% by volume, what would be the molecular mass of air?

Solution:

The molar ratios are also volume ratios for gases (Avogadro's principle)

$$\begin{aligned} \text{Molecular mass of air} &= \frac{78 \times 28 + 21 \times 32 + 0.9 \times 40 + 0.1 \times 44}{78 + 21 + 0.9 + 0.1} \\ &= 28.964. \end{aligned}$$

**Q.24:** How many molecules are there in 1.624 gm Ferric chloride(FeCl<sub>3</sub>)?

Solution:

Molar Mass of Ferric chloride =  $56 + 35.5 \times 3 = 162.5$  gm

Number of moles =  $1.624 / 162.5$

$$\begin{aligned} \text{Number of molecules} &= \frac{1.624}{162.5} \times 6.022 \times 10^{23} \\ &= 6.023 \times 10^{21} \text{ Molecules} \end{aligned}$$

**Q.25:** What is the mass of 1 Ammonia Molecule?

Solution:

Molar Mass of Ammonia =  $14 + 3 \times 1 = 17$  gm

Mass of one molecule =  $17 \times 6.022 \times 10^{23}$

$$= 2.8 \times 10^{-23} \text{ g}$$

**Q. 26:** Calculate the mass of 0.5 moles of CaCO<sub>3</sub> in g.

Solution:

Molar mass (i.e., molecular mass in g) =  $40 + 12 + 3 \times 16 = 100$  g

Mass of 0.5 moles of CaCO<sub>3</sub> =  $0.5 \times 100 = 50$  g

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