Chemistry Study Materials for Class 9

(NCERT Questions – Answers)

Ganesh Kumar Date:- 06/07/2020

Atoms and Molecules

Question 7: What is the mass of

(a)1 mole of nitrogen atoms? (b) 10 moles of sodium sulphite (Na_2SO_3)?

(c)4 mole of aluminium atoms (Atomic mass of aluminium = 27)?

Answer 7:

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

(b) The mass of 10 moles of sodium sulphite (Na2SO3) is 10 × [2 × 23 + 32 + 3 × 16]g

= 10 × 126g = 1260g

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

Question 8: Convert into mole.

(a) 12g of oxygen gas (b)12g of water (c)22g of carbon dioxide

Answer 8: (a) 32 g of oxygen gas = 1 mole

Then, 12g of oxygen gas = 12/32 mole = 0.375 mole

(b) 18g of water = 1 mole

Then, 20 g of water = 20/18 mole = 1.11 moles (approx.)

(c) 44g of carbon dioxide = 1 mole

Then, 22g of carbon dioxide = 22/44 mole = 0.5 mole

Question 9: What is the mass of:

(a) 0.2 mole of oxygen atoms? (b) 0.5 mole of water molecules?

Answer 9: (a) Mass of one mole of oxygen atoms = 16g

Then, mass of 0.2 mole of oxygen atoms = 0.2 × 16g = 3.2g

(b) Mass of one mole of water molecule = 18g

Then, mass of 0.5 mole of water molecules = 0.5 × 18g = 9g

Question 10: Calculate the number of molecules of sulphur (S_8) present in 16g of solid sulphur.

Answer 10: 1 mole of solid sulphur (S_8) = 8 × 32g = 256g

i.e., 256g of solid sulphur contains = 6.022×10^{23} molecules

Then, 16g of solid sulphur contains = $\frac{6.022 \times 10^{23}}{256} \times 16$ molecules

$= 3.76 \times 10^{22}$ molecules (approx)

Question 11: Calculate the number of aluminium ions present in 0.051g of aluminium oxide. (Hint: The mass of an ion is the same as that of an atom of the same element. Atomic mass of Al= 27u)

Answer 11: 1 mole of aluminium oxide (Al_2O_3) = 2 × 27 + 3 × 16 = 102g

i.e., 102g of Al_2O_3 = 6.022×10^{23} molecules of Al_2O_3

Then, 0.051 g of Al_2O_3 contains = $\frac{6.022 \times 10^{23}}{102} \times 0.051$ molecules

$= 3.011 \times 10^{20}$ molecules of Al_2O_3

The number of aluminium ions (Al^{3+}) present in one molecules of aluminium oxide is 2.

Therefore,

The number of aluminium ions (Al^{3+}) present in 3.11×10^{20} molecules

(0.051g) of aluminium oxide (Al_2O_3) = $2 \times 3.011 \times 10^{20} = 6.022 \times 10^{20}$

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