CHAPTER 11TH CLASS

UNIT– 1 (SOME BASIC CONCEPTS OF CHEMISTRY)

IMPORTANT FORMULAS

PALNIVEL

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1. kelvin and Celsius

$$k = {}^{0}C + 273$$

2. Fahrenheit and Celsius

$$^{0}F = \frac{9}{5}\ ^{0}C + 32$$

3. Mole formula

$n = \frac{w}{M}$

Where,

n = Number of moles

w = mass of solute

M = Molar mass of solute

Unit of

n = mole

4. Mole formula

$$n = \frac{N}{N_A}$$

Where,

n = Number of moles.

N = Number of particles.

N_A = Avogadro number

The value of Avogadro number = 6.022×10^{23}

5. Relation between Empirical and Molecular formula

Molecular Formula = n x Empirical Formula

$$n = \frac{\text{Molecular mass}}{\text{Empirical mass}}$$

Where “n” is an Integer

6. Molarity

$$\text{Molarity (M)} = \frac{\text{Number of moles of solute}}{Volume\ of\ solution\ (in\ Litre)} = \frac{\text{Number of moles of solute x 1000}}{Volume\ of\ solution\ (in\ ml)}$$

$$\text{Moles of solute(n)} = \frac{Mass\ of\ solute(w)}{Molar\ Mass\ of\ solute\ (M)}$$

$$\text{Volume} = \frac{Mass}{Density}$$

Unit of

Molarity = M or mol l^{-1}

7.Molality

$$\text{Molality(m)} = \frac{\text{Number of moles of solute}}{Mass\ of\ solvent\ (\ in\ Kg)} = \frac{\text{Number of moles of solute x 1000}}{Mass\ of\ solvent\ (\ in\ g)}$$

$$\text{Moles of solute(n)} = \frac{Mass\ of\ solute(w)}{Molar\ Mass\ of\ solute\ (M)}$$

Unit of

Molality = m or mol Kg^{-1}

8. Mole fraction ($\mathcal{u}$)

Mole fraction of solute, $\mathcal{u}_2 = \frac{n_2}{n1 + n2}$

Mole fraction of solvent, $\mathcal{u}_1 = \frac{n1}{n1 + n2}$

where,

n_2 = Number of moles of solute

n_1 = Number of moles of solvent

9. Parts per million (ppm)

When a solute is present in trace quantities, the concentration is expressed in parts per million.

$$\text{Parts per million} = \frac{\text{Number of parts of the component x}10^6}{\text{Total number of parts of all the components of the solution}}$$

or

$$\text{Parts per million} = \frac{\text{Mass of solute} \quad \text{x} \quad 10^6}{\text{Mass of solution}}$$

10. Mass percent (w/w)

$$\text{Mass percent} = \frac{\text{Mass of solute} \times 100}{\text{Mass of solution}}$$

11. Volume percentage (V/V)

$$\text{Volume percentage} = \frac{\text{Volume of solute} \quad \text{x} \quad 100}{\text{Volume of solution}}$$

12. Mass by Volume percentage (W/V)

$$\text{Mass by volume percentage} = \frac{\text{Mass of the solute} \quad \text{x} \quad 100}{\text{Volume of the solution}}$$

13.RELATION BETWEEN MOLARITY AND MOLALITY

$$\text{Molality(m)} = \frac{\text{M x 1000}}{(1000 \text{ x d}) - (\text{M x } M_2)}$$

where,

M =Molarity

M_2 = Molar mass of solute

d = density

14.SOME OTHER FORMULAES

$M_1V_1 = M_2V_2$

where, M_1 is the molarity and V_1 is the volume of the concentrated solution.
M_1 is the molarity and V_1 is the volume of the diluted solution