# Chemistry Basic Formulas

## Normality

### Formula

$$\text{Normality} = \frac{\text{Grams Equivalent Weight}}{\text{Litres of Solution}}$$

## Molarity

### Formula

$$\text{Molarity} = \frac{\text{Number of Moles Concentration}}{\text{Litres of Solution}}$$

## Molality

**Formula**

$$\text{Molality} = \frac{\text{Number of Moles Concentration}}{\text{Mass of Solution}}$$

## Enthalpy

**Formula**

$$\text{Enthalpy} = \text{Energy} + (\text{Pressure} \times \text{Volume})$$

## Entropy

## Formula

$$\text{Entropy} = -\sum_{i=1}^{n} p_i \, (\log_2 p_i)$$

$$= -p_1(\log_2 p_1) - p_2(\log_2 p_2) - \ldots - p_n(\log_2 p_n)$$

$$\text{Entropy}\,(\Delta S_{\text{reaction}}) = \sum \Delta S_{\text{products}} - \sum \Delta S_{\text{reactants}}$$



## Ionic Strength

## Formula

$$I = \frac{1}{2} \sum_{i=1}^{n} c_i z_i^2$$

$I$ → Ionic Strength

$c_i$ → ion concentration

$z_i$ → ion charges

getcalc.com

# Boyle's Law

## Formula

Boyle's Law:

$$V_i \times P_i = V_f \times P_f$$

$V_i$ ⟶ initial volume

$V_f$ ⟶ final volume

$P_i$ ⟶ initial pressure

$P_f$ ⟶ final pressure



# Charle's (Gas) Law

## Formula

Charles Law:

$$V_i \times T_i = V_f \times T_f$$

$V_i$ ⟶ initial volume

$V_f$ ⟶ final volume

$T_i$ ⟶ initial Kelvin temperature

$T_f$ ⟶ final Kelvin temperature



# Ideal Gas Law

## Formula

### Ideal Gas Law:

$$PV = nRT$$

- P → Pressure
- V → Volume
- n → number of moles
- R → gas constant ( 8.314 J $mol^{-1}$ $k^{-1}$ )
- T → temperature

getcalc.com

## Nernst Equation

## Formula

### Nernst Equation:

$$E = \frac{RT}{zF} \ln\left(\frac{X_{out}}{X_{in}}\right)$$

- $E$ → Membrane Potential (voltage)
- $R$ → gas constant ( 8.314 J $mol^{-1}$ $k^{-1}$ )
- $F$ → Faraday's constant ( $9.649 \times 10^4$ C . $mol^{-1}$ )
- $X_{out}$ → concentration of ion outside the cell
- $X_{in}$ → concentration of ion inside the cell
- $z$ → number of electrons
- $T$ → temperature in Kelvin



## Gibb's Free Energy

## Formula

### Gibbs Free Energy:

$$\Delta G = \Delta H - (T \times \Delta S)$$

- $\Delta G$ → Gibbs Free Energy
- $\Delta H$ → change in enthalpy
- $\Delta S$ → change in entropy
- $T$ → temperature

getcalc.com

## Equilibrium Constant

## Formula

$$aA + bB \rightleftharpoons cC + dD$$

$$K_c = \frac{[C]^c [D]^d}{[A]^a [B]^b}$$

$K_c$ ⟶ Equilibrium Constants

$[A]$ ⟶ concentration of molars A

$[B]$ ⟶ concentration of molars B

$[C]$ ⟶ concentration of molars C

$[D]$ ⟶ concentration of molars D

a,b,c,d ⟶ number of moles of A,B,C,D respectively



## pH - pOH

## Formula

pH-pOH:

$$pOH = 14 - pH$$

$$pH \longrightarrow -\log_{10}(H^+)$$

$$pOH \longrightarrow -\log_{10}(OH^-)$$