Some Basic Concepts of Chemistry Formula Sheet

(1) $1 \text{ mole} = 6.022 \times 10^{23} = N_A$

(2) $\text{No. of moles of entities} = \dfrac{\text{given no. of entities}}{6.022 \times 10^{23}}$

(3) $\text{No. of atoms} = \dfrac{\text{given Mass of atom } (u)}{\text{Relative Atomic Mass } (u)}$

(4) $\text{Average Atomic Mass} = \dfrac{\%_1 M_1 + \%_2 M_2 - \cdots}{\text{Total } \%}$

(5) $\text{Actual Molecular Mass} = \Sigma [\text{Actual Atomic Mass}]$

(6) $\text{Relative Molecular Mass} = \Sigma [\text{Relative Atomic Mass}]$

(7) $\text{No. of molecules} = \dfrac{\text{given Mass of molecule } (u)}{\text{Relative Molecular Mass } (u)}$

(8) $\text{No. of moles} = \dfrac{\text{given Mass (gms)}}{\text{Molar Mass (gms/mol)}}$

(9) 1 gram-atom = 1 mole atom

(10) 1 gram-molecule = 1 mole molecule

(11) Average Molecular Mass $= \dfrac{M_A n_A + M_B n_B ----}{n_A + n_B + ----}$

(12) No. of moles (NTP) $= \dfrac{\text{given Vol.(l)}}{22.4 \text{ l/mol}}$

(13) No. of moles (STP) $= \dfrac{\text{given Vol.(l)}}{22.7 \text{ l/mol}}$

(14) Mole '/. of element $= \dfrac{\text{Moles of element}}{\text{Total moles}} \times 100\%$

(15) Mass '/. of element $= \dfrac{\text{Total Mass of element}}{\text{Total Mass}} \times 100\%$

$= \dfrac{(\text{No. of atoms}) \times (\text{Mass of 1 atom})}{\text{Total Mass}} \times 100\%$

(16) Vapour Density $= \dfrac{\text{Molar Mass}}{2}$

(17) Equation of Combustion $\rightarrow C_xH_y + \left(x + \frac{y}{4}\right) O_2 \rightarrow xCO_2 + \frac{y}{2} H_2O$

(18) Volume Contraction $\rightarrow$ [Total volume of reactant gases] $-$ [Total volume of product gases]

(19) Percentage yield $\rightarrow \left[\dfrac{\text{Actual yield}}{\text{Theoretical yield}}\right] \times 100\%$

(20) Percentage Purity = $\frac{\text{Mass of pure substance}}{\text{Mass of sample}} \times 100\%$

(21) Molarity (M) = $\frac{\text{No. of moles of solute}}{\text{Volume of solution (l)}} = \frac{\text{No. of milli-moles of solute}}{\text{Volume of solution (ml)}}$

(22) Condition for dilution = $M_1V_1 = M_2V_2$

(23) Molality (m) = $\frac{\text{No. of moles of solute}}{\text{Mass of solvent (kg)}}$

(24) Mole fraction (Binary solution) $\Rightarrow X_A = \frac{n_A}{n_A+n_B}$ $X_B = \frac{n_B}{n_A+n_B}$ $X_A + X_B = 1$

(25) Mass/Mass% $\Rightarrow \frac{\text{Mass of solute (gms)}}{\text{Mass of solution (gms)}} \times 100\%$

(26) Mass/Volume% $\Rightarrow \frac{\text{Mass of solute (gms)}}{\text{Volume of solution (ml)}} \times 100\%$

(27) Volume/Volume% $\Rightarrow \frac{\text{Vol. of solute (ml)}}{\text{Vol. of solution (ml)}} \times 100\%$

(28) ppm = $\frac{\text{mass of solute (gms)}}{\text{mass of solution (gms)}} \times 10^6$

(29) ppb = $\frac{\text{mass of solute (gms)}}{\text{mass of solution (gms)}} \times 10^9$

(30) ppt = $\frac{\text{mass of solute (gms)}}{\text{mass of solution (gms)}} \times 10^{12}$

(31) Formality = $\frac{\text{No. of moles of ionic compound}}{\text{Vol. of soln (L)}}$

(32) Strength = $\frac{\text{Mass of solute (gms)}}{\text{Vol. of solution (L)}}$