Chemistry formulas for grade 11, grade 12 and under graduates.

Ideal Gas law $PV = nRT$ n = number of moles R = universal gas constant = 8.3145 J/mol K	Combined Gas law $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$
Boyle's law $P_1V_1 = P_2V_2$	Charles law $\frac{V_1}{T_1} = \frac{V_2}{T_2}$
Gay-Lussac law $\frac{P_1}{T_1} = \frac{P_2}{T_2}$	Diffusion: Rate at which two gases mix Graham's law of diffusion The rate of diffusion of a gas is inversely proportional to the square root of their density or the molar mass of the gas. $\text{Rate}_{\text{diffusion}} \propto \frac{1}{\sqrt{\text{density}}}$ $\frac{\text{Diffusion-Rate}_B}{\text{Diffusion-Rate}_A} = \sqrt{\frac{\text{Molar-Mass}_A}{\text{Molar-Mass}_B}}$
Effusion: Rate at which a gas escapes thru pin hole Graham's law of effusion The rate of effusion of a gas is inversely proportional to the square root of either the density or the molar mass of the gas. $\text{Rate}_{\text{effusion}} \propto \frac{1}{\sqrt{\text{density}}}$	**Solution:** Solution is a homogeneous mixture of two or more substances. **Solute** is a substance that is dissolved in the solution. **Solvent** is the substance that dissolves the solute. Solvent is present in greater amount.
Concentration is the ratio of solute and solvent. Concentration can be measured using molarity, molality and mole fraction. $\text{Molarity (M)} = \frac{\text{moles of solute}}{\text{liters of solution}}$ $\text{Molality (m)} = \frac{\text{moles of solute}}{\text{kg of solution}}$	Unit of Molarity (M) : mol/L : moles per litre Unit of Molality (M) : mol/kg : moles per kg
Mole fraction: Mole fraction of a component in solution is the number of moles of that component divided by the total number of moles of all components in the solution. $\text{Mole-fraction } (X_a) = \frac{\text{moles}_a}{\text{moles}_a + \text{moles}_b + \ldots}$	**Dilution**: Siluting a solution means adding more solvent in solution without the addition of more solute. $M_iV_i = M_fV_f$ M_i: Molarity of solution before diluting. V_i: Volume of solution before diluting. M_f: Molarity of solution after diluting.

	V_f: Volume of solution after diluting.
Mole: Mole is the amount of substance that contains same number of particles as there are atoms in Carbon-12. One mole of substance is Avogadro's number (i.e. 6.023×10^{23}).	One mole of gas has volume of 22.4 liter at STP.
Relation between moles and grams 1 mole = molecular weight of substance in grams.	Ionization Enthalpy: It is the energy needed to remove an electron from an atom or molecule (i.e from low state to n=∞). It is always endothermic (i.e. positive). OR Ionization energy: energy needed to remove an electron from an atom
Henderson-Hasselbalch equation: $pH = pK_a + \log_{10} \frac{[A^-]}{[HA]}$ where $[A^-]$: Concentration of conjugate base [HA]: concentration of the acid OR $pH = pK_a + \log_{10} \frac{[\text{Conjugate Base}]}{[\text{Acid}]}$	