Order of a Reaction	It is the sum of powers of the concentration of the reactants Rate = $k [A]^x [B]^y$ order = $x + y$
Zero Order Reactions	Rate = $k[R]^0$ $k = [R]_0 - [R]/t$ unit of k is mol $L^{-1}s^{-1}$ E.g. The decomposition of gaseous ammonia on a hot platinum surface The thermal decomposition of HI on gold surface
First Order Reactions	Rate = $k[R]$ $k = 2.303/t \log [R]_0/[R]$ unit of k is s^{-1} E.g. All natural and artificial radioactive decay of unstable nuclei, decomposition of N_2O_5 and N_2O

Half-Life of a Reaction	It is the time in which the concentration of a reactant becomes half of its initial concentration. It is denoted by $t_{1/2}$. **For zero order reaction** $t_{1/2} \propto [R]_0$ or initial concentration $t_{1/2} = [R]_0/2k$ **For first order reaction** $t_{1/2}$ is independent of $[R]_0$ and is equal to 0.693/k
Collision Frequency	It is the number of collisions per second per unit volume Rate of reaction = $Z_{AB}\, e^{-Ea/RT}$ Z_{AB} - collision frequency of reactants $e^{-Ea/RT}$ - fraction of molecules with energies equal or more than Ea (activation energy)
Arrhenius Equation	It explains the temperature dependence of the rate of a reaction $k = A\, e^{-Ea/RT}$ A - Arrhenius factor or the frequency factor Ea - activation energy in joules/ mole ($J\ mol^{-1}$)

Pseudo First Order Reaction	Reactions that become first order under certain conditions E.g. Acid hydrolysis of ethyl acetate Acid catalysed inversion of cane sugar
Effective Collisions	Collisions in which molecules collide with sufficient kinetic energy or threshold energy and proper orientation Rate = $PZ_{AB}\, e^{-Ea/RT}$ P - probability or steric factor
Activation Energy (E_a)	It is the energy required by reactant molecules to form the intermediate or activated complex (C) ΔH = Activation energy of forward reaction – Activation energy of backward reaction