$$t_{1/2} = \frac{0.693 * V_d}{Cl} = 0.693 * \frac{1}{K}$$

$$V_d = \frac{\text{Dose (mg)}}{\text{initial conc. of the drug } (C_0)} \quad \{\text{amount of drug in body}\}$$

$$V_d = \frac{\text{total amount of the drug (mg)}}{\text{Plasma concentration (mg/ml)}}$$

$$\text{Maintenance dose} = \frac{C_{ss} * Cl}{F}$$

$$\text{loading dose} = \frac{C_{ss} * V_d}{F}$$

$$Cl = K * V_d$$

$$C_{ss} = 1\text{½ initial dose}$$

$$K * t_{1/2} = 0.693$$

$$\text{Rate of infusion} = C_{ss} * Cl$$

$$\text{Rate of elimination} = \frac{V_{max} * C}{K_m + C}$$

$$\text{Renal } Cl = \frac{\text{conc. of drug in urine } (C_u) * \text{urine flow rate } (V)}{\text{Plasma concentration of drug}}$$

$$Cl = \frac{\text{Rate of elimination (mg/min)}}{\text{conc. of drug on plasma (mg/ml)}} = \frac{\text{Dose}}{AUC}$$

$$\text{Hepatic } Cl = \frac{\text{blood flow}(Q) * [C_{\text{into liver}} - C_{\text{out of liver}}]}{C_{\text{into liver}}}$$

ER

$$\text{Bioavailability } (F) = \left(\frac{AUC_{oral}}{AUC_{IV}}\right) * 100\%$$

$$F = f \times (1 - ER)$$

$$Cl_{total} = Cl_{hepatic} + Cl_{Renal} + Cl_{pulmonary} + Cl_{other}$$

$$\text{Dose} = Css \times Vd \div \text{Bioavailability}$$