MCB80.1x Equation Sheet

Nernst Equation

$E_{ion} = \frac{RT}{zF} ln \frac{[ion]_o}{[ion]_i}$ for T in Kelvin, R = 8.314 *J/K*mol*, and F = 96, 485 *C/mol*

GHK Equation

$Vm = \frac{RT}{F} ln \frac{P_k[K]_o + P_{Na}[Na]_o + P_{Cl}[Cl]_i}{P_k[K]_i + P_{Na}[Na]_i + P_{Cl}[Cl]_o}$ for T in Kelvin, R = 8.314 *J/K*mol*, and F = 96, 485 *C/mol*

Driving Force

$Driving\ Force = V_{membrane} - E_{ion}$

Ohms Law

$Current\ (I) = \frac{Voltage\ (V)}{Resistance\ (R)}$ Current in Amps (*A*), Voltage in Volts (*V*), Resistance in Ohms (*Ω*)

Length Constant

$Length\ Constant\ (L) = \sqrt{\frac{R_{membrane}}{R_{axial}}}$ $R_{membrane}$ in *Ω*cm*, R_{axial} in *Ω/cm*

Time Constant

$Time\ Constant\ (T) = R_{membrane} C_{membrane}$ $R_{membrane}$ in Ω*cm, $C_{membrane}$ in F