Physical Quantity	Symbol	Units	Definition
Charge	Q	Coulomb (C)	1C = -6.241x10^{18} electrons
Current	I	Ampere (A)	1A = 1C / sec
Resistance	R	Ohm (Ω)	1Ω = 1V/1A
Voltage	V	Volt (V)	1V = 1A x 1Ω
Power	P	Watt (W)	1W = 1V x 1A
Energy	E	Joule (J)	1 J = 1W x 1 sec
Capacitance	C	Farad (F)	1 F = (1 A x 1 sec) / 1 V
Inductance	L	Henry (H)	1 H = (1 V x 1 sec) / 1 A

Ohm's Law $I = \frac{V}{R} \quad V = IR$

Kirchhoff's Current Law (KCL) $\sum_{node} I = 0$

Kirchhoff's Voltage Law (KVL) $\sum_{loop} V = 0$

Resistance $R = \rho \frac{l}{A} \quad P = \frac{V^2}{R} \quad P = I^2 R$

ρ = resistivity A = cross sectional area l = length

Capcitance

$$Q = CV \quad C = \varepsilon \frac{A}{d} \quad \varepsilon = k\varepsilon_0$$

$$I = C\frac{dV}{dt} \quad V = \frac{1}{C}\int I\,dt \quad E = \frac{1}{2}CV^2$$

ε= permittivity, ε_0= permittivity of free space,
k = dielectric constant
A = area of plates, d = distance between plates

Inductance

$$L_{solenoid} = \mu \frac{N^2 A}{\ell}$$

$$V = L\frac{dI}{dt} \quad I = \frac{1}{L}\int V\,dt \quad E = \frac{1}{2}L\,I^2$$

μ= permeability, μ_0= permeability of free space,
N = number of turns, A = area within solenoid,
ℓ = length of solenoid

Series $R_S = R_1 + R_2 \quad C_S = \frac{C_1 C_2}{C_1 + C_2} \quad L_S = L_1 + L_2$

Parallel $R_P = \frac{R_1 R_2}{R_1 + R_2} \quad C_P = C_1 + C_2 \quad L_P = \frac{L_1 L_2}{L_1 + L_2}$

Biased Bipolar Transistor $I_C = \beta I_B$

Decibels for Power $10\log_{10}\frac{A}{B}$

Decibels for Amplitude $20\log_{10}\frac{A}{B}$

Euler's Identity $e^{j\theta} = \cos\theta + j\sin\theta$

$$\cos\theta = \mathrm{Re}\{e^{j\theta}\} = \frac{e^{j\theta} + e^{-j\theta}}{2}$$

$$\sin\theta = \mathrm{Im}\{e^{j\theta}\} = \frac{e^{j\theta} - e^{-j\theta}}{2j}$$

Complex Impedance
$Z_R = R$
$Z_C = 1/j\omega C$
$Z_L = j\omega L$

RC curcuit $\omega_{cutoff} = 1/RC \quad t = RC$

LC curcuit $\omega_{resonant} = 1/\sqrt{LC}$