$1q = 6.28 \times 10^{18} e$; $F = k\frac{q_1 q_2}{d^2}, k = 9 \times 10^9$; $E = \frac{F}{q}$; $E = \frac{V}{d}$;

$I = \frac{q}{t}$; $V = \frac{W}{q}$; $\rho = \frac{1}{\chi}$; $\chi_{cu} = 56$; $R = \rho\frac{l}{A}$; $R_t = R_0(1 + \alpha t)$

$V = RI$; kvl: $\sum v = 0$, kcl: $\sum I = 0$,

Seri: $R_t = \sum R_i$, Par: $\frac{1}{R_t} = \sum \frac{1}{R_i}$,

Voltage divider: $v_1 = v\frac{R_1}{R_1 + R_2}$, Current divider: $I_1 = \frac{R_2}{R_1 + R_2} I$,

$W = Vq$, $W = VIt$, $W = RI^2 t$, $Q = KW$, $K = 0.24, P = \frac{W}{t}$, $P = VI$,

$1hp = 746w$, $\eta = \frac{P_2}{P_1} \times 100$,

1 wb = 10^8 magnetic flux, $B = \frac{\Phi}{A}$, $F_m = \theta = NI, H = \frac{F_m}{l}$, $\mu = \frac{B}{H}$, $\mu_0 = 4\pi \times 10^{-7}$, $\mu_r = \frac{\mu}{\mu_0}$,

$$R_m = \frac{l}{\mu A}, \quad Ohm\ law: R_m = \frac{\theta}{\phi},$$

$L = \mu\frac{N^2 A}{l}$, $\tau = \frac{L}{R}$, $I_L(1\tau) = 0.63I_{max}, I_L(3\tau) = 0.95I_{max}, I_L(5\tau) = 0.99I_{max}$,

$v_L = C_{emf} = -L\frac{\Delta I}{\Delta t}$, $W_L = \frac{1}{2}LI^2$,

$k = \frac{\Phi_{1,2}}{\Phi_1}$, $M = k\sqrt{L_1 L_2}$, $L_T = L_1 + L_2 \pm 2M$,

$C = \frac{q}{V}$, $C = E_0 k\frac{A}{d}$, $E_0 = 8.8 \times 10^{-12}$,

$\tau = RC$, $V_C(1\tau) = 0.63V_S$, $W_C = \frac{1}{2}CV^2$