$v = \sqrt{\tau / \mu}$

$y = y_m \sin(kx - \omega t)$

$v = \sqrt{B / \rho}$

$s = s_m \cos(kx - \omega t)$

$I = \dfrac{P_s}{4\pi r^2}$

$P_{avg} = \dfrac{1}{2} \mu \omega^2 v y_m^2$

$\Delta P = \Delta P_m \sin(kx - \omega t)$

$\Delta P_m = \rho v \omega S_m$

$I = \dfrac{1}{2} \rho \left(\omega S_m \right)^2 v$

$\beta = 10 \ \log \dfrac{I}{I_0}$, $I_0 = 10^{-12} W/m^2$

$f' = f \left(\dfrac{v \pm v_D}{v \mp v_s} \right)$

$y = \left(2 y_m \cos \dfrac{\phi}{2} \right) \sin \left(kx - \omega t - \dfrac{\phi}{2} \right)$

$\Delta L = \dfrac{\lambda}{2\pi} \varphi$

$\Delta L = m\lambda$, $m = 0, 1, 2, 3,$ ....

$\Delta L = \left(m + \dfrac{1}{2} \right) \lambda$, $m = 0, 1, 2, 3,$ ....

$y = 2 y_m (\sin kx) \ (\cos \omega t)$

$f_n = \dfrac{nv}{2L}, \quad n = 1, 2, 3, \ldots$

$f_n = \dfrac{nv}{4L}, \quad n = 1, 3, 5, \ldots$

$\alpha = \dfrac{\Delta L}{L} \dfrac{1}{\Delta T}, \quad \beta = \dfrac{\Delta V}{V} \dfrac{1}{\Delta T}$

$PV = nRT = NkT$

$W = \int P \ dV$

$W = n \ R \ T \ \ln \ (V_f / V_i)$

$v_{rms} = \sqrt{\dfrac{3RT}{M}} \ , \quad \dfrac{1}{2} m v^2 = \dfrac{3}{2} kT$

$Q = mc\Delta T \ , \ Q = mL$

$\Delta E_{int} = Q - W, \quad \Delta E_{int} = n \ C_v \Delta T$

$Q = n C_p \Delta T \ , \quad Q = n C_v \Delta T$

$C_p - C_v = R, \quad \gamma = Cp / Cv$

$P_{Cond} = \dfrac{Q}{t} = \kappa A \dfrac{T_H - T_C}{L}$

$PV^{\gamma} = \text{constant}$, $TV^{\gamma\text{-}1} = \text{constant}$

$T_F = \dfrac{9}{5} T_C + 32, \qquad T_K = T_C + 273$

$W = Q_H - Q_L \ , \quad \varepsilon = \dfrac{W}{Q_H} = 1 - \dfrac{Q_L}{Q_H}$

$K_{\mathrm{Ref}} = \dfrac{Q_L}{W} \ , \quad K_{HP} = \dfrac{Q_H}{W} \ , \quad \Delta S = \int \dfrac{dQ}{T}$

$\Delta S = nR \ln \dfrac{V_f}{V_i} + n C_V \ln \dfrac{T_f}{T_i}$

$F = \dfrac{k q_1 q_2}{r^2} \ , \quad F = qE$

$U = -\vec{p}.\vec{E} \ , \quad \vec{\tau} = \vec{p} \times \vec{E}$

$\phi_c = \oint \vec{E}.d\vec{A} = \dfrac{q_{in}}{\varepsilon_0}$

$\phi = \int_{Surface} \vec{E} \ . \ d\vec{A} \ , \quad E = \dfrac{kq}{r^2}$

$E = \dfrac{kQ}{R^3} r, \quad E = \dfrac{2k\lambda}{r}$

$E = \dfrac{\sigma}{2\varepsilon_o}, \quad E = \dfrac{\sigma}{\varepsilon_o}$

$\Delta V = V_B - V_A = -\int_A^B \vec{E}.d\vec{S} = \dfrac{\Delta U}{q_0}$

$V = \dfrac{kQ}{r} \ , \ U_{12} = \dfrac{k q_1 q_2}{r_{12}}$

$E_x = -\dfrac{\partial V}{\partial x}, \ E_y = -\dfrac{\partial V}{\partial y}, \ E_z = -\dfrac{\partial V}{\partial z}$

$C = \dfrac{Q}{V} \ , \quad C = \dfrac{\varepsilon_0 A}{d}$

$C = \dfrac{2\pi\varepsilon_0 L}{\ln(b/a)}, \quad C = \dfrac{4\pi\varepsilon_0 ab}{b - a}$

$U = \dfrac{1}{2} CV^2, \quad C_{\kappa} = \kappa C_{air}$

$I = \dfrac{dQ}{dt}, \ I = JA, \ J = nev_d$

$R = \dfrac{V}{I} = \rho \dfrac{L}{A}, \quad J = \sigma E = E / \rho$

$\rho = \rho_0 \ [1 + \alpha (T - T_0)] \ , \ P = IV$

$q(t) = C\varepsilon [1 - e^{-t/RC}] \ , \ i(t) = \dfrac{\varepsilon}{R} e^{-t/RC}$

$q(t) = q_o e^{-t/RC} \ , \ i(t) = \dfrac{q_o}{RC} e^{-t/RC}$

$\vec{F} = q(\vec{v} \times \vec{B}) \ , \ \vec{F} = i(\vec{L} \times \vec{B})$

$\vec{\tau} = \vec{\mu} \times \vec{B}, \quad \vec{\mu} = Ni\vec{A}$

$U = -\vec{\mu}.\vec{B}$,

$f = \dfrac{1}{T} = \dfrac{|q| B}{2\pi m}, \ r = \dfrac{mv}{qB}$

$d\vec{B} = \dfrac{\mu_0}{4\pi} \dfrac{i \ d\vec{s} \times \vec{r}}{r^3}$

$\oint \vec{B} \ . \ d\vec{s} = \mu_0 \ i_{enc}$

$B = \dfrac{\mu_0 \ i}{4 \ \pi \ R} \varphi \ , \quad B = \dfrac{\mu_0 \ i}{2 \ \pi \ r}$

$F_{ba} = \dfrac{\mu_o L i_a i_b}{2\pi d}, \quad B = \dfrac{\mu_0 i}{2\pi R^2} \ r$

$B_s = \mu_0 n i$

$\Phi_B = \int \vec{B} \cdot d\vec{A}$

$E_{ind} = -\dfrac{d\Phi_B}{dt}, \quad E_{ind} = BLv$

$\varepsilon_o = 8.85 \times 10^{-12} \ C^2/N.m^2$

$k = 9.00 \times 10^{9} \ N.m^2/C^2$

$q_e = -e = -1.60 \times 10^{-19}$ C

$q_p = +e = +1.60 \times 10^{-19}$ C

$m_e = 9.11 \times 10^{-31}$ kg

$m_p = 1.67 \times 10^{-27}$ kg

μ = micro = 10^{-6}, n = nano = 10^{-9}

p = pico = 10^{-12}

$\mu_0 = 4\pi \times 10^{-7}$ Wb/A. m

$k = 1.38 \times 10^{-23}$ J/K

$N_A = 6.02 \times 10^{23}$ molecules/mole

1 atm = 1.01×10^{5} N/m^2

R = 8.31 J/mol. K

g = 9.8 m/s^2

1L = 10^{-3} m^3

For water:

L_F = 333 kJ/kg

L_V = 2256 kJ/kg

c = 4190 J/kg.K

$\int x^n dx = \dfrac{x^{n+1}}{n+1}$

$v = v_o + at$

$v^2 = v_o^2 + 2a(x - x_o)$

$\Delta K = -\Delta U$

$\Delta U_g = mg\Delta y$