$c = 2.9979 \times 10^{8}$ m/s

$h = 6.6261 \times 10^{-34}$ J s

$N_A = 6.02214 \times 10^{23}$ mol^{-1}

1 amu = 1.66054×10^{-27} kg

$m_e = 9.10939 \times 10^{-31}$ kg

$R = 8.314$ J/(K mol) $R = 0.08206$ L atm K^{-1} mol^{-1}

$R_H = 2.17987 \times 10^{-18}$ J

$e = 1.60218 \times 10^{-19}$ C 1 eV = 1.60218×10^{-19} J

$\varepsilon_0 = 8.8542 \times 10^{-12}$ C^{2}J^{-1}m^{-1}

$K_w = 1.00 \times 10^{-14}$ & 14.00 = pH + pOH at 25.0°C

$\Im$ (Faraday's constant) = 96,485 C mol^{-1}

Electromagnetic Spectrum:
Violet ~ 400-430 nm Blue ~ 431-490 nm
Green ~ 491-560 nm
Yellow ~ 561-580 nm Orange ~ 581-620 nm
Red ~ 621-700 nm

Complementary Colors: red/green, blue/orange, yellow/violet

$I^- < Br^- < Cl^-$ (weak field ligands)
$< F^- < OH^- < H_2O$ (intermediate)
$< NH_3 < CO < CN^-$ (strong field ligands)

1 C • V = 1 J   1 J = 1 kgm^{2}s^{-2}

1A = 1C/s   1W = 1 J/s

ln = 2.3025851log

1 Bq = 1 nuclei/sec

$x = [-b \pm (b^2 - 4ac)^{1/2}]/2a$

$ax^2 + bx + c = 0$

$K.E. = \frac{1}{2} mv^2 \quad p = mv \quad \lambda = \frac{h}{p}$

$E = h\nu = hc/\lambda \qquad c = \nu\lambda$

$E_n = -\frac{Z^2 R_H}{n^2} \qquad E_{nl} = -\frac{Z_{eff}{}^2 R_H}{n^2}$

for $n_f < n_i$……   for $n_f > n_i$…..

$\nu = \frac{Z^2 R_H}{h}\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right) \qquad \nu = \frac{Z^2 R_H}{h}\left(\frac{1}{n_i^2} - \frac{1}{n_f^2}\right)$

$U(r) = (z_1 z_2 e^2)/(4\pi\varepsilon_o r)$

Electronegativity = (IE + EA)/2

$\Delta H_r° = \Sigma\Delta H_B(\text{reactants}) - \Sigma\Delta H_B(\text{products})$
$\Delta H_r° = \Sigma\Delta H_f° (\text{products}) - \Sigma\Delta H_f^{°}(\text{reactants})$
$\Delta S_r° = \Sigma S° (\text{products}) - \Sigma S^{°}(\text{reactants})$
$\Delta G_r° = \Sigma\Delta G_f° (\text{products}) - \Sigma G_f^{°}(\text{reactants})$

$\Delta G = \Delta H - T\Delta S$

$\Delta G = \Delta G° + RT \ln Q$

$\Delta G° = -RT \ln K$

$\Delta G = RT \ln Q/K$

$\ln (K_2/K_1) = -(\Delta H°/R)(1/T_2 - 1/T_1)$

$PV = nRT$

$s = k_H P$

$pH \approx pK_a - \log([HA]/[A^-])$

$pH = -\log [H_3O^+]$ $pOH = -\log [OH^-]$

$K_w = K_a K_b$ $pK = -\log K$

$Q = It$

$\Delta G°_{cell} = -(n)(\Im)\, \Delta E°_{cell}$

$\Delta E°(\text{cell}) = E°(\text{cathode}) - E°(\text{anode})$

$\Delta E° = E°(\text{reduction}) - E°(\text{oxidation})$

$\Delta E_{cell} = E°_{cell} - (RT/n\Im)\ln Q$

$\Delta E_{cell} = E°_{cell} - [(0.025693 \text{ V})(\ln Q)/n]$ at 25.0°C

$\ln K = (n\Im/RT)\, \Delta E°$

$A = A_o e^{-kt} \qquad N = N_o e^{-kt} \qquad A = kN$

$[A] = [A]_o e^{-kt} \qquad t_{½} = \ln 2 / k$

$1/[A] = 1/[A]_o + kt \qquad t_{½} = 1 / k[A]_o$

$\ln(k) = \ln(A) - E_a/RT \qquad k = Ae^{-(E_a/RT)}$

$\ln(k_2/k_1) = -(E_a/R)(1/T_2 - 1/T_1)$

$d[P]/dt = (k_2[E]_o[S])/([S] + K_m)$

$V_{max} = k_2[E]_o$