Useful Constants

Speed of light in vacuum	$c = 2.997925 \times 10^{10}$ cm/sec
	$= 3 \times 10^{10}$ cm/sec
Fundamental charge	$e = 4.8 \times 10^{-10}$ statcoulomb
	$= 1.6 \times 10^{-19}$ coulomb
Planch's constant	$h = 6.6 \times 10^{-27}$ erg-sec
Electron rest mass	$m_e = 0.9 \times 10^{-27}$ gm
Proton rest mass	$m_p = 1.7 \times 10^{-24}$ gm
Gravitational constant	$G = 6\ 7 \times 10^{-8}$ CGS units
Acceleration of gravity at sea level	$g = 980$ cm/sec^2
Bohr radius	$a_o = 0.5 \times 10^{-8}$ cm
Avogadro's number	$N_o = 6.0 \times 10^{23}$ mole^{-1}
Boltzmann's constant	$k = 1.4 \times 10^{-16}$ erg/deg Kelvin
Standard temperature	$T_o = 273$ deg Kelvin
Standard pressure	$P_o = 1$ atm $= 1.01 \times 10^6$ dyne/cm^2
Molar volume at S.T.P.	$V_o = 22.4 \times 10^3$ cm^3/mole
Thermal energy kT at S.T.P.	$kT_o = 3.8 \times 10^{-14}$ erg $= \frac{1}{40}$ ev
Density of air at S.T.P.	$\rho_o = 1.3 \times 10^{-3}$ gm/cm^3
Speed of sound in air at S.T.P.	$v_o = 3.32 \times 10^4$ cm/sec
Sound impedance of air at S.T.P.	$Z_o = 42.8$ (dyne/cm^2)/(cm/sec)
Standard sound intensity	$I_o = 1$ μWatt/cm^2
Factor of ten in intensity	$= 1$ bel $= 10$ db
One fermi (F)	$= 10^{-13}$ cm
One angstrom unit (Å)	$= 10^{-8}$ cm

One micron (μ)	$= 10^{-4}$ cm
One hertz (Hz)	= 1 cycle per second (cps)
Wavelength of one-electron-volt photon	$= 1.24 \times 10^{-4}$ cm = 12345 Å
One electron volt (ev)	$= 1.6 \times 10^{-12}$ erg
One watt (W)	$= 1$ joule/sec $= 10^{7}$ erg/sec
One coulomb (coul)	$= 3 \times 10^{9}$ statcoul=c/10 statcoul
One volt (V)	$= \frac{1}{300}$ statvolt $= 10^{8}/c$ statvolt
One ohm (Ω)	$= 1/(9 \times 10^{11})$ statohm $= 10^{9}/c^{2}$ statohm
Thirty ohms	= 1/c statohm
Impedance per square of vacuum for electromagnetic waves	$= 4\pi/c$ statohm = 377 ohm
One farad (F)	9×10^{11} statfarad $= c^{2}/10^{9}$ statfarad
One henry (H)	$= 1/(9 \times 10^{11})$ stathenry $= 10^{9}/c^{2}$ stathenry

Useful Identities

$$\cos x + \cos y = |2 \cos \tfrac{1}{2}(x - y)| \cos \tfrac{1}{2}(x + y)$$

$$\cos x - \cos y = |-2 \sin \tfrac{1}{2}(x - y)| \sin \tfrac{1}{2}(x + y)$$

$$\sin x + \sin y = |2 \cos \tfrac{1}{2}(x - y)| \sin \tfrac{1}{2}(x + y)$$

$$\sin x - \sin y = |2 \sin \tfrac{1}{2}(x - y)| \cos \tfrac{1}{2}(x + y)$$

$$\cos (x \pm y) = \cos x \cos y \mp \sin x \sin y$$

$$\sin (x \pm y) = \sin x \cos y \pm \sin y \cos x$$

$$\cos 2x = \cos^2 x - \sin^2 x$$

$$\sin 2x = 2 \sin x \cos x$$

$$\cos^2 x = \tfrac{1}{2}(1 + \cos 2x)$$

$$\sin^2 x = \tfrac{1}{2}(1 - \cos 2x)$$

$$\sin x = x - \frac{1}{6}x^3 + \cdots\cdots\cdots$$

$$\cos x = 1 - \tfrac{1}{2}x^2 + \cdots\cdots\cdots$$

$$(1 + x)^n = 1 + nx + \tfrac{1}{2}n(n - 1)x^2 + \cdots\cdots; \; x^2 < 1.$$

$$\cos\theta_1 + \cos(\theta_1 + \gamma) + \cos(\theta_1 + 2\gamma) + \ldots + \cos|\theta_1 + (N - 1)\gamma| = \cos|\theta_1 + \tfrac{1}{2}(N - 1)\gamma| \frac{\sin \frac{1}{2}N\gamma}{\sin \frac{1}{2}\gamma}$$