

APPENDIX A

SELECTED CONSTANTS

I. Fundamental Constants

		<u>Cgs</u>	<u>Mks</u>
Acceleration of gravity (g)	9.80665	$\times 10^2 \text{ cm} \cdot \text{s}^{-2}$	$\text{m} \cdot \text{s}^{-2}$
local	9.809	$\times 10^2 \text{ cm} \cdot \text{s}^{-2}$	$\text{m} \cdot \text{s}^{-2}$
at equatorial sea level	9.78	$\times 10^2 \text{ cm} \cdot \text{s}^{-2}$	$\text{m} \cdot \text{s}^{-2}$
at polar sea level	9.83	$\times 10^2 \text{ cm} \cdot \text{s}^{-2}$	$\text{m} \cdot \text{s}^{-2}$
Gravitational constant (G)	6.67	$\times 10^{-8} \text{ dyn} \cdot \text{cm}^2 \cdot \text{g}^{-2}$	$10^{-11} \text{ N} \cdot \text{m}^2 \cdot \text{kg}^{-2}$
Earth's radius (r_{Earth})	6.38	$\times 10^8 \text{ cm}$	10^6 m
Earth's mass (m_{Earth})	5.98	$\times 10^{27} \text{ g}$	10^{24} kg
Electron charge (e)	1.60219	$\times \text{—}$	10^{-19} coulomb
	4.80325	$\times 10^{-10} \text{ esu}$	—
Electron volt (eV)	1.60219	$\times 10^{-12} \text{ erg} \cdot \text{eV}^{-1}$	$10^{-19} \text{ J} \cdot \text{eV}^{-1}$
Electron rest mass (m_e)	9.1095	$\times 10^{-28} \text{ g}$	10^{-31} kg
Proton rest mass (m_p)	1.6726	$\times 10^{-24} \text{ g}$	10^{-27} kg
Neutron rest mass (m_n)	1.6748	$\times 10^{-24} \text{ g}$	10^{-27} kg
Planck's constant (h)	6.6262	$\times 10^{-27} \text{ erg} \cdot \text{s}$	$10^{-34} \text{ J} \cdot \text{s}$
	4.1357	$\times 10^{-15} \text{ eV} \cdot \text{s}$	$10^{-15} \text{ eV} \cdot \text{s}$
Planck's constant ($\hbar = h/2\pi$)	1.05459	$\times 10^{-27} \text{ erg} \cdot \text{s}$	$10^{-34} \text{ J} \cdot \text{s}$
	6.5822	$\times 10^{-16} \text{ eV} \cdot \text{s}$	$10^{-16} \text{ eV} \cdot \text{s}$
Bohr radius (a_0)	0.529177	$\times 10^{-8} \text{ cm}$	10^{-10} m
Rydberg (R)	13.6058	$\times \text{eV}/hc$	eV/hc
	1.09737	$\times 10^5 \text{ cm}^{-1}$	10^7 m^{-1}
Speed of light (c)	2.997925	$\times 10^{10} \text{ cm} \cdot \text{s}^{-1}$	$10^8 \text{ m} \cdot \text{s}^{-1}$
Avogadro's constant (N_A)	6.022	$\times 10^{23} \text{ mol}^{-1}$	10^{23} mol^{-1}
Boltzmann's constant (k_B)	1.3807	$\times 10^{-16} \text{ erg} \cdot \text{K}^{-1}$	$10^{-23} \text{ J} \cdot \text{K}^{-1}$
	8.617	$\times 10^{-5} \text{ eV} \cdot \text{K}^{-1}$	$10^{-5} \text{ eV} \cdot \text{K}^{-1}$
Gas constant (R)	8.314	$\times 10^7 \text{ erg} \cdot \text{K}^{-1} \text{ mol}^{-1}$	$1 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$
Permeability constant (μ_0)	1.26	$\times \text{—}$	$10^{-6} \text{ henry} \cdot \text{m}^{-1}$
	1.00		—
Permittivity constant (ϵ_0)	8.85	$\times \text{—}$	$10^{-12} \text{ farad} \cdot \text{m}^{-1}$
	1.00		—

		Cgs	Mks
Speed of sound in dry air at STP	3.31	$\times 10^4 \text{ cm} \cdot \text{s}^{-1}$	$10^2 \text{ m} \cdot \text{s}^{-1}$
Heat of fusion of water	7.97	$\times 10 \text{ cal} \cdot \text{g}^{-1}$	$10^4 \text{ cal} \cdot \text{kg}^{-1}$
Heat of vaporization of water	5.39	$\times 10^2 \text{ cal} \cdot \text{g}^{-1}$	$10^5 \text{ cal} \cdot \text{kg}^{-1}$
Index of refraction (n) of			
water (5892Å)	1.33	—	—
crown glass (5892Å)	1.52	—	—
air (5900Å)	1.0002765	—	—

II. Conversion Factors

1 angstrom	10^{-10} m		
1 day	86,400 s		
1 atm	$29.9 \text{ in} \cdot \text{Hg}$	$= 76.0 \text{ cm} \cdot \text{Hg}$	$= 1.01 \times 10^5 \text{ N} \cdot \text{m}^{-2}$
1 calorie	4.19 J		
1 weber/m ²	1 Tesla	$= 10^4 \text{ gauss}$	

III. Resistor color code

<u>first three bands</u>		<u>fourth band</u>	<u>tolerance</u>		
black	0	green	5	unmarked	20%
brown	1	blue	6	silver	10%
red	2	violet	7	gold	5%
orange	3	gray	8		
yellow	4	white	9		

IV. Temperatures of Substances (at a pressure of one atmosphere)

Melting point of ice	$0.00^\circ\text{C} \equiv 273.15 \text{ K}$
Boiling point of water	$100.00^\circ\text{C} = 373.15 \text{ K}$
Boiling point liquid nitrogen	77 K
Boiling point liquid Helium	4.2 K
Dry ice + methanol	194.6 K

V. Color as function of wavelength

4000 - 4500 Å	Violet
4500 - 5000 Å	Blue
5000 - 5750 Å	Green
5750 - 5950 Å	Yellow
5950 - 6200 Å	Orange
6200 - 7000 Å	Red