

Appendix H: Numerical Constants

π		= 3.141 592 653 589 793 238 462
e		= 2.718 281 828 459 045 235 360
Speed of light	c	= $2.997\,92458 \times 10^8$ m/s
Absolute zero	0 K	= -273.15 °C
Gravitational constant		= $6.672\,590 \times 10^{-11}$ N·m ² /kg ²
Planck constant	h	= $6.626\,0755 \times 10^{-34}$ joule second
Boltzmann constant	k	= $1.380\,658 \times 10^{-23}$ joule/degree
Avogadro's number		= $6.022\,1367 \times 10^{23}$ /mole
Gas constant	R	= 8.314 510 joule/mole degree
Volume of gas at STP		= 22.414 liter/mole
Faraday		= 96 485.309 coulomb/g equivalent
Electron volt	eV	= $1.602\,177\,33 \times 10^{-19}$ joule
Electronic charge		= $1.602\,177\,33 \times 10^{-19}$ coulomb
Electron rest mass		= $9.109\,3897 \times 10^{-31}$ kg
Atomic mass unit		= $1.660\,5402 \times 10^{-27}$ kg
Proton mass		= $1.672\,6231 \times 10^{-27}$ kg
Solar day		= 86 400 s
Sidereal day		= 86 164 s = 23 hr 56 min 4.09 s
Earth's magnetic field		= 50 000 nT
Earth mass		= 5.977×10^{24} kg
Mass of atmosphere, oceans, lakes/rivers		= 5.1352×10^{18} kg, 1.35×10^{21} kg, 5.0×10^{17} kg
Earth mean density		= 5.517 g/cm ³
Earth polar moment of inertia		= 8.0376×10^{37} kg m ²
Standard gravity		= $9.806\,65$ m/s ² = 32.1937 ft/s ²
Equatorial gravity		= $9.780\,32$ m/s ²
Equatorial radius		= 6 378 139 m = 3963.34 mile
Polar radius		= 6.356 754 m = 3949.99 mile
Flattening		= 1/298.25
Surface area of earth, land		= 5.10×10^{14} m ² , 1.489×10^{14} m ²
Mean height of continents, depth of oceans		= 623 m, 3795 m
Earth's core mean radius, mass		= 3.47×10^6 m, 1.90×10^{24} kg
Ratio sun mass to Earth mass		= 3.329×10^5
Ratio Earth mass to moon mass		= 81.303
Rotational velocity of Earth		= 7.292×10^{-5} rad/s
Mean orbital velocity		= 29.77 km/s
Earth perihelion, aphelion		= January 3, July 4
Ecliptic obliquity		= $23^{\circ}26'$
Near-surface temperature gradient		= 20 to 30 K/km
Earth's mean heat flow at surface		= 50 mW/m ²
Mean surface temperature		= 288.15 K

See *Physics Today*, August 1991, p. 12–13.

Normal atmospheric pressure	= $1.013\,25 \times 10^5$ Pa
Speed of sound in air	= 331.45 m/s