Physical Constants and Conversion Factors

(1) Units of length
1 meter = 1 m
1 mile = 1609 m
1 foot = 0.3048 m
1 inch = 2.54 cm

(2) Units of time
1 second = 1 s
1 minute = 60 s
1 hour = 3600 s
1 day = 86,400 s

(3) Units of mass
1 kilogram = 1 kg
1 gram = 0.001 kg

(4) Units of velocity
1 ft/s = 0.3048 m/s
1 mi/hr = 0.44704 m/s

(5) Units of force
1 newton (N) = 1 kg m/s^2
1 pound = 4.4482 N
1 pound = weight of 0.45359 kg (on Earth)

(6) Units of energy or work
1 joule = 1 newton-meter
1 J = 1 N m
1 Calorie = 4184 J
1 kilowatt-hour = 3.6×10^6 J

(7) Units of power
1 watt = 1 joule per second
1 W = 1 J/s

(8) Units of pressure
1 pascal (Pa) = 1 N/m^2
1 atmosphere = 1.013×10^5 Pa

(9) Units of temperature
Celsius: T in C = (5/9) (T in F - 32)
Kelvin: T in K = T in C + 273.15

(10) Gravity
Acceleration due to Earth's gravity
$\quad$ g = 9.81 m/s^2
Newton's gravitational constant
$\quad$ G = 6.67×10^{-11} m^3 s^{-2} kg^{-1}

(11) Earth
Radius of the Earth
$\quad$ R = 6371 km = 6.37×10^6 m
Mass of the Earth
$\quad$ M = 5.974×10^{24} kg
$\quad$ GM = gR^2
Radius of Earth's orbit
$\quad$ r = 93 million miles
$\quad$ r = 1.46×10^{11} m
$\quad$ r = 1 AU (astronomical unit)

(12) Moon
Mass of the moon
$\quad$ M = 7.348×10^{22} kg
Radius of Moon's orbit
$\quad$ r = 3.844×10^8 m

(13) Sun
Mass of the sun
$\quad$ M = 1.989×10^{30} kg
$\quad$ GM = $4\pi^2$ AU^3/y^2

(14) Fluids
Density of water
$\quad$ ρ = 1.0×10^3 kg/m^3
Air pressure at STP
$\quad$ p= 1 atmosphere
$\quad$ p = 1.013×10^5 Pa