

Selected Physical Constants

Physical Constant	Value
Speed of light in a vacuum	$c = 2.99792458 \times \begin{cases} 10 \text{ meters/second} \\ 10^{10} \text{ centimeters/second} \end{cases} \setminus$ $c = \begin{cases} 1 \text{ meter of distance/meter of light-travel time} \\ 1 \text{ centimeter of distance/centimeter of light-travel time} \end{cases}$
Gravitational constant	$G = 6.673 \times \begin{cases} 10^{-11} \text{ meter}^5 / (\text{kilogram-second}^2) \\ 10^{-8} \text{ centimeter}^5 / (\text{gram-second}^2) \end{cases}$
Planck constant	$h = 6.6261 \times \begin{cases} 10^{-34} \text{ kilogram-meter}^2 / \text{second}^2 \\ 10^{-27} \text{ gram-centimeter}^2 / \text{second}^2 \end{cases}$
Boltzmann constant	$k = 1.38066 \times \begin{cases} 10^{-14} \text{ joule/degree Kelvin} \\ 10^{-16} \text{ erg/degree Kelvin} \end{cases}$
Elementary charge	$e = \begin{cases} 1.60218 \times 10^{-19} \text{ coulombs} \\ 4.80321 \times 10^{-10} \text{ esu or } (\text{gram centimeter}^2 / \text{second}^2)^{1/2} \end{cases}$
Electron mass	$m_e = 9.1094 \times \begin{cases} 10^{-31} \text{ kilogram} \\ 10^{-27} \text{ gram} \end{cases}$
Electron rest energy	$m_e c^2 = 8.1871 \times \begin{cases} 10^{-11} \text{ joules} \\ 10^{-7} \text{ ergs} \end{cases}$ $= 0.510999 \text{ MeV}$
Proton mass	$m_p = 1.67262 \times \begin{cases} 10^{-27} \text{ kilogram} \\ 10^{-21} \text{ gram} \end{cases}$
Proton rest energy	$m_p c^2 = 1.503279 \times \begin{cases} 10^{-10} \text{ joules} \\ 10^{-3} \text{ ergs} \end{cases}$ $= 938.272 \text{ MeV}$
Mass of Earth	$M_{\oplus} = 5.9742 \times \begin{cases} 10^{21} \text{ kilograms} \\ 10^{27} \text{ grams} \end{cases}$
Radius of a sphere having the same volume as Earth	$R_{\oplus} = 6.3710 \times \begin{cases} 10^6 \text{ meters} \\ 10^8 \text{ centimeters} \end{cases}$
Mean distance of Earth from Sun = "astronomical unit"	$AU = 1.495978 \times \begin{cases} 10^{11} \text{ meters} \\ 10^{13} \text{ centimeters} \end{cases}$
Mean speed of Earth in its orbit about Sun	$v = 29.78 \text{ kilometers/second}$
Mean distance of Moon from Earth	$3.844 \times \begin{cases} 10^6 \text{ meters} \\ 10^{10} \text{ centimeters} \end{cases}$
Mass of Sun	$M_{\odot} = 1.989 \times \begin{cases} 10^{30} \text{ kilograms} \\ 10^{33} \text{ grams} \end{cases}$
Mean radius of Sun	$R_{\odot} = 6.9599 \times \begin{cases} 10^6 \text{ meters} \\ 10^{10} \text{ centimeters} \end{cases}$

Conversion Factors

From	To
1 second	$= 2.99792458 \times \begin{cases} 10^8 \text{ meters} \\ 10^{10} \text{ centimeters} \end{cases} \text{ of light-travel time}$
1 meter of light time travel	$= 3.335641 \times 10^{-9} \text{ second}$

From	To
1 centimeter of light time travel	$= 3.335641 \times 10^{-11}$ second
1 year	$= 3.156 \times 10^7$ seconds $= 9.460 \times \left\{ \begin{array}{l} 10^{15} \text{ meters} \\ 10^{17} \text{ centimeters} \end{array} \right\}$ of light-travel time
1 kilometer	$= 0.6214$ mile
1 electron-volt	$= 1.602 \times 10^{-19}$ joule $= 1.602 \times 10^{-12}$ erg