

# Table of Constants

## The Sun

Mass	$M_{\odot} = 1.9891 \times 10^{30} \text{ Kg}$
Radius	$R_{\odot} = 6.955 \times 10^8 \text{ m}$
Luminosity	$L_{\odot} = 3.826 \times 10^{26} \text{ W}$
Apperant magnitude at mid-day	$m_{\odot} = -26.72$
Absolute V-band magnitude	$M_{V_{\odot}} = 4.82$
Absolute bolometric magnitude	$M_{bol} = 4.72$
Apperant angular diameter	$\theta_{\odot} = 30'$
Temperature on the surface	$T_{\odot} = 5778 \text{ K}$
Solar Constant (at Earth)	$S = 1366 \text{ W/m}^2$

## The Earth

Mass	$M_{\oplus} = 5.9736 \times 10^{24} \text{ Kg}$
Radius	$R_{\oplus} = 6.3708 \times 10^6 \text{ m}$
Mean density	$\rho_{\oplus} = 5515 \text{ Kg/m}^3$
Gravitational acceleration on the surface	$g = 9.81 \text{ m/s}^2$
Inclination of the axis	$\epsilon = 23^{\circ}26'$
Albedo	$\alpha_{\oplus} = 0.39$

## The Moon

Mass	$M_M = 7.4377 \times 10^{22} \text{ Kg}$
Radius	$R_M = 1.7374 \times 10^6 \text{ m}$
Mean distance from Earth	$d_M = 3.78 \times 10^8 \text{ m}$
Synodic period	$P_{sy} = 29.5306 \text{ days}$
Apperant magnitude (full moon)	$m_{moon} = -12.74$
Albedo	$\alpha = 0.14$
Inclination of the lunar orbit w.r.t. the ecliptic	$= 5.14^{\circ}$

## The Venus

Radius	$R_V = 0.949 R_{\oplus}$
Orbital semi-major axis	$a_{Venus} = 0.732 \text{ A.U.}$
Orbital period	$T_{Venus} = 224.70 \text{ days}$

Albedo	$\alpha_{\oplus} = 0.87$
<b>The Mars</b>	
Mass	$M_{Mars} = 6.421 \times 10^{23} kg$
Radius	$R_{Mars} = 3393 \text{ km}$
Orbital semi-major axis	$a_{Mars} = 1.52 \text{ A.U.}$
Rotational period	$T_{Mars} = 24.623 \text{ h}$
Orbital radius of Phobos	$a_{Ph} = 9380 \text{ km}$
<b>The Jupiter</b>	
Mass	$M_J = 1.898 \times 10^{27} \text{ Kg}$
Orbital semi-major axis	$a_{Jup} = 5.204 \text{ A.U.}$
Number of arcseconds in a rad.	$= 206265''$
1 sidereal day	$= 23^h 56^m 4^s .1$
1 tropical year	$= 365.2564 \text{ solar days}$ $= 3.1557 \times 10^7 \text{ s}$
1 sidereal year	$= 365.2422 \text{ solar days}$
1 Astronomical Unit (A.U.)	$a_{\oplus-\odot} = 1.4960 \times 10^{11} \text{ m}$
1 lightyear (ly)	$= 9.46 \times 10^{15} \text{ m}$ $= 6.324 \times 10^4 \text{ A. U.}$
1 parsec (pc)	$= 3.0856 \times 10^{16} \text{ m}$ $= 3.262 \text{ ly}$
Distance to the galactic centre	$d_{GC} = 8.3 \pm 0.3 \text{ kpc}$
Speed of Light	$c = 2.99792458 \times 10^8 \text{ m/s}$
Universal Gravitational Constant	$G = 6.6726 \times 10^{-11} \text{ Nm}^2\text{kg}^{-2}$
Planck Constant	$h = 6.62 \times 10^{-34} \text{ J} \cdot \text{s}$
Hubble Constant	$H_0 = (67.80 \pm 0.77) \text{ Km/s/Mpc}$
Age of the Universe	$t_0 = 13.77 \times 10^9 \text{ years}$
Stephan's Constant	$\sigma = 5.67 \times 10^{-8} \text{ Wm}^{-2}\text{K}^{-4}$
Boltzmann Constant	$\kappa_B = 1.38 \times 10^{-23} \text{ JK}^{-2}$
Wien's displacement law	$\lambda_m T = 2.898 \times 10^{-3} \text{ m} \cdot \text{K}$
Charge of a electron	$q_e = 1.602 \times 10^{-19} \text{ C}$
Mass of a electron	$m_e = 9.1 \times 10^{-31} \text{ kg}$
Mass of a proton	$m_p = 938.27 \text{ MeV}/c^2$
Mass of a neutron	$m_n = 939.56 \text{ MeV}/c^2$
Mass of a Deuterium atom	$m_D = 1875.60 \text{ MeV}/c^2$
Mass of a Helium-3 atom	$m_{He3} = 2808.30 \text{ MeV}/c^2$
Mass of a Helium-4 atom	$m_{He} = 4.002603 \text{ a.m.u.}$ $= 3727.40 \text{ MeV}/c^2$
Mass of a Carbon atom	$m_C = 12.000000 \text{ a.m.u.}$
Rest frequency of spin-flip transition of hydrogen	$\nu_{21} = 1420.41 \text{ MHz}$

Distance of Barnard's star	$d_{Barnard}$	=	1.83 pc
Coordinates of northern ecliptic pole (J2000.0)	$(\alpha_E, \delta_E)$	=	$18^h 00^m 00^s, +66^\circ 33.6'$
Coordinates of northern galactic pole (J2000.0)	$(\alpha_G, \delta_G)$	=	$12^h 51^m, +27^\circ 08'$
Diameter of human pupil		=	6 mm
Height of Christ the Redeemer		=	39.60 m
Height of Eiffel Tower		=	324 m

Basic Equations of spherical trigonometry (for a spherical triangle ABC)

$$\sin a \sin B = \sin b \sin A \quad (1)$$

$$\cos a = \cos b \cos c + \sin b \sin c \cos A \quad (2)$$

$$\sin a \cos B = \cos b \sin c - \sin b \cos c \cos A \quad (3)$$