

Universal constants:

Avogadro constant	$N_A = 6.022 \times 10^{23} \text{ mol}^{-1}$	
Boltzmann constant	$k_B = 1.381 \times 10^{-23} \text{ J K}^{-1}$	
Charge of electron	$e = 1.602 \times 10^{-19} \text{ C}$	
Planck constant	$h = 6.626 \times 10^{-34} \text{ J s}$	
Speed of light in vacuum	$c = 2.998 \times 10^8 \text{ m s}^{-1}$	
Universal gravitational constant	$G = 6.674 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$	
Universal gas constant	$R = 8.315 \text{ J mol}^{-1} \text{ K}^{-1}$	
Stefan-Boltzmann constant	$\sigma = 5.670 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$	
Wien's displacement constant	$b = 2.898 \times 10^{-3} \text{ m K}$	
Permittivity of free space	$\epsilon_0 = 8.854 \times 10^{-12} \text{ m}^{-3} \text{ kg}^{-1} \text{ s}^4 \text{ A}^2$	
Permeability of free space	$\mu_0 = 1.257 \times 10^{-6} \text{ N A}^{-2}$	
Mass of electron	$m_e = 9.109 \times 10^{-31} \text{ kg}$	$= 0.511 \text{ MeV}/c^2$
Mass of proton	$m_p = 1.673 \times 10^{-27} \text{ kg}$	$= 938.272 \text{ MeV}/c^2$
Mass of neutron	$m_n = 1.675 \times 10^{-27} \text{ kg}$	$= 939.565 \text{ MeV}/c^2$
Mass of deuteron	$m_D = 3.344 \times 10^{-27} \text{ kg}$	$= 1875.613 \text{ MeV}/c^2$
Mass of He nucleus	$m_{\text{He}} = 6.645 \times 10^{-27} \text{ kg}$	$= 3727.181 \text{ MeV}/c^2$

Astronomical data:

Mass of Sun	$M_{\odot} = 1.988 \times 10^{30} \text{ kg}$	
Radius of Sun	$R_{\odot} = 6.957 \times 10^8 \text{ m}$	
Luminosity of Sun	$L_{\odot} = 3.828 \times 10^{26} \text{ W}$	
Effective temperature of Sun	$T_{\text{eff}, \odot} = 5772 \text{ K}$	
Apparent magnitude of Sun (in V-band)	$m_{V, \odot} = -26.74$	
Absolute magnitude of Sun (in V-band)	$M_{V, \odot} = +4.82$	
Apparent bolometric magnitude of Sun	$m_{\text{bol}, \odot} = -26.83$	
Absolute bolometric magnitude of Sun	$M_{\text{bol}, \odot} = +4.74$	
Solar constant (above atmosphere of Earth)	$S_{\odot} = 1361 \text{ W m}^{-2}$	
Apparent angular diameter of Sun (from Earth)	$\theta_{\odot} \approx 32'$	
Mass of Earth	$M_{\oplus} = 5.972 \times 10^{24} \text{ kg}$	
Radius of Earth	$R_{\oplus} = 6.378 \times 10^6 \text{ m}$	
Axial tilt of Earth	$\epsilon = 23^{\circ}26'$	
Inclination of the lunar orbit w.r.t. the ecliptic	$= 5^{\circ}8'43''$	
Mass of Jupiter	$M_J = 1.898 \times 10^{27} \text{ kg}$	
Radius of Jupiter	$R_J = 6.991 \times 10^7 \text{ m}$	
1 Astronomical Unit	$1 \text{ au} = 1.496 \times 10^{11} \text{ m}$	
1 parsec	$1 \text{ pc} = 3.086 \times 10^{16} \text{ m}$	
1 light-year	$1 \text{ ly} = 9.461 \times 10^{15} \text{ m}$	
1 jansky	$1 \text{ Jy} = 10^{-26} \text{ W m}^{-2} \text{ Hz}^{-1}$	
1 tropical year	$= 365.2422 \text{ solar days}$	$= 3.156 \times 10^7 \text{ s}$
	$= 365 \text{ d } 5 \text{ h } 48 \text{ min } 46 \text{ s}$	
1 sidereal year	$= 365.2564 \text{ solar days}$	$= 3.156 \times 10^7 \text{ s}$
	$= 365 \text{ d } 6 \text{ h } 9 \text{ min } 13 \text{ s}$	
Rate of precession of Vernal Equinox	$= 1^{\circ} \text{ per } 71.6 \text{ years}$	

Calculus related formulae:

$$\begin{aligned}
 &1. \frac{dy}{dx} = \frac{dy}{du} \frac{du}{dx} \quad 2. \frac{d}{dx} x^n = nx^{n-1} \quad 3. \frac{d}{dx} \sin kx = k \cos kx \quad 4. \frac{d}{dx} \cos kx = -k \sin kx \quad 5. \frac{d}{dx} \tan kx = k \sec^2 kx \\
 &6. \int x^n dx = \frac{x^{n+1}}{n+1} + \text{constant, for } n \neq -1 \quad 7. f(x) \simeq f(x_0) + \left. \frac{df}{dx} \right|_{x=x_0} (x - x_0), \text{ for } x \approx x_0
 \end{aligned}$$

