

## E SOME USEFUL CONSTANTS FOR ASTRONOMY

### Physical Constants

Name	Value
speed of light ( $c$ )	$2.9979 \times 10^8$ m/s
gravitational constant ( $G$ )	$6.674 \times 10^{-11}$ m <sup>3</sup> /(kg s <sup>2</sup> )
Planck's constant ( $h$ )	$6.626 \times 10^{-34}$ J-s
mass of a hydrogen atom ( $M_H$ )	$1.673 \times 10^{-27}$ kg
mass of an electron ( $M_e$ )	$9.109 \times 10^{-31}$ kg
Rydberg constant ( $R_\infty$ )	$1.0974 \times 10^7$ m <sup>-1</sup>
Stefan-Boltzmann constant ( $\sigma$ )	$5.670 \times 10^{-8}$ J/(s-m <sup>2</sup> deg <sup>4</sup> ) <sup>[1]</sup>
Wien's law constant ( $\lambda_{\max}T$ )	$2.898 \times 10^{-3}$ m K
electron volt (energy) (eV)	$1.602 \times 10^{-19}$ J
energy equivalent of 1 ton TNT	$4.2 \times 10^9$ J

Table E1

### Astronomical Constants

Name	Value
astronomical unit (AU)	$1.496 \times 10^{11}$ m
Light-year (ly)	$9.461 \times 10^{15}$ m
parsec (pc)	$3.086 \times 10^{16}$ m = 3.262 light-years
sidereal year (y)	$3.156 \times 10^7$ s
mass of Earth ( $M_{\text{Earth}}$ )	$5.974 \times 10^{24}$ kg
equatorial radius of Earth ( $R_{\text{Earth}}$ )	$6.378 \times 10^6$ m
obliquity of ecliptic	23.4° 26'

Table E2

1 deg stands for degrees Celsius or kelvins

**Astronomical Constants**

Name	Value
surface gravity of Earth ( $g$ )	9.807 m/s <sup>2</sup>
escape velocity of Earth ( $v_{\text{Earth}}$ )	$1.119 \times 10^4$ m/s
mass of Sun ( $M_{\text{Sun}}$ )	$1.989 \times 10^{30}$ kg
equatorial radius of Sun ( $R_{\text{Sun}}$ )	$6.960 \times 10^8$ m
luminosity of Sun ( $L_{\text{Sun}}$ )	$3.85 \times 10^{26}$ W
solar constant (flux of energy received at Earth) ( $S$ )	$1.368 \times 10^3$ W/m <sup>2</sup>
Hubble constant ( $H_0$ )	approximately 20 km/s per million light-years, or approximately 70 km/s per megaparsec

**Table E2**