

## USEFUL CONSTANTS

Constant	Symbol	Value	Units
Rest mass of electron	$m_e$	$9.11 \times 10^{-31}$	kg
Mass of proton	$m_p$	$1.6726 \times 10^{-27}$	kg
Mass of neutron	$m_n$	$1.6749 \times 10^{-27}$	kg
One atomic mass unit (AMU)	u	$1.6605 \times 10^{-27}$	kg
Charge of electron	e	$1.60 \times 10^{-19}$	C
Planck's constant	h	$6.63 \times 10^{-34}$	Js
Mass of Sun (solar mass)	$m_{\odot}$	$2 \times 10^{30}$	kg
Mass of Earth	$m_{\oplus}$	$5.97 \times 10^{24}$	kg
Mass of Moon	$m_{\text{moon}}$	$7.35 \times 10^{22}$	kg
Radius of Sun	$R_{\odot}$	$6.96 \times 10^8$	m
Radius of Earth	$R_{\oplus}$	$6.37 \times 10^6$	m
Radius of Moon	$R_{\text{moon}}$	$1.74 \times 10^6$	m
Acceleration due to gravity at surface of Earth	g	9.81	$\text{ms}^{-2}$
Newton's gravitational constant	G	$6.67 \times 10^{-11}$	$\text{Nm}^2 \text{kg}^{-2}$
Average distance from Earth to Sun		$1.50 \times 10^{11}$	m
Average distance from Earth to Moon		$3.84 \times 10^8$	m
Speed of light in a vacuum	c	$3.00 \times 10^8$	$\text{ms}^{-1}$
1 light year	ly	$9.46 \times 10^{15}$	m
1 parsec	pc	3.26 or $3.09 \times 10^{16}$	ly or m
Permeability of free space	$\mu_0$	$4\pi \times 10^{-7}$	$\text{Hm}^{-1}$
Permittivity of free space	$\epsilon_0$	$8.85 \times 10^{-12}$	$\text{Fm}^{-1}$
Boltzmann's constant	k	$1.38 \times 10^{-23}$	$\text{JK}^{-1}$
Molar gas constant	R	8.314	$\text{JK}^{-1} \text{mol}^{-1}$
Speed of sound in air at STP		$3.31 \times 10^2$	$\text{ms}^{-1}$
Density of water at 20°C		998	$\text{kgm}^{-3}$
Atmospheric pressure at sea level	1 atm	101 325	Pa
Refractive index of air	n	1.00	
Refractive index of glass	n	1.5	
Refractive index of water	n	1.33	

