

Useful Data

M_e	Mass of the earth	5.98×10^{24} kg	
R_e	Radius of the earth	6.37×10^6 m	
g	Free-fall acceleration on earth	9.80 m/s ²	
G	Gravitational constant	6.67×10^{-11} N m ² /kg ²	
k_B	Boltzmann's constant	1.38×10^{-23} J/K	
R	Gas constant	8.31 J/mol K 8.314	
N_A	Avogadro's number	6.02×10^{23} particles/mol	
T_0	Absolute zero	-273°C	
σ	Stefan-Boltzmann constant	5.67×10^{-8} W/m ² K ⁴	
p_{atm}	Standard atmosphere	101,300 Pa	
v_{sound}	Speed of sound in air at 20°C	343 m/s	
m_p	Mass of the proton (and the neutron)	1.67×10^{-27} kg	
m_e	Mass of the electron	9.11×10^{-31} kg	
K	Coulomb's law constant ($1/4\pi\epsilon_0$)	8.99×10^9 N m ² /C ²	
ϵ_0	Permittivity constant	8.85×10^{-12} C ² /N m ²	
μ_0	Permeability constant	1.26×10^{-6} T m/A	
e	Fundamental unit of charge	1.60×10^{-19} C	
c	Speed of light in vacuum	3.00×10^8 m/s	
h	Planck's constant	6.63×10^{-34} J s	4.14×10^{-15} eV s
\hbar	Planck's constant	1.05×10^{-34} J s	6.58×10^{-16} eV s
a_B	Bohr radius	5.29×10^{-11} m	

Common Prefixes

Prefix	Meaning	symbol
femto-	10^{-15}	f
pico-	10^{-12}	p
nano-	10^{-9}	n
micro-	10^{-6}	μ
milli-	10^{-3}	m
centi-	10^{-2}	c
kilo-	10^3	k
mega-	10^6	M
giga-	10^9	G
terra-	10^{12}	T

Conversion Factors

Length		Time
1 in = 2.54 cm		1 day = 86,400 s
1 mi = 1.609 km		1 year = 3.16×10^7 s
1 m = 39.37 in		Pressure
1 km = 0.621 mi		1 atm = 101.3 kPa = 760 mm of Hg
Velocity		1 atm = 14.7 lb/in ²
1 mph = 0.447 m/s		Rotation
1 m/s = 2.24 mph = 3.28 ft/s		1 rad = $180^\circ/\pi = 57.3^\circ$
Mass and energy		1 rev = $360^\circ = 2\pi$ rad
1 u = 1.661×10^{-27} kg		1 rev/s = 60 rpm
1 cal = 4.19 J		
1 eV = 1.60×10^{-19} J		
		$1 L = 1 \times 10^{-3} m^3$

Mathematical Approximations

Binominal Approximation: $(1 + x)^n \approx 1 + nx$ if $x \ll 1$

Small-Angle Approximation: $\sin \theta \approx \tan \theta \approx \theta$ and $\cos \theta \approx 1$ if $\theta \ll 1$ radian

Greek Letters Used in Physics

Alpha		α	Mu	μ
Beta		β	Pi	π
Gamma	Γ	γ	Rho	ρ
Delta	Δ	δ	Sigma	Σ
Epsilon		ϵ	Tau	τ
Eta		η	Phi	Φ
Theta	Θ	θ	Psi	ψ
Lambda		λ	Omega	Ω
				ω