

The SI System

PHYSICAL QUANTITY	UNIT	SYMBOL	DEFINITION OF UNITS
Length	Meter	m	The basic units of the SI System
Mass	Kilogram	kg	
Time	Second	s	
Electric current	Ampere	A	
Temperature	Kelvin	K	
Amount of substance	Mole	mol	
Energy	Joule	J	$\text{kg m}^2 \text{s}^{-2}$
Force	Newton	N	J m^{-1}
Electric charge	Coulomb	C	A s
Electric potential difference	Volt	V	$\text{J A}^{-1} \text{s}^{-1}$
Electrical resistance	Ohm	Ω	V A^{-1}
Power	Watt	W	J s^{-1}

Prefixes for Fractions and Multiples

FRACTION	PREFIX	SYMBOL	MULTIPLE	PREFIX	SYMBOL
10^{-1}	deci	d	10	deka	da
10^{-2}	centi	c	10^2	hecto	h
10^{-3}	milli	m	10^3	kilo	k
10^{-6}	micro	μ	10^6	mega	M
10^{-9}	nano	n	10^9	giga	G
10^{-12}	pico	p	10^{12}	tera	T
10^{-15}	femto	f			
10^{-18}	atto	a			

Some Widely Used Non-SI Units

PHYSICAL QUANTITY	UNIT	SYMBOL	DEFINITION OF SI UNITS
Length	Ångstrom	Å	10^{-10} m
	Micron	μ	10^{-6} m
Volume	Liter	l	10^{-3} m^3
Energy	Calorie	cal	4.184 J
	Erg	erg	10^{-7} J
	Electronvolt	eV	$1.6021 \times 10^{-19} \text{ J}$
	Kilowatt hour	kWh	$3.6 \times 10^6 \text{ J}$
Pressure	Atmosphere	atm	$1.01325 \times 10^5 \text{ N m}^{-2}$
	Millimeter of mercury	mmHg	133.322 N m^{-2}

Fundamental Constants

CONSTANT	SYMBOL	VALUE	SI UNITS	CGS UNITS
Speed of light in vacuum	c	2.99792	10^8 m s^{-1}	$10^{10} \text{ cm s}^{-1}$
Avogadro's number	N_A	6.0221	10^{23} mol^{-1}	10^{23} mol^{-1}
Planck's constant	h	6.6262	10^{-34} J s	10^{-27} erg s
Boltzmann's constant	k_B	1.38066	$10^{-23} \text{ J K}^{-1}$	$10^{-16} \text{ erg K}^{-1}$
Gas constant	R	8.3144	$\text{J K}^{-1} \text{ mol}^{-1}$	$10^7 \text{ erg K}^{-1} \text{ mol}^{-1}$
Faraday's constant	F	9.6487	10^4 C mol^{-1}	
Bohr radius	a_0	5.29177	10^{-11} m	10^{-9} cm
Elementary charge	e	1.60219	10^{-19} C	
		4.80298		$10^{-10} \text{ cm}^{3/2} \text{ g}^{1/2} \text{ s}^{-1} \text{ mol}^{-1}$
Electron rest mass	m_e	9.1095	10^{-31} kg	10^{-28} g
Proton rest mass	m_p	1.67265	10^{-27} kg	10^{-24} g
Gravitational constant	G	6.6720	$10^{-11} \text{ N m}^2 \text{ kg}^{-2}$	$10^{-8} \text{ dyn cm}^2 \text{ g}^{-2}$
Permittivity of vacuum	ϵ_0	8.85419	$10^{-12} \text{ kg}^{-1} \text{ m}^{-3} \text{ s}^4 \text{ A}^2$	
Ice point at 1 atm		2.7315	10^2 K	
Atomic mass unit		1.6605	10^{-27} kg	10^{-24} g
π		3.14159		
e		2.71828		
$\log_e 10 = \ln 10$		2.30258	$(\ln x = 2.30258 \log_{10} x)$	

Conversion Factors for Energy Units

To convert from energy in units of the left column to units of the first row, multiply by the factor at their intersection.

	eV	cm^{-1}	kcal mol^{-1}	kJ mol^{-1}	K	erg
1 eV =	1	8065	23.06	96.48	1.160×10^4	1.602×10^{-12}
1 cm^{-1} =	1.240×10^{-4}	1	2.859×10^{-3}	1.196×10^{-2}	1.439	1.986×10^{-16}
1 kcal mol^{-1} =	4.336×10^{-2}	349.8	1	4.184	503.2	6.948×10^{-14}
1 kJ mol^{-1} =	1.036×10^{-2}	83.60	0.239	1	120.3	1.661×10^{-14}
1 K =	8.617×10^{-5}	0.6950	1.987×10^{-3}	8.314×10^{-3}	1	1.381×10^{-16}
1 erg =	6.241×10^{11}	5.034×10^{15}	1.439×10^{13}	6.022×10^{13}	7.243×10^{15}	1