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1 unit conversion

see http://physics.nist.gov/cuu/Units/units.html and [1] page T-5

Description	Name	Symbol	convert	SI
Force	Newton	N		$\frac{m\ kg}{s^2}$
energy, work, quantity of heat	joule	J	$N\ m$	$\frac{m^2\ kg}{s^2}$
power	Watt	W	$\frac{J}{s}$	$\frac{m^2\ kg}{s^3}$
pressure, stress	pascal	Pa	$\frac{N}{m^2}$	$\frac{kg}{m\ s^2}$
electric charge, quantity of electricity	coulomb	C		$s\ A$
electric potential difference, electromotive force	volt	V	W/A	$\frac{m^2\ kg}{s^3\ A}$
capacitance	farad	F	C/V	$\frac{s^4\ A^2}{m^2\ kg}$
electric resistance	ohm	Ω	V/A	$\frac{m^2\ kg}{s^3\ A^2}$
magnetic field	Tesla	T	$\frac{V\ s}{m}$	$\frac{m\ kg}{s^2\ A}$

1Joule $= 6.24150974\ 10^{18}$ electron volts

$k_{Boltzmann}T_{room} = \frac{1}{40}$ eV

$T_{room} = 293.15K$

2 constants

see http://en.wikipedia.org/wiki/Physical_constant and http://physics.nist.gov/cuu/Constants/

Universal constants :

Description	Symbol	SI value
speed of light in vacuum	c	$299792458\ \frac{m}{s}$
Newtonian constant of gravitation	G	$6.67428(67)\ 10^{11}\frac{m^3}{kg\ s^2}$
Planck's constant	h	$6.62606896(33)\ 10^{34}\ J\ s$
reduced Planck constant	$\hbar = \frac{h}{2\pi}$	$1.054571628(53)\ 10^{34}\ J\ s$

Description	Symbol, definition	SI value
magnetic constant (vacuum permeability)	μ_0	$4\pi\ 10^7\frac{N}{A^2}$
electric constant (vacuum permittivity)	$\epsilon_0 = \frac{1}{\mu_0 c^2}$	$8.854187817\ 10^{12}\ \frac{F}{m}$
elementary charge	e	$1.602176487(40)\ 10^{19}\ C$
Bohr radius	$a_0 = \frac{\alpha}{4\pi R_\infty}$	$0.5291772108(18)\ 10^{10}\ m$
classical electron radius	$r_e = \frac{e^2}{4\pi\epsilon_0 m_e c^2}$	$2.8179402894(58)\ 10^{15}\ m$
electron mass	m_e	$9.10938215(45)\ 10^{31}\ kg = 511\frac{KeV}{c^2}$
fine-structure constant	$\alpha = \frac{\mu_0 e^2 c}{2h} = \frac{e^2}{4\pi\epsilon_0\hbar c}$	$7.2973525376(50)\ 10^3$
proton mass	m_p	$1.672621637(83)\ 10^{27}\ kg$
Rydberg constant	$R_\infty = \frac{\alpha^2 m_e c}{2h}$	$10973731.568525(73)\ \frac{1}{m}$
atomic mass unit (unified atomic mass unit)	$m_u = \frac{1}{u}$	$1.66053886(28)\ 10^{27}\ kg$
Avogadro's number	N_{Av}	$6.0221415(10)\ 10^{23}\ \frac{1}{mol}$
Boltzmann constant	$k_B = \frac{R}{N_{Av}}$	$1.3806505(24)\ 10^{23}\ \frac{J}{K}$
gas constant	R	$8.314472(15)\ \frac{J}{K\ mol}$
standard atmosphere	atm	$101325\ Pa = 14.7\ Psi$

Miscellaneous:

$$1\ eV = 1.602\ 10^{-19} J \tag{1}$$

standard temperature is $293.15\ K$

$$\frac{m_{proton}}{m_e} = 1836 \tag{2}$$

3 Symbol notations

See page 631-642 of [5]

$C_v \equiv$ specific heat for constant volume
$k_b \equiv$ Boltzmann constant
$\vec{E} \equiv$ electric field
$\vec{B} \equiv$ magnetic field
$\vec{D} \equiv$ electric displacement, equ 4.21, page 175 [2]
$\vec{N} \equiv$ torque
$W \equiv$ work
$\vec{v} \equiv$ velocity
$V \equiv$ electrostatic potential [Volts]
$V \equiv$ volume
$U \equiv$ potential energy [Volts]
$\vec{P} \equiv$ polarization, page 166 [2]
$I \equiv$ current [Amps]
$\vec{F} \equiv$ force [Newtons, $\frac{kg \cdot m}{s^2}$]
$E \equiv$ energy
$T \equiv$ kinetic energy
$T \equiv$ temperature
$L \equiv$ lagrangian
$L \equiv$ capacitance
$\vec{L} \equiv$ classical (orbital) angular momentum
$l \equiv$ quantum (orbital) angular momentum
$\vec{p} \equiv$ linear momentum
$\omega \equiv$ angular frequency
$z \equiv$ single particle partition function
$Z \equiv$ total partition function

References

[1] Sears, Zemansky, Young *University Physics, Fifth edition*, (1976)

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[8] Marion *Classical Dynamics of Particles and systems*, (1970) Second edition.
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[9] Tipler, Llewellyn *Modern Physics*, (1999)