

DATA AND FORMULAE

Data

speed of light in free space	c	$= 3.00 \times 10^8 \text{ m s}^{-1}$
permeability of free space	μ_0	$= 4\pi \times 10^{-7} \text{ H m}^{-1}$
permittivity of free space	ϵ_0	$= 8.85 \times 10^{-12} \text{ F m}^{-1}$ $(1/(36\pi)) \times 10^{-9} \text{ F m}^{-1}$
elementary charge	e	$= 1.60 \times 10^{-19} \text{ C}$
the Planck constant	h	$= 6.63 \times 10^{-34} \text{ Js}$
unified atomic mass constant	u	$= 1.66 \times 10^{-27} \text{ kg}$
rest mass of electron	m_e	$= 9.11 \times 10^{-31} \text{ kg}$
rest mass of proton	m_p	$= 1.67 \times 10^{-27} \text{ kg}$
molar gas constant	R	$= 8.31 \text{ J K}^{-1} \text{ mol}^{-1}$
the Avogadro constant	N_A	$= 6.02 \times 10^{23} \text{ mol}^{-1}$
the Boltzmann constant	k	$= 1.38 \times 10^{-23} \text{ J K}^{-1}$
gravitational constant	G	$= 6.67 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$
acceleration of free fall	g	$= 9.81 \text{ m s}^{-2}$

Formulae

uniformly accelerated motion	s	$= ut + \frac{1}{2} at^2$
	v^2	$= u^2 + 2as$
work done on/by a gas	W	$= p\Delta V$
hydrostatic pressure	p	$= \rho gh$
gravitational potential	ϕ	$= -Gml/r$
temperature	T/K	$= T/^\circ\text{C} + 273.15$
pressure of an ideal gas	p	$= \frac{1}{3} \frac{Nm}{V} \langle c^2 \rangle$
mean translational kinetic energy of an ideal gas molecule	E	$= \frac{3}{2} kT$
displacement of particle in s.h.m.	x	$= x_0 \sin \omega t$
velocity of particle in s.h.m.	v	$= v_0 \cos \omega t$ $= \pm \omega \sqrt{(x_0^2 - x^2)}$
electric current	I	$= Anvq$
resistors in series	R	$= R_1 + R_2 + \dots$
resistors in parallel	$1/R$	$= 1/R_1 + 1/R_2 + \dots$
electric potential	V	$= \frac{Q}{4\pi\epsilon_0 r}$
alternating current/voltage	x	$= x_0 \sin \omega t$
magnetic flux density due to a long straight wire	B	$= \frac{\mu_0 I}{2\pi d}$
magnetic flux density due to a flat circular coil	B	$= \frac{\mu_0 NI}{2r}$

magnetic flux density due to a long solenoid

$$B = \mu_0 n I$$

radioactive decay

$$x = x_0 \exp(-\lambda t)$$

decay constant

$$\lambda = \frac{\ln 2}{t_{\frac{1}{2}}}$$