

**RECOMMENDED VALUES OF PHYSICAL CONSTANTS**  
**For use in Physics and Electronics Examinations**

<u>Quantity</u>	<u>Symbol</u>	<u>Value</u>
speed of light in a vacuum	$c$	$2.979250 \times 10^8 \text{ ms}^{-1}$
magnetic constant, permeability of a vacuum	$\mu_0$	$4\pi \times 10^{-7} \text{ Hm}^{-1}$ (exact)
electric constant, permittivity of a vacuum	$\epsilon_0 = \mu_0^{-1} c^{-2}$	$8.8541853 \times 10^{-12} \text{ Fm}^{-1}$
elementary charge	$e$	$1.6021917 \times 10^{-19} \text{ C}$
Faraday constant	$F$	$9.648670 \times 10^4 \text{ Cmol}^{-1}$
Planck constant	$h$ $\hbar = h/2\pi$	$6.626196 \times 10^{-34} \text{ Js}$ $1.0545919 \times 10^{-34} \text{ Js}$
unified atomic mass constant	$u$	$1.660531 \times 10^{-27} \text{ kg}$
rest mass: of electron	$m_e$	$9.109558 \times 10^{-31} \text{ kg}$
of proton	$m_p$	$1.672614 \times 10^{-27} \text{ kg}$
of neutron	$m_n$	$1.67492 \times 10^{-27} \text{ kg}$
charge to mass ratio for electron	$e/m_e$	$1.758803 \times 10^{11} \text{ C kg}^{-1}$
gas constant	$R$	$8.31434 \text{ JK}^{-1} \text{ mol}^{-1}$
Avogadro constant	$N_A$	$6.022169 \times 10^{23} \text{ mol}^{-1}$
Boltzmann constant	$k = R/N_A$	$1.380622 \times 10^{-23} \text{ JK}^{-1}$
molar volume	$V_M$	$2.24144 \times 10^{-2} \text{ m}^3 \text{ mol}^{-1}$
Stefan-Boltzmann constant	$\sigma = 2\pi^5 k^4 / 15h^3 c^2$	$5.66961 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$
gravitational constant	$G$	$6.6732 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$
acceleration of free fall at the earth's surface	$g$	take as $9.81 \text{ ms}^{-2}$
Rydberg constant	$R_\infty = \mu_0^2 m_e e^4 c^3 / 8h^3$	$1.09737312 \times 10^7 \text{ m}^{-1}$
Bohr radius	$a_0 = h^2 / \pi \mu_0 c^2 m_e e^2$	$5.2917715 \times 10^{-11} \text{ m}$
Bohr magneton	$\mu_B = eh/4\pi m_e$	$9.274096 \times 10^{-24} \text{ JT}^{-1}$
nuclear magneton	$\mu_N = (m_e/m_p) \mu_B$	$5.050951 \times 10^{-27} \text{ JT}^{-1}$
Magnetic moment: of electron	$\mu_e$	$9.284851 \times 10^{-24} \text{ JT}^{-1}$
of proton	$\mu_p$	$1.4106203 \times 10^{-26} \text{ JT}^{-1}$