LIST OF SELECTED CONSTANT VALUES

Speed of light in vacuum	c	$= 3.00 \times 10^{8}\, ms^{-1}$
Permeability of free space	μ_o	$= 4\pi \times 10^{-7}\, H\, m^{-1}$
Permittivity of free space	ε_o	$= 8.85 \times 10^{-12}\, F\, m^{-1}$
Electron charge magnitude	e	$= 1.6 \times 10^{-19}\, C$
Planck constant	h	$= 6.63 \times 10^{-34}\, Js$
Electron mass	m_e	$= 9.11 \times 10^{-31} kg$ $= 5.49 \times 10^{-4}\, u$
Neutron mass	m_n	$= 1.674 \times 10^{-27} kg$ $= 1.008665u$
Proton mass	m_p	$= 1.672 \times 10^{-27} kg$ $= 1.007277u$
Hydrogen mass	m_H	$= 1.673 \times 10^{-27} kg$ $= 1.007825u$
Deuteron mass	m_d	$= 3.34 \times 10^{-27} kg$ $= 2.014102u$
Molas gas constant	R	$= 8.31\, J\, K^{-1}\, mol^{-1}$
Avogadro constant	N_A	$= 6.02 \times 10^{23}\, mol^{-1}$
Boltzmann constant	k	$= 1.38 \times 10^{-23} JK^{-1}$
Free-fall acceleration	g	$= 9.81 ms^{-2}$
Atomic mass unit	$1u$	$= 1.66 \times 10^{-27} kg$ $= 931.5 \frac{MeV}{c^2}$
Electron volt	$1eV$	$= 1.6 \times 10^{-19}\, J$
Constant of proportionality for Coulomb's Law	$k = \frac{1}{4\pi\varepsilon_o}$	$9.0 \times 10^{9}\, N\, m^2\, C^{-2}$
Atmospheric pressure	$1atm$	$= 1.013 \times 10^{5} Pa$
Density of water	ρ_w	$= 100 kgm^{-3}$

LIST OF SELECTED FORMULAE

1	$v = u + at$	23	$\theta = \frac{1}{2}(\omega_o + \omega)t$	43	$v = f\lambda$	63	$\gamma = 3\alpha$
2	$s = ut + \frac{1}{2}at^2$	24	$\omega^2 = \omega_o^2 + 2\alpha\theta$	44	$y(x,t) = A\sin(\omega t \pm kx)$	64	$n = \frac{m}{M} = \frac{N}{N_A}$
3	$v^2 = u^2 + 2as$	25	$\tau = rF\sin\theta$	45	$v_y = A\omega\cos(\omega t \pm kx)$	65	$v_{rms} = \sqrt{< v^2 >}$
4	$s = \frac{1}{2}(u + v)t$	26	$I = \Sigma mr^2$	46	$y = 2A\cos kx\ \sin\omega t$	66	$v_{rms} = \sqrt{\frac{3kT}{m}} = \sqrt{\frac{3RT}{M}}$
5	$p = mv$	27	$I_{\text{solid sphere}} = \frac{2}{5}MR^2$	47	$f_n = \frac{nv}{2L}$	67	$PV = \frac{1}{3}Nmv_{rms}^2$
6	$J = F\Delta t$	28	$I_{\text{solid cylinder/disc}} = \frac{1}{2}MR^2$	48	$f_n = \frac{n}{2L}\sqrt{\frac{T}{\mu}}$	68	$P = \frac{1}{3}\rho v_{rms}^2$
7	$J = \Delta p = mv - mu$	29	$I_{ring} = MR^2$	49	$f_n = \frac{nv}{4L}$	69	$K_{tr} = \frac{3}{2}\left(\frac{R}{N_A}\right)T = \frac{3}{2}kT$
8	$f = \mu N$	30	$I_{\text{rod}} = \frac{1}{12}ML^2$	50	$v = \sqrt{\frac{T}{\mu}}$	70	$U = \frac{1}{2}fNkT = \frac{1}{2}fnRT$
9	$W = \vec{F}\cdot\vec{s} = Fs\cos\theta$	31	$\Sigma\tau = I\alpha$	51	$\mu = \frac{m}{L}$	71	$\Delta U = Q - W$
10	$K = \frac{1}{2}mv^2$	32	$L = I\omega$	52	$f_a = \left(\frac{v \pm v_o}{v \mp v_s}\right)f$	72	$W = nRT\ln\left(\frac{V_f}{V_i}\right) = nRT\ln\left(\frac{P_i}{P - f}\right)$
11	$U = mgh$	33	$y = A\sin\omega t$	53	$\sigma = \frac{F}{A}$	73	$W = \int P\,dV = P(V_f - V_i)$
12	$U_s = \frac{1}{2}kx^2 = \frac{1}{2}Fx$	34	$v = \omega A\cos\omega t = \pm\omega\sqrt{A^2 - y^2}$	54	$\varepsilon = \frac{\Delta L}{L_o}$	74	$W = \int P\,dV = 0$
13	$W = \Delta K$	35	$a = -\omega^2 A\sin\omega t = -\omega^2 y$	55	$Y = \frac{\sigma}{\varepsilon}$		
14	$P_{av} = \frac{\Delta W}{\Delta t}$	36	$K = \frac{1}{2}m\omega^2(A^2 - y^2)$	56	$U = \frac{1}{2}F\Delta L$		
15	$P = \vec{F}\cdot\vec{v} = Fv\cos\theta$	37	$U = \frac{1}{2}m\omega^2 y^2$	57	$\frac{U}{V} = \frac{1}{2}\sigma\varepsilon$		
16	$a_c = \frac{v^2}{r} = r\omega^2 = v\omega$	38	$E = \frac{1}{2}m\omega^2 A^2$	58	$\frac{Q}{t} = -kA\left(\frac{\Delta T}{L}\right)$		
17	$F_c = \frac{mv^2}{r} = mr\omega^2 = mv\omega$	39	$\omega = \frac{2\pi}{T} = 2\pi f$	59	$\Delta L = \alpha L_o \Delta T$		
18	$s = r\theta$	40	$T = 2\pi\sqrt{\frac{l}{g}}$	60	$\Delta A = \beta A_o \Delta T$		
19	$v = r\omega$	41	$T = 2\pi\sqrt{\frac{m}{k}}$	61	$\Delta V = \gamma V_o \Delta T$		
20	$a_t = r\alpha$	42	$k = \frac{2\pi}{\lambda}$	62	$\beta = 2\alpha$		
21	$\omega = \omega_o + \alpha t$						
22	$\theta = \omega_o t + \frac{1}{2}\alpha t^2$						