
$c = 3.0 \times 10^8$ m/s $\quad G = 6.67 \times 10^{-11}\text{Nm}^2/\text{kg}^2 \quad g = 9.8$ m/s^2

$R = 8.315 \frac{\text{J}}{\text{mol} \cdot \text{K}} \quad k = 1.38 \times 10^{-23} \frac{\text{J}}{\text{K}} \quad N_A = 6.02 \times 10^{23}$

1 ft = 12 in $\quad$ 1 in = 2.54 cm $\quad$ 1 lb = 0.454 kg $\quad$ 1 mi = 1.6 km

$I_o = 10 \times 10^{-12} \frac{\text{W}}{\text{m}^2} \quad 1 \text{ atm} = 1.013 \times 10^5 \text{Pa} \quad 1\,\text{m}^3 = 10^3\,\text{L} = 10^6\,\text{cm}^3$

$1\,\text{cal} = 4186\,\text{J} \quad 1\,u = 1.6605 \times 10^{-27}\text{kg}$

$av.\,speed = \frac{distance\,traveled}{time\,elapsed} \quad \overline{v} = \frac{x_2 - x_1}{t_2 - t_1} = \frac{\triangle x}{\triangle t} \quad \overline{a} = \frac{v_2 - v_1}{t_2 - t_1} = \frac{\triangle v}{\triangle t}$

$a = const \quad v = v_0 + at \quad x = x_0 + v_0 t + \frac{at^2}{2} \quad v^2 - v_0^2 = 2a(x - x_0)$

$F_{fr} = \mu_k F_N \quad F_{fr} \leq \mu_s F_N$

$a = \frac{v^2}{r} \quad F = G\frac{m_1 m_2}{R^2} \quad \left(\frac{T_1}{T_2}\right)^2 = \left(\frac{a_1}{a_2}\right)^3$

$W = Fd\cos(\theta) \quad KE = \frac{mv^2}{2} \quad PE = mgh \quad PE = \frac{kx^2}{2}$

$\triangle E = W \quad P = \frac{\triangle E}{\triangle t} \quad P = F.v$

$\sum \overrightarrow{F} = \frac{\triangle \overrightarrow{p}}{\triangle t} \quad \overrightarrow{J} = \overrightarrow{F}\,\triangle t \quad x_{C.M.} = \frac{m_1 x_1 + m_2 x_2 + m_3 x_3 + ...}{m_1 + m_2 + m_3 + ...}$

$\overline{\omega} = \frac{\triangle \theta}{\triangle t} \quad \overline{\alpha} = \frac{\triangle \omega}{\triangle t} \quad f = \frac{1}{T} \quad \omega = 2\pi f$

$\alpha = const \quad \omega = \omega_o + \alpha t \quad \theta = \theta_o + \omega_o t + \frac{\alpha t^2}{2} \quad \omega^2 = \omega_o^2 + 2\alpha \triangle \theta$

$\theta = \frac{l}{r} \quad v = \omega r \quad a = \alpha r$

$\tau = rF\sin\theta \quad \tau = I\alpha \quad KE_{rot} = \frac{I\omega^2}{2} \quad W = \tau \triangle \theta \quad P = \tau\omega$

$L = I\omega \quad L = r.p_\perp = rp\sin\theta \quad \frac{\triangle L}{L} = \frac{1}{E}\frac{F}{A}$

$P = P_o + \rho g y \quad F_b = \rho V g \quad A_1 v_1 = A_2 v_2 \quad P + \rho g y + \frac{\rho v_2^2}{2} = const.$

$x = A\cos(\omega t + \theta_o) \quad \omega^2 = \frac{k}{m} \quad T = \frac{2\pi}{\omega} = 2\pi\sqrt{\frac{m}{k}} \quad f = \frac{1}{T} = \frac{\omega}{2\pi} = \frac{1}{2\pi}\sqrt{\frac{k}{m}}$

$T = 2\pi\sqrt{\frac{L}{g}} \quad E = \frac{kA^2}{2} \quad I \propto \frac{A^2}{r^2}$

$v = \lambda f \quad v = \sqrt{\frac{F_T}{\mu}} \quad v = 331 + 0.6T \quad \beta = 10\log\frac{I}{I_o}$

$n = \frac{N}{N_A} = \frac{m}{\mu} = \frac{V}{V_\mu} \quad T(^\circ\text{C}) = \frac{5}{9}(T(^\circ\text{F}) - 32) \quad T(^\circ\text{F}) = \frac{9}{5}T(^\circ\text{C}) + 32$

$\triangle L = \alpha L_o \triangle T \quad \triangle V = \beta V_o \triangle T \quad PV = nRT \quad PV = NkT$

$\left\langle KE \right\rangle = \frac{1}{2}m\langle v^2 \rangle = \frac{1}{2}mv_{rms}^2 = \frac{3}{2}kT \quad Q = mc\triangle T \quad Q = mL$

$\triangle U = Q - W \quad W = P\triangle V \quad e = \frac{|Q_H| - |Q_L|}{|Q_H|} \quad e = 1 - \frac{T_L}{T_H}$

Object	I	Object	I
thin loop	MR^2	$\begin{pmatrix}\text{uniform rod}\\ \text{through center}\end{pmatrix}$	$\frac{1}{12}MR^2$
solid cylinder	$\frac{1}{2}MR^2$	$\begin{pmatrix}\text{uniform rod}\\ \text{through end}\end{pmatrix}$	$\frac{1}{3}MR^2$
uniform sphere	$\frac{2}{5}MR^2$		