$$\left|\vec{A}\right| = \sqrt{A_x^2 + A_y^2 + A_z^2}$$

$$\theta = \tan^{-1}\frac{A_y}{A_x}$$

$$\vec{v} = \frac{\Delta\vec{r}}{\Delta t}$$

$$\vec{a} = \frac{\Delta\vec{v}}{\Delta t}$$

$$x = x_0 + v_0 t + \frac{1}{2}at^2$$

$$v = v_0 + at$$

$$v^2 = v_0^2 + 2a\Delta x$$

$$\Sigma\vec{F} = m\vec{a}$$

$$F = G\frac{m_1 m_2}{R^2}$$

$$f_k = \mu_k F_N$$

$$a_c = \frac{v^2}{r}$$

$$T = \frac{2\pi r}{v}$$

$$F_c = \frac{mv^2}{r}$$

$$T = \frac{2\pi R}{v}$$

$$KE = \frac{1}{2}mv^2$$

$$W = (F\cos\theta)s$$

$$PE = mgh$$

$$W_{nc} = E_f - E_i$$

$$E = KE + PE$$

$$\vec{p} = m\vec{v}$$

$$\vec{p}_i = \vec{p}_f$$

$$s = r\theta$$

$$\overline{\omega} = \frac{\Delta\theta}{\Delta t}$$

$$\overline{\alpha} = \frac{\Delta\omega}{\Delta t}$$

$$\omega = \omega_0 + \alpha t$$

$$\theta = \theta_0 + \omega_0 t + \frac{1}{2}\alpha t^2$$

$$\omega^2 = \omega_0^2 + 2\alpha\Delta\theta$$

$$v_t = \omega r$$

$$a_t = \alpha r$$

$$a_r = \frac{v^2}{r} = \omega^2 r$$

$$T = \frac{2\pi}{\omega}$$

$$KE = \frac{1}{2}I\omega^2$$

$$\tau = Fl$$

$$\tau_{net} = I\alpha$$

$$KE = \frac{1}{2}I_{CM}\omega^2 + \frac{1}{2}mv_{CM}^2$$

$$L = I\omega$$

$$W_R = \tau\theta$$

$$F_{el} = -kx$$

$$x = A\cos\omega t$$

$$v = -\omega A\sin\omega t$$

$$a = -\omega^2 A\cos\omega t$$

$$\omega = \frac{2\pi}{T} = 2\pi f \;;\; f = \frac{1}{T}$$

$$\omega = \sqrt{\frac{k}{m}}$$

$$PE_{el} = \frac{1}{2}kx^2$$

$$\omega = \sqrt{\frac{mgL}{I}}$$

$$\omega = \sqrt{\frac{g}{L}}$$

$$P = \frac{F}{A}$$

$$\rho = \frac{m}{V}$$

$$P_2 = P_1 + \rho gh$$

$$F_B = W_{fluid\ displaced}$$

$$\rho Av = \text{const}$$

$$\mathrm{P} + \frac{1}{2}\rho v^2 + \rho gy = \text{const}$$

$$\mathrm{T} = \mathrm{T_C} + 273.15$$

$$Q = mc\Delta T$$

$$Q = Lm$$

$$PV = nRT = NkT$$

$$\Delta U = Q - W$$

$$W = P\Delta V$$

$$W = nRT\ln\left(\frac{V_f}{V_i}\right)$$

$$\Delta U = nC_V\Delta T$$

$$Q = nC_P\Delta T$$

$$P_i V_i^{\gamma} = P_f V_f^{\gamma}$$

$$\gamma = \frac{C_P}{C_V}$$

$$C_P = C_V + R$$

$$e = W / Q_H$$

$$\Delta S = Q / T$$

$$v = \lambda f$$

$$f_n = n\left(\frac{v}{2L}\right);\ n = 1,2,3,4...$$

$$f_n = n\left(\frac{v}{4L}\right);\ n = 1,3,5,7...$$

$$\sin\theta = \frac{\lambda}{D}$$

…..constants…….

$$g = 9.8\,\mathrm{m/s^2}$$

$$\mathrm{G} = 6.67\times10^{-11}\,\mathrm{Nm^2/kg^2}$$

$$1\,\mathrm{atm} = 1.013\times10^5\,\mathrm{Pa}$$

$$R = 8.314\ \mathrm{J/(mol\cdot K)}$$

$$k = 1.38\times10^{-23}\,\mathrm{J/K}$$

$$C_V = \frac{3}{2}R$$

$$c_{water} = 4186\,\mathrm{J/(kg\cdot K)}$$

$$c_{ice} = 2000\,\mathrm{J/(kg\cdot K)}$$

$$\mathrm{L_{F_{water}}} = 33.5\times10^4\ \mathrm{J/kg}$$

$$\mathrm{L_{V_{water}}} = 22.6\times10^5\ \mathrm{J/kg}$$