

$$v = v_0 + at \quad PE = \frac{1}{2} k x^2 \quad \bar{a} = \frac{\Delta v}{\Delta t} \quad \frac{1}{2} m_A v_A^2 + \frac{1}{2} m_B v_B^2 = \frac{1}{2} m_A v_A'^2 + \frac{1}{2} m_B v_B'^2$$

$$V_x = |\vec{V}| \cos(\theta) \quad W = F d \cos(\theta) \quad \vec{F}_G = m \vec{g} \quad \vec{p} = m \vec{v} \quad \bar{F} = \frac{\Delta p}{\Delta t} \quad x = x_0 + v_0 t + \frac{1}{2} a t^2$$

$$m_A \vec{v}_A + m_B \vec{v}_B = m_A \vec{v}'_A + m_B \vec{v}'_B \quad \vec{F}_{AB} = -\vec{F}_{BA} \quad PE + KE = \text{const.} \quad \vec{I} = \vec{F} \Delta t = \Delta \vec{p}$$

$$v^2 = v_0^2 + 2a(x - x_0) \quad V_y = |\vec{V}| \sin(\theta) \quad \bar{v} = \frac{\Delta x}{\Delta t} \quad a_R = \frac{v^2}{r} \quad |\vec{V}| = \sqrt{V_x^2 + V_y^2} \quad \bar{v} = \frac{v + v_0}{2}$$

$$\tan(\theta) = \frac{V_y}{V_x} \quad PE = mgh \quad m_A \vec{v}_A + m_B \vec{v}_B = (m_A + m_B) \vec{v} \quad KE = \frac{1}{2} m v^2 \quad \vec{F}_G = G \frac{m_1 m_2}{r^2} \hat{r}_{12}$$

$$\omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0) \quad L = I\omega \quad \sum \vec{F} = m\vec{a} \quad \sum \vec{\tau} = I\vec{\alpha} \quad v = r\omega \quad \omega = 2\pi f$$

$$\theta = \theta_0 + \omega_0 t + \frac{1}{2} \alpha t^2 \quad \bar{\omega} = \frac{\omega + \omega_0}{2} \quad \omega = \Delta\theta / \Delta t \quad \tau = r F \sin(\theta) \quad a_R = \omega^2 r \quad a_{\tan} = r\alpha$$

$$KE = \frac{1}{2} I \omega^2 \quad \omega = \omega_0 + \alpha t \quad \alpha = \Delta\omega / \Delta t \quad KE = \frac{1}{2} M v_{CM}^2 + \frac{1}{2} I_{CM} \omega^2 \quad T = 1/f$$

$$\sum F_x = 0, \quad \sum F_y = 0, \quad \sum \tau = 0 \quad \rho = m/V \quad KE = \frac{1}{2} m \bar{v}^2 = \frac{3}{2} k T \quad \bar{P} = \frac{\Delta E}{\Delta t} \quad \sum \tau = \Delta L / \Delta t$$

$$P_1 + \frac{1}{2} \rho v_1^2 + \rho g y_1 = P_2 + \frac{1}{2} \rho v_2^2 + \rho g y_2 \quad P = \rho g h \quad \Delta L = \alpha L_0 \Delta T \quad \Delta V = \beta V_0 \Delta T$$

$$P_{\text{OUT}} = P_{\text{IN}} \quad PV = nRT \quad PV = NkT \quad U = \frac{3}{2} nRT \quad P = F/A \quad Q = mc\Delta T$$

$$\Delta S \geq 0 \quad \Delta U = Q - W \quad e = \frac{W}{Q_H} = 1 - \frac{Q_L}{Q_H} \quad \Delta S = Q/T \quad Q/t = k A \frac{T_1 - T_2}{l}$$