PHYS 201 Formula Sheet **Chapters 9—11 (Exam 3)**

For constant α:

$$\omega = \omega_0 + \alpha t \qquad \omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$$

$$\theta - \theta_0 = \omega_0 t + \tfrac{1}{2}\alpha t^2 \qquad \theta - \theta_0 = \left(\frac{\omega + \omega_0}{2}\right)t$$

$$s = r\theta \qquad v = r\omega \qquad a_{\text{tan}} = r\alpha \qquad a_{\text{rad}} = v^2 / r = r\omega^2$$

$$K = \tfrac{1}{2} I\omega^2 \qquad I = m_A r_A^2 + m_B r_B^2 + ... \qquad U = Mgy_{\text{cm}}$$

$$K_{\text{total}} = \tfrac{1}{2} M v_{\text{cm}}^2 + \tfrac{1}{2} I_{\text{cm}}\omega^2$$

$$\tau = Fl \qquad \sum \tau = I\alpha \qquad \Delta W = \tau \Delta\theta \qquad P = \tau\omega \qquad L = I\omega$$

$$\sum \tau = \frac{\Delta L}{\Delta t} \qquad L = mvl$$

first and second conditions for equilibrium:
$\sum F_x = 0$, $\sum F_y = 0$ and $\sum \tau = 0$ (any axis)

$$Y = \frac{F_\perp / A}{\Delta l / l_0} \qquad B = -\frac{\Delta p}{\Delta V / V_0} \qquad S = \frac{F_\parallel / A}{x / h} = \frac{F_\parallel / A}{\phi}$$

$$F_x = -kx \qquad a_x = -\frac{k}{m}x \qquad \omega = 2\pi f \qquad f = \frac{1}{T}$$

$$U_{\text{el}} = \tfrac{1}{2} kx^2 \qquad K = \tfrac{1}{2} mv^2$$

$$x = A\cos\omega t \qquad v_x = -\omega A \sin\omega t \qquad \omega = \sqrt{\frac{k}{m}} \qquad f = \frac{1}{2\pi}\sqrt{\frac{k}{m}} \qquad T = 2\pi\sqrt{\frac{m}{k}}$$

$$f = \frac{1}{2\pi}\sqrt{\frac{g}{L}} \qquad T = 2\pi\sqrt{\frac{L}{g}}$$