Physics 190 Formula Sheet

$$v = v_o + a\,t$$

$$x - x_o = \frac{1}{2}(v + v_o)\,t$$

$$x - x_o = v_o\,t + \frac{1}{2}a\,t^2$$

$$v^2 = v_o^2 + 2\,a\,(x - x_o)$$

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

$$a_t = \frac{dv}{dt}$$

$$\vec{v_{ad}} = \vec{v_{ab}} + \vec{v_{bc}} + \vec{v_{cd}}$$

$$\sum \vec{F} = m\,\vec{a}$$

$$w = m\,g$$

$$f_s \le \mu_s\,N$$

$$f_k = \mu_k\,N$$

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

$$W = \vec{F}\cdot\vec{s}$$

$$K = \frac{m\,v^2}{2}$$

$$P = \frac{W}{t}$$

$$U_g = m\,g\,h$$

$$U_s = \frac{k\,x^2}{2}$$

$$\Delta K + \Delta U_g + \Delta U_s = W_f$$

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

$$\vec{F} = \frac{d\vec{p}}{dt}$$

$$\vec{p}_{after} = \vec{p}_{before}$$

$$x_{cm} = \frac{\sum_i m_i x_i}{\sum_i m_i}$$

$$\theta = \frac{s}{r}$$

$$\theta = \theta_o + \omega_o t + \frac{\alpha t^2}{2}$$

$$\theta = \theta_o + \frac{(\omega + \omega_o)\,t}{2}$$

$$\theta = \theta_o + \frac{(\omega^2 - \omega_o^2)}{2\,\alpha}$$

$$\omega = \omega_o + \alpha\,t$$

$$v = r\,\omega$$

$$a = r\,\alpha$$

$$I = I_c + m\,d^2$$

$$K = \frac{I\,\omega^2}{2}$$

$$\vec{\tau} = r\,F\sin\phi, \quad \text{RHR}$$

$$\sum_i \vec{\tau_i} = I\,\vec{\alpha}$$

$$dW = \tau\,d\theta$$

$$\vec{L} = I\,\vec{\omega}$$

$$\vec{\tau} = \frac{d\vec{L}}{dt}$$

$$\omega = 2\,\pi\,f$$

$$T = \frac{1}{f}$$

$$F = -\,k\,x$$

$$\frac{d^2x}{dt^2} + \frac{k}{m}\,x = 0$$

$$x = A\cos(\omega\,t + \phi)$$

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

$$E = \frac{k\,A^2}{2}$$

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

$$G = 6.67 \times 10^{-11}\,\frac{N\,m^2}{kg^2}$$

$$T^2 = \frac{4\,\pi^2\,r^3}{G\,m}$$

$$U_g = -\,\frac{G\,m_1\,m_2}{r}$$

$$E = -\,\frac{G\,m_1\,m_2}{2\,r}$$

$$P\,V = n\,R\,T$$

$$R = 8.31\,\frac{J}{mole\ K}$$

$$R = 0.0821\,\frac{liter\ atm}{mole\ K}$$

$$k = \frac{R}{N_A}$$

$$k = 1.38 \times 10^{-23}\,\frac{J}{K}$$

$$1\ cal = 4.186\ J$$

$$\Delta Q = m\,c\,\Delta T$$

$$Q = m\,L$$

$$L_f = 79.7\,\frac{cal}{gm}$$

$$L_v = 540\,\frac{cal}{gm}$$

$$\frac{dQ}{dt} = -\,\kappa\,A\,\frac{dT}{dx}$$

$$W = \int_{V_o}^{V_f} P\,dV$$

$$dU = dQ - dW$$

$$P = \frac{2\,N}{3\,V}\,K$$

$$K = \frac{3\,k\,T}{2}$$

$$v_{rms} = \sqrt{\frac{3\,k\,T}{m}} = \sqrt{\frac{3\,R\,T}{M}}$$

$$U = \frac{3\,N\,k\,T}{2} = \frac{3\,n\,R\,T}{2}$$

$$C_P - C_V = R$$

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

$$P\,V^{\gamma} = \text{constant}$$

$$W = Q_h - Q_c$$

$$e = \frac{W}{Q_h}$$

$$e_{max} = 1 - \frac{T_c}{T_h}$$

$$dS = \frac{dQ}{T}$$