

These are the equations as they will appear on the last page of the final exam:

Assorted thermodynamics equations:

$$\begin{array}{lll} \Delta L = L_i \alpha \Delta T & PV = nRT = NK_B T & Q = mc\Delta T \\ Q = L\Delta m & P = F/A & W = \int PdV \\ W = nRT \ln\left(\frac{V_i}{V_f}\right) & \Delta E_{int} = Q - W & \Delta E_{int} = nC_V \Delta T \\ Q = nC_V \Delta T & Q = nC_P \Delta T & \gamma = C_P/C_V \\ C_P - C_V = R & PV^\gamma = C & P = \frac{2}{3}(N/V)\left(\frac{1}{2}m_0\overline{v^2}\right) \end{array}$$

Constants:

$$\begin{array}{lll} R = 8.314 \text{ J/mol}\cdot\text{K} & K_B = 1.381 \times 10^{-23} \text{ J/K} & 1 \text{ cal} = 4.186 \text{ J} \\ T_{triplept} = 273.16 \text{ K}, 0.01^\circ \text{ C} & N_A = 6.0221 \times 10^{23} & \end{array}$$

Previous Assorted Equations

$$\begin{array}{lll} W = F\Delta x \cos \theta & W = \vec{F} \cdot \Delta \vec{x} & F_s = -kx \\ W = \int_{r_i}^{r_f} \vec{F} \cdot d\vec{r} & W_{net} = \Delta K & U_g = mgy \\ U_s = \frac{1}{2}kx^2 & W_{int} = -\Delta U & F_x = -\frac{dU}{dx}, F_y = -\frac{dU}{dy} \\ \Delta E_{mech} = \Delta K + \Delta U & \Delta E_{sys} = \sum T & \Delta K + \Delta U + f_k d = W + Q + \sum T \\ \Delta E_{mech} = \sum W_{other forces} - f_k d & P = \frac{dE}{dt} & P = \vec{F} \cdot \vec{v} \\ \vec{p} = m\vec{v} & \vec{F} = \frac{d\vec{p}}{dt} & \sum \vec{p}_i = \sum \vec{p}_f \\ \vec{F} = \frac{\sum m_i x_i}{M_{tot}} & \vec{r}_{com} = \frac{1}{M} \int \vec{r} dm & \vec{p}_{tot} = M_{tot} \vec{v}_{CM} \\ \theta = s/r & \omega = d\theta/dt & \alpha = d\omega/dt \\ v = r\omega & a_t = r\alpha & a_c = r\omega^2 \\ \omega_f = \omega_i + \alpha t & \theta_f = \theta_i + \omega_i t + \frac{1}{2}\alpha t^2 & \omega_f^2 = \omega_i^2 + 2\alpha(\theta_f - \theta_i) \\ \theta_f = \theta_i + \frac{1}{2}(\omega_i + \omega_f)t & K_{rot} = \frac{1}{2}I\omega^2 & K_{tot} = K_{trans} + K_{rot} \\ I = \sum m_i r_i^2 & I = \int r^2 dm & I = I_{CM} + MD^2 \\ I_{hoop} = MR^2 & I_{disk} = \frac{1}{2}MR^2 & I_{sphere} = \frac{2}{5}MR^2 \\ \tau_{net} = I\alpha & \vec{\tau} = \vec{r} \times \vec{F} & \sum \vec{\tau} = d\vec{L}/dt \\ L = I\omega & \vec{L} = I\vec{\omega} & \frac{d\vec{L}}{dt} = 0 \end{array}$$