Some equations and formulae that might or might not be useful:

$\Delta E = h\nu$; $\nu = \frac{c}{\lambda}$; $\lambda = \frac{h}{p}$

$E_{kinet} = \frac{p^2}{2m}$; $\hat{p}_x = -i\hbar\frac{\partial}{\partial x}$; $\Delta p_x \cdot \Delta x \geq \frac{\hbar}{2}$

$E_n = \frac{h^2 n^2}{8ma^2}$; $\Psi_n(x) = \sqrt{\frac{2}{a}}\sin\left(\frac{\pi n}{a}x\right)$

$E_n = \left(n+\frac{1}{2}\right)h\nu$;

$\Psi_n(x) = A_n H_n\left(\sqrt{\alpha}x\right)e^{-\alpha x^2/2}$;

$\nu = \frac{1}{2\pi}\sqrt{\frac{k}{\mu}}$; $\alpha = \sqrt{k\mu}/\hbar$;

$E_{m_l} = \frac{\hbar^2}{2I}m_l{}^2$; $\Psi_{m_l}(\phi) = \frac{1}{\sqrt{2\pi}}e^{im_l\phi}$;

$E_l = \frac{l(l+1)\hbar^2}{2I}$; $\Psi_{l.m_l} = Y_{l,m_l}(\theta,\phi)$;

$\left|\vec{l}\right|^2 = l(l+1)\hbar^2$; $l_z = m_l\hbar$

$E_J = \frac{J(J+1)\hbar^2}{2I} = hcBJ(J+1)$;

$B = \frac{\hbar^2}{2hcI}$

$E_n = -\frac{m_e e^4}{8\varepsilon_o^2 h^2 n^2} = -\frac{\hbar^2}{2m_e a_o^2 n^2}$;

$\Psi_{n,l.m_l} = R_{n,l}(r)Y_{l,m_l}(\theta,\phi)$; $a_o = \frac{4\pi\varepsilon_o\hbar^2}{m_e e^2}$;

$\hat{I}_z\alpha = \frac{\hbar}{2}\alpha$; $\hat{I}_z\beta = -\frac{\hbar}{2}\beta$; $\left[\hat{I}_x,\hat{I}_y\right] = i\hbar\hat{I}_z$;

$\hat{I}^2\alpha = \frac{3\hbar^2}{4}\alpha$; $\hat{I}^2\beta = \frac{3\hbar^2}{4}\beta$;

$\hat{H} = -\gamma B_0\hat{I}_z$; $\nu = \gamma B_0/2\pi$; $\vec{\mu} = \gamma\vec{I}$;

$\mu_{21} = \int\Psi_2{}^*\mu\Psi_1\,dx$

$h = 6.62\times10^{-34}$ J s; $\hbar = h/(2\pi)$; $c = 3\times10^8$ m/s;

$k_B = 1.38\times10^{-23}$ J K^{-1}; $N_A = 6.02\times10^{23}$ mol^{-1};
$R = N_A\times k_B = 8.31$ J mol^{-1} K^{-1}

$m_e = 9.1\times10^{-31}$ kg; $m_p = 1.67\times10^{-27}$ kg;
1 a.m.u. = 1.66×10^{-27} kg;

$H_0(\xi) = 1$; $H_1(\xi) = 2\xi$; $H_2(\xi) = 4\xi^2-2$;

$H_3(\xi) = 8\xi^3-12\xi$; here $\xi = \sqrt{\alpha}x$ $A_n = \frac{1}{\sqrt{2^n n!}}\left(\frac{\alpha}{\pi}\right)^{1/4}$

$\hat{l}_z = -i\hbar\frac{\partial}{\partial\phi}$; $l_z = m_l\hbar$; $I = \mu r^2$;

$Y_{0,0}(\theta,\phi) = 1/\sqrt{4\pi}$; $Y_{1,0}(\theta,\phi) = (3/4\pi)^{1/2}\cos\theta$;

$Y_{1,\pm1}(\theta,\phi) = \mp(3/8\pi)^{1/2}\sin\theta\, e^{\pm i\phi}$;

$Y_{2,0}(\theta,\phi) = (5/16\pi)^{1/2}(3\cos^2\theta - 1)$;

$Y_{2,\pm1}(\theta,\phi) = \mp(15/8\pi)^{1/2}\cos\theta\sin\theta\, e^{\pm i\phi}$;

$Y_{2,\pm2}(\theta,\phi) = (15/32\pi)^{1/2}\sin^2\theta\, e^{\pm 2i\phi}$

$R_{1,0} = 2(1/a_o)^{3/2}e^{-r/a_o}$; $R_{2,0} = \frac{1}{\sqrt{8}}(1/a_o)^{3/2}\left(2-\frac{r}{a_o}\right)e^{-r/2a_o}$

$R_{2,1} = \frac{1}{2\sqrt{6}}(1/a_o)^{3/2}\frac{r}{a_o}e^{-r/2a_o}$

$\hat{I}_x\alpha = \frac{\hbar}{2}\beta$; $\hat{I}_x\beta = \frac{\hbar}{2}\alpha$; $\hat{I}_y\alpha = i\frac{\hbar}{2}\beta$; $\hat{I}_y\beta = -i\frac{\hbar}{2}\alpha$

$\int\alpha^*\alpha\,d\sigma = 1$; $\int\beta^*\beta\,d\sigma = 1$; $\int\beta^*\alpha\,d\sigma = 0$; $\int\alpha^*\beta\,d\sigma = 0$

$\vec{\mu} = \gamma\vec{I}$; $\gamma_H = 2.675\times10^8$ rad s^{-1} T^{-1}

$p_i = \frac{a_i}{N} = \frac{g_i e^{-\varepsilon_i \beta}}{q}$; $q = \sum_i g_i e^{-\varepsilon_i \beta}$;

$\beta = \frac{1}{k_B T}$; $W = \frac{N!}{a_0! a_1! a_2! ...}$; $\ln N! \approx N \ln N - N$

$q_{transl} = \frac{V}{\Lambda^3}$; $\Lambda = h\left(\frac{\beta}{2\pi m}\right)^{1/2}$;

$q_{rot} = \frac{1}{hcB\beta}$ (assuming that $k_B T >> hcB$);

$q_{vibr} = \frac{1}{1 - e^{-h\nu\beta}} \approx \frac{1}{h\nu\beta}$ (when $k_B T >> h\nu$)

$E = -N \frac{\partial}{\partial \beta} \ln q = N k_B T^2 \frac{\partial}{\partial T} \ln q$;

$E = -\frac{\partial}{\partial \beta} \ln Q$; where $Q = q^N$ or $q^N/N!$

$U - U(0) = -\left(\frac{\partial}{\partial \beta} \ln Q\right)_V = k_B T^2 \left(\frac{\partial}{\partial T} \ln Q\right)_V$

$S = k_B \ln W$; $S = \frac{U - U(0)}{T} + k_B \ln Q$

$P(L, N) = \left(\frac{3}{2\pi N b^2}\right)^{\frac{3}{2}} e^{\frac{-3L^2}{2Nb^2}}$; $\langle L^2 \rangle = Nb^2$;

Non-ideal chain: $\langle L^2 \rangle = C_\infty N b^2$;
or $\langle L^2 \rangle = N_e b_e^2$; where $N_e = N/C_\infty$ and $b_e = b\, C_\infty$

$e^{i\alpha} = \cos\alpha + i \sin\alpha$; $\cos\alpha = (e^{i\alpha} + e^{-i\alpha})/2$; $\sin\alpha = (e^{i\alpha} - e^{-i\alpha})/(2i)$

$\sin 2\alpha = 2 \sin\alpha \cos\alpha$; $\cos 2\alpha = \cos^2\alpha - \sin^2\alpha$;
$2\sin^2\alpha = 1 - \cos 2\alpha$; $2\cos^2\alpha = 1 + \cos 2\alpha$

$\int_{-\infty}^{\infty} e^{-ax^2} x^{2n}\, dx = \sqrt{\frac{\pi}{a}} \frac{1 \cdot 3 \cdot 5 \cdot ... \cdot (2n-1)}{2^n a^n}$; (for $n \geq 0$)

$\int_0^{\infty} e^{-ax^2} dx = \frac{1}{2}\sqrt{\frac{\pi}{a}}$; $\int_0^{\infty} e^{-ax^2} x^2\, dx = \frac{1}{4a}\sqrt{\frac{\pi}{a}}$

$\int_0^{a} \sin^2\left(\frac{\pi n}{a} x\right) dx = \frac{a}{2}$;

$\int_0^{\infty} x^n e^{-ax} dx = \frac{n!}{a^{n+1}}$

I might add more equations as necessary