

Formulae for Exam #1

$$k = 1.381 \cdot 10^{-23} \text{ J/K} = 8.617 \cdot 10^{-5} \text{ eV/K}$$

$$h = 6.626 \cdot 10^{-34} \text{ Js} = 4.136 \cdot 10^{-15} \text{ eVs}$$

$$N_A = 6.022 \cdot 10^{23}$$

$$\Delta U = Q + W_{\text{on}} \quad \text{where} \quad W_{\text{on}} = - \int p dV$$

$$C = \frac{Q}{\Delta T}$$

$$pV = NkT \quad pV^\gamma = \text{const.}, \text{ where } \gamma = (f + 2)/f$$

$$U = \frac{f}{2} NkT \quad \frac{1}{2} kT \text{ for each quadratic degree of freedom}$$

$$H = U + pV$$

$$\Omega = \binom{q + N - 1}{q} \quad \Omega = \binom{N}{n} = \frac{N!}{n!(N-n)!}$$

$$\ln N! \approx N \ln N - N \quad \ln(1 + x) \approx x$$

$$S = k \ln \Omega$$

$$S = Nk \left[\ln \left(\frac{V}{N} \left(\frac{4\pi m U}{3N h^2} \right)^{3/2} \right) + \frac{5}{2} \right]$$