Midterm 3 Equations, Chem 125H, Fall 2020 NJIT

Bond order = [(# of bonding electrons)-(# of antibonding electrons)]/2

Hooke's Law: $F=-k(R-R_e)$

$$\nu = \frac{1}{2\pi}\sqrt{\frac{k}{\mu}}$$

$$\mu = \frac{(m_1)(m_2)}{m_1 + m_2}$$

$$E_v = h\nu_0\left(v + \frac{1}{2}\right)$$

$$E_J = \frac{h^2}{8\pi^2 I}J(J+1) = hBJ(J+1)$$

$$I = \mu R_e^{\ 2}$$

Bragg Law: $n\lambda = 2d\sin\theta$

Clausius-Clapeyron Equation:

$$\ln\left(\frac{P_{vap}^{T_1}}{P_{vap}^{T_2}}\right) = \frac{\Delta H_{vap}}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

$$\text{Mass percent} = \left(\frac{\text{grams of solute}}{\text{grams of solution}}\right)\times 100$$

$$\text{Mole fraction of component A} = \chi_A = \frac{n_A}{n_A + n_B + \ldots}$$

$$\text{Molality} = \frac{\text{moles of solute}}{\text{kilograms of solvent}}$$

$\Delta G = \Delta H - T\Delta S$

Henry's Law: $P = k_H\chi$ or $P = kC$

Raoult's Law:

$P_{solution} = \chi_{solvent} P°_{solvent}$

$P_{Total} = P_a + P_b = \chi_A P°_A + \chi_B P°_B$

$\Delta T = K_b m_{solute}$

$\Delta T = K_f m_{solute}$

$\pi = MRT$

van't Hoff factor,

$$i = \frac{\text{moles of particles in solution}}{\text{moles of solute dissolved}}$$

$\Delta T = i K_b m_{solute}$

$\Delta T = i K_f m_{solute}$

$\pi = iMRT$