Equations and constants for Exam 2, CHM 3400, Fall 2015
You are responsible for knowing the conditions under which the equations apply.

1 atm = 760 Torr = 1.01325 bar

R = 8.31451 J K^{-1} mol^{-1} = 0.0831451 L bar K^{-1} mol^{-1} = 0.08206 L atm K^{-1} mol^{-1}

$dU = TdS - pdV$

$\Delta H = C_p \Delta T$

$\Delta_r H(T') = \Delta_r H(T) + \Delta C_p \Delta T$

$S = k_B ln W$

$dS = \frac{dq_{rev}}{T}$

$dS_{surr} = \frac{-dq}{T}$

$\Delta S = nRln\left(\frac{V_f}{V_i}\right)$

$\Delta S = \int \frac{n\bar{C}_P}{T} dT$

$\Delta S = n\bar{C}_p ln\left(\frac{T_f}{T_i}\right)$

$\Delta S = \frac{\Delta_{trans} H}{T}$

$\Delta S = -nR(x_A ln x_A + x_B ln x_B)$

$dG = -SdT + Vdp$

$\left(\frac{\partial G}{\partial T}\right)_P = -S$

$\left(\frac{\partial G}{\partial P}\right)_T = V$

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

$\Delta G = V\Delta p$

$\Delta G = nRT(x_A ln x_A + x_B ln x_B)$

$\frac{dP}{dT} = \frac{\Delta_{trans} H}{T\Delta_{trans} V}$

$ln\frac{P^2}{P^1} = \frac{\Delta_{vap} H^o}{R}\left(\frac{1}{T^1} - \frac{1}{T^2}\right)$

$f = c - p + 2$

$p_A = x_A p_A^*$

$p_B = x_B K$, $p_B = m_B K'$

$G = n_A \mu_A + n_B \mu_B$

$\mu_A = \mu_A^* + \ln a_A$

$\mu_B = \mu_B^* + \ln a_B$

$a_j = \gamma_j x_j$

$\Pi = [B]RT$

$\Delta T_f = K_f m_B$

$\Delta T_b = K_b m_B$

$\gamma_\pm = \left(\gamma_+^{\nu_+} \gamma_-^{\nu_-}\right)^{\frac{1}{\nu}}$
$(where\ \nu = \nu_+ + \nu_-)$

$log_{10}\gamma_\pm = -A|z_+ z_-|I^{1/2}$

$I = \frac{1}{2}\sum m_i z_i^2$