

I.

$$\log_{10} P = 7.944 - 3000/T$$

for solids at moderate pressures $a_i = 1$

$$\therefore K_a = f_{H_2O} = P_{H_2O} \text{ since } \phi_{H_2O} = 1$$

$$K_a = 10^{(7.944 - 3000/T)}$$

$$\ln K_a = 2.3026 (7.944 - 3000/T)$$

$$\Delta G = -RT \ln K_a$$

$$\Delta G = -RT [2.3026 (7.944 - 3000/T)]$$

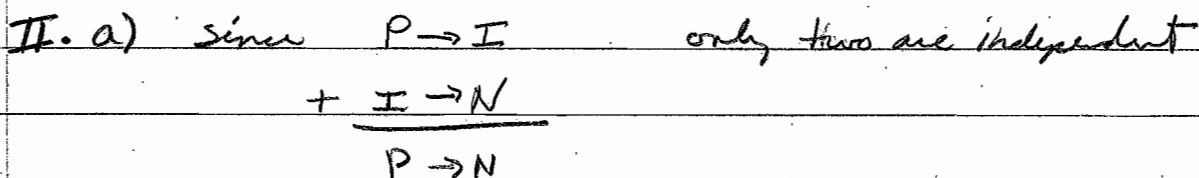
$$\Delta G = -RT (18.29 - 6907.8/T)$$

$$\Delta G = -RT [18.29 - 6907.8/T]$$

$$K_a = 10^x$$

$$\ln K_a = \ln(10)^x$$

$$\ln K_a = x \ln 10$$



$$b) K_{a1} = \frac{y_I}{y_P} = 7.676 \Rightarrow y_I = 7.676 y_P$$

$$K_{a2} = \frac{y_N}{y_P} = 2.165 \Rightarrow y_N = 2.165 y_P$$

$$y_P + y_N + y_I = 1$$

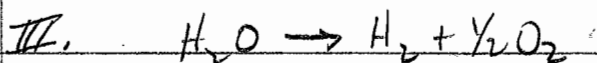
$$7.676 y_P + 2.165 y_P + y_P = 1$$

$$y_P = 0.092$$

$$y_I = 0.200$$

$$y_N = 0.708$$

$$e) K_{a3} = \frac{y_N}{y_I} = \frac{1}{0.200} = 3.545$$



at 25°C

$$2500^\circ K = 4040^\circ F$$

$$\Delta H_{R,25} = +57798$$

$$\Delta G_{R,25} = +54635$$

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

$$\Delta S_{R,25} = +10.608$$

Butter to use
 ~~$C_p = a + bT + \dots$~~

$$\Delta H_{R,2500} = +57798 + (7.7)(2500^{298}) + \frac{1}{2}(8.5)(2500^{298}) - 10.7(2500^{298})$$

$$\Delta H_{R,2500} = 60550$$

$$\Delta S_{R,2500} = 10.608 + [7.7 + \frac{1}{2}(8.5) - 10.7] \ln \frac{2500}{298.16}$$

$$\Delta S_{R,2500} = 16.364 \quad 13.27$$

$$\Delta G_{R,2500} = 60905 - (2500 \text{ K}) (16.364)$$

$$\Delta G_{R,2500} = -27760 = -RT \ln K_A$$

$$K_A = 5.95 \times 10^{-3}$$

$$K_A = 3.74 \times 10^{-3}$$