國立成功大學
111學年度碩士班招生考試試題

編　號：84

系　所：資源工程學系

科　目：熱力學

日　期：0219

節　次：第 2 節

備　註：不可使用計算機

※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

[1] In a binary A-B solution, the activity coefficients of A at temperature T is $\ln \gamma_A = \alpha X_B^2$, in which α is independent of temperature. Please derive that $\ln \gamma_B = A X_A^2$. (20%)

[2] (a) Derive the Clapeyron eequation (b) When the pressure is increased, what happen to the melting temperature of ice? And what happen to the boiling point of water? Explain. (20%)

[3] Consider the gas reaction A+4B→2C+3D at1000°C and P_{tot} = 1atm. The volume ratio of A:B:C:D = 4:3:2:1 before reaction. (a) write down the expression for equilibrium constant at fixed pressure, Kp, in terms of partial pressure of A, P_A. （b）Discuss the effect of total pressure on P_A. (20%)

[4] Please derive (a) $(\delta S / \delta P)_T = - (\delta V / \delta T)_P$　(b) $TdS = C_p dT - T(\delta V / \delta T)_P dP$. (20%)

[5] (a)Explain the second law of thermodynamics, (b) Using the second law, construct a thermodynamic quantity that can be used to determine whether a reaction is spontaneous. (20%)