## 國立臺北科技大學 100 學年度碩士班招生考試

系所組別:3721 有機高分子研究所乙組

第二節 熱力學 試題 (選考)

第一頁 共一頁

## 注意事項:

- 1. 本試題共 4 題,配分共 100 分。
- 2. 請標明大題、子題編號作答,不必抄題。
- 3. 全部答案均須在答案卷之答案欄內作答,否則不予計分。
- 1, For an ideal polymeric rubber, dE=TdS- PdV+ fdL. f is the stretching force with a small deformation dL. Under constant volume and temperature, Prove f=-T(dS/dL) (25%)
- 2.A steel casting [Cp=0.12(BTU)/(1bm)( $^{0}$ F)] weighing 75(1bm) and having a temperature of  $800^{0}$ (F) is quenched in 300(1bm) of oil[Cp=0.6(BTU)/(1bm)( $^{0}$ F)], If there are no heat losses, what is the changes of the entropy of the total system.(25%)
- 3, Prove the following;
- (1), (dT/dV)s=-(dP/dS)v
- (2), Clapeyron equation (8%)
- (3), Gibbs-Duhem equation(for constant T and P). (8%)
- 4,(1), What is the meaning of fugacity and activity coefficient ?(9%)

(9%)

- (2), Explain the second law of thermodynamics. (8%)
- (3), From S=k ln Q,

S is the entropy and Q is the thermodynamic probability. What is the value of Q at zero absolute temperature for a perfect crystal.(8%)

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