國立臺北科技大學 103 學年度碩士班招生考試

系所組別：3721 分子科學與工程系有機高分子碩士班乙組

第三節 熱力學 試題（選考）

注意事項：

1. 本試題共 5 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。

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1. Calculate the entropy change of the following mixing process;

   2 Kg of water at 90°C are mixed with 3 Kg of water at 10 °C in an isolated system. Specific heat capacity of water is 4.18 KJ/Kg K   (25 %)

2. Prove the following equation;   (25 %)

   When we stretchihg a polymer

   Prove (dS/dL)=-(df/dT)

   (dS/dL) is under constant temperature and pressure

   (df/dT) is under constant pressure and length

   L is the length of the polymer

3. Prove the Maxwell relation;   (15 %)

   (dP/dT)=(dS/dV) (7 %)

   (dV/dT)=-(dS/dP) (8 %)

4. Explain the following problems;   (15 %)

   (a) Gibbs- Duhem equation (4 %)

   (b) Partial molar Quantity. (4 %)

   (c) Ideal gas and real gas (4 %)

   (d) three laws of thermodynamics (3 %)

5. (a) Explain How PET and Polylactide can be dissolved by Trifluoroacetic acid (10 %)

   (b)How to choose a solvent to solvate Teflon(-CF2-CF2-)n   (10 %)