

國立臺北科技大學九十七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 (選考) 試題

填准考證號碼

第一頁 共一頁

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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, Answer the following problems ; (25%)

- (a) What is the Carnot cycle?(7)
- (b) What is the partial molar quantity?(6)
- (c) What is the fugacity coefficient?(6)
- (d) What is the second law of thermodynamics?(6)

2, The deformation process is affected by entropy and enthalpy when a rubber band is elongated. What is the major contribution? Entropy or enthalpy? And Why ? (25%)

3. Prove the following equation ; (25%)

- (a) $T=(dU/dS)_v=(dH/dS)_p$ (8)
- (b) $(dT/dV)_s=-(dP/dS)_v$ (8)
- (c) Clapeyron equation ;
 $dP/dT=H/TV$ (where H is the enthalpy changes between the two phases, and V is the volume changes between the two phases.) (9)

4, Air is to be compressed reversibly from an initial condition of 1 atm and 60° F to a final state of 5 atm and 60° F by adiabatic compression followed by cooling at constant volume. Assume air is an ideal gas, and $C_v=5$ and $C_p=7$ Btu/lb mol F.

What is the work required for the total process ?(25%)