

國立臺北科技大學 111 學年度碩士班招生考試

系所組別：3301、3302 材料科學與工程研究所

第一節 普通熱力學 試題

第 1 頁 共 1 頁

注意事項：

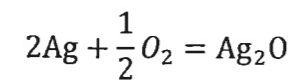
1. 本試題共六題，共 100 分。
2. 不必抄題，作答時請將試題題號及答案依照順序寫在答案卷上。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. Calculate the change of U, H, and S for 2 mole of monatomic ideal gas ($c_v=1.5 R$) from 1 atm, 273 K to 10 atm, 373 K. (30%)

2. Show that (10%)

$$\left(\frac{\partial T}{\partial P}\right)_S = \frac{\alpha VT}{c_P}$$

3. Please calculate the entropy of mixture for 1 mole each of Al, Co, Cr, Mo, and Fe into 5 moles of AlCoCrMoFe high entropy alloy. (20%)
4. Please estimate the oxygen partial pressure when the following reaction achieves chemical equilibrium between silver and silver oxide at room temperature (25 °C). Would you think that Ag can oxidize in air at 1 atm and room temperature? (20%)



$$\Delta G^\circ = -30540 + 66.11 T \text{ (J)}$$

5. Is diamond free of defect? Use the fundamental Law of Thermodynamics to explain. (10%)
6. Explain why the melting point of ice increases or decreases with increasing pressure. (10%)