

國立成功大學

114學年度碩士班招生考試試題

編 號： 68

系 所： 資源工程學系

科 目： 物理化學

日 期： 0211

節 次： 第 3 節

注 意： 1. 可使用計算機
2. 請於答案卷(卡)作答，於
試題上作答，不予計分。

1. An ideal gas at 27°C expands isothermally and reversibly from 1000 to 100 kPa against a pressure that is gradually reduced. Calculate q per mole and w per mole and each of the thermodynamic quantities $\Delta\bar{U}$, $\Delta\bar{G}$, $\Delta\bar{H}$, and $\Delta\bar{S}$. (20%)
2. What is the entropy of mixing of 2 mol of N_2 with 1 mol of O_2 at 298 K? (assuming that they are ideal gases) (10%)
3. The enthalpy of fusion at 273.15K is $6.00 \text{ kJ}\cdot\text{mol}^{-1}$. What is the value of the freezing point constant of water? (10%)
4. Suppose that 2.5 mmol $\text{Ar}_{(\text{g})}$ occupies 72 dm^3 at 25°C and expands to 150 dm^3 . Calculate ΔG for the process. (10%)
5. The enthalpy of vaporization of methanol is $35,270 \text{ J}\cdot\text{mol}^{-1}$ at its normal boiling point of 337 K. Calculate (a) the entropy of vaporization of methanol at this temperature and (b) the entropy change of the surroundings. (10%)
6. What is the standard enthalpy of a reaction for which the equilibrium constant is (a) doubled, (b) halved when the temperature is increased by 15°C at 37°C ? (20%)
7. The vapor pressure of pure liquid A at 20°C is 68,800 Pa and that of pure liquid B is 82,100 Pa. These two compounds form ideal liquid and gaseous mixtures. Consider the equilibrium composition of a mixture in which the mole fraction of A in the vapor is 0.612. Calculate the total pressure of the vapor and the composition of the liquid mixture. (20%)