

淡江大學九十一學年度碩士班招生考試試題

系別：化學工程學系

科目：物理化學

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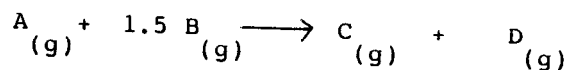
本試題共 士 頁

- 25 points 1. The vapor pressure of a liquid X can be expressed as

$$\log P = 6.2512 - \frac{1526.2}{T} - \frac{41264.4}{T^2}$$

where P is mm Hg. The densities of liquid and vapor phases are 0.752 Kg/dm^3 and $2.14 \times 10^{-4} \text{ Kg/dm}^3$, respectively. If the molecular weight of X is 40 g/mole, calculate heat of vaporization at 478.5 K, the normal boiling point. Use SI units.

- 25 points 2. Calculate $\Delta G_{500 \text{ K}}^{\circ}$ for the reaction



$$\text{if } C_{p,A} = 26.715 + 23.866 \times 10^{-3} T - 50.626 \times 10^{-7} T^2$$

$$C_{p,B} = 25.503 + 13.612 \times 10^{-3} T - 42.556 \times 10^{-7} T^2$$

$$C_{p,C} = 30.204 + 9.933 \times 10^{-3} T + 11.171 \times 10^{-7} T^2$$

$$C_{p,D} = 25.719 + 57.923 \times 10^{-3} T - 380.87 \times 10^{-7} T^2$$

all the values are expressed as $\text{Jmol}^{-1}\text{K}^{-1}$

$$\text{and } \Delta H_{298 \text{ K}}^{\circ} = -518.619 \text{ KJ}, \Delta G_{298 \text{ K}}^{\circ} = -495.946 \text{ KJ}.$$

- 25 points 3. A reactant R undergoes three first-order parallel reactions to give three products B1, B2 and B3. Find the concentrations of B1, B2 and B3 as a function of time t, respectively. The reactions proceed isothermally.
- 25 points 4. An ideal gas is carried through a Carnot cycle. Draw the diagrams of the cycle using (1) P and V, (2) H and T, and (3) S and T as variables, respectively. (4) Specify each path for the cycle.