淡江大學 102 學年度日間部轉學生招生考試試題

系別：化學工程與材料工程學系三年級　科目：物 理 化 學

考試日期:7 月 24 日(星期三) 第 3 節　本試題共 4 大題， 2 頁

本試題雙面印刷

Problem One (20 points)

The work function (the energy required to remove an electron from the metal to infinity) for metallic rubidium is 2.09 eV. Calculate the kinetic energy and the speed of the electrons ejected by light of wavelength 195 nm. 1 eV = 1.60218×10^{-19} J; Plank's constant: h =6.626 x 10^{-34} Js

Problem Two (30 points)

Consider the equilibrium reaction

$$A \longleftrightarrow B$$

The rate constant for the forward reaction is k and that for the backward reaction is k'. If the initial concentration of A is $[A]_0$, and no B is present initially, show that at a time t after the start of the reaction, the concentration of A satisfy the relation:

$$[A]=\frac{k'+ke^{-(k+k')t}}{k'+k}[A]_0$$

Detailed steps for solving the differential equation must be provided.

What is the equilibrium concentration of B?

Problem Three (20 points)

The experimentally determined phase diagrams for the nearly ideal solution of hexane and heptane are given below. (a) For a solution containing 1 mol each of hexane and heptane, estimate the vapour pressure at 70°C when vaporization on reduction of the external pressure just begins. (b) What is the vapour pressure of the solution at 70°C when just one drop of liquid remains. (c) Estimate from the figures the mole fraction of hexane in the liquid and vapour phases for the conditions of part b. (d) At 85°C and 760 Torr, what are the amounts of substance in the liquid and vapour phases when $z_{heptane} = 0.40$?

背面尚有試題

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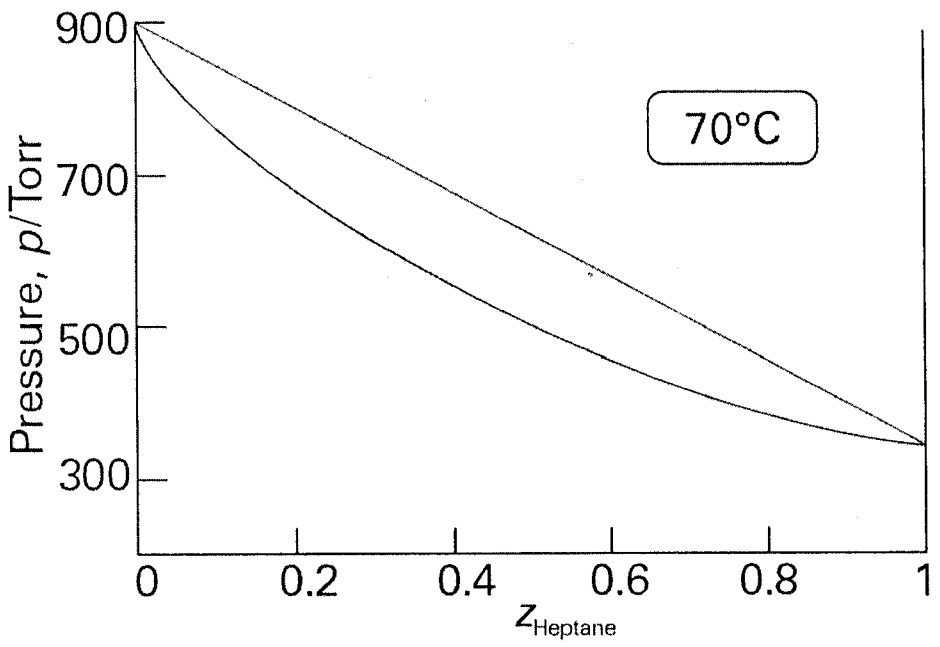

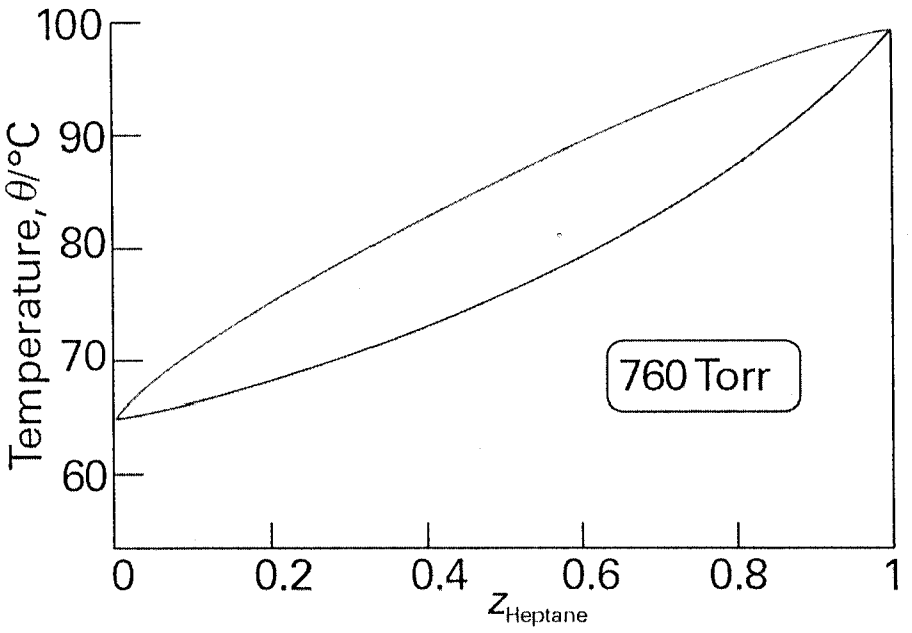

Problem Four (30 points)

Calculate the molar entropy changes of the sample and the surroundings when liquid water is transformed to ice at –5°C and 1.00 atm. The difference in heat capacities between liquid and solid water is 37.3 J K^{-1} mol^{-1}. The enthalpy of fusion at 0°C and 1 atm is 6.01 kJ mol^{-1}.