考生注意事項：

一、考試時間 100 分鐘。

二、可使用不具備翻譯功能之計算機

試題：

一、Which of the following statements is correct？ (20 pts)

(1). Which of the following methods would be used to measure the weight-average molecular weight of a polydisperse specimen of polymer？

(a)viscometry (b)cryoscopy (c)light scattering (d)membrane osmometry。 (5 pts)

(2). Hardening of plastics often involves cross-linking. This process is called？ (5 pts)

(a)Curing　(b)Vulcanisation　(c)Compounding　(d)Plasticization。

(3). Polyurethanes are prepared by reacting: (5 pts)

(a)phenols and aldehydes　(b)alcohols and isocyanates

(c)amines and isocyanates　(d)epoxides and alcohols　。

(4). In emulsion polymerization, the initiator is：(5 pts)

(a)Soluble in monomer　(b)Soluble in water

(c)Insoluble in both　(d)Soluble in both。

二、Please explain the following meaning or definition. (20 pts)

(1).Atactic macromolecule ?   (5 pts)

(2).Flory-Huggins interaction parameter(χ) ? (5 pts)

(3).Second-order transition ? (5 pts)

(4).Rheology ?   (5 pts)

三、(1).Explain the difference between: (a)tensile stress and tensile modulus. (b)creep and stress relaxation ? (10 pts)
(2).What thermal instrumental technique would we use to determine Tg ? (10 pts)

四、An osmotic pressure measurement of a solution of poly(vinyl chloride)(c=1.5×10^{-3}g/cm^3) in toluene at 25℃ (ρ=0.867 g/cm^3) in the apparatus indicated a difference of 4.67mm in the heights of the solution and solution levels.(a) What is the osmotic pressure of the solution ? (7 pts) (b) If the second Virial coefficient for poly(vinyl chloride) in toluene is B=200cm^3/g，calculate the number-average molecular weight of the polymer ? (8 pts)

五、In your own words, explain the difference between step-reaction polymerization and chain-reaction polymerization. (10 pts)

六、Speculate on why polyester clothing is more wrinkle resistant than cotton. Why is a hot iron used to press out the wrinkles ? (5 pts)

七、What is the average degree of polymerization of a sample of polyester prepared from 4-hydroxybenzoic acid if the acid number, determined with standard KOH solution, is 11.2 ? (10 pts)

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