

國立勤益技術學院九十五學年度研究所一般招生筆試試題
卷

所別：材料與化學工程所

組別：材料科技組

科目：高分子科學

准考證號碼：□□□□□□□□ (考生自填)

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
- 三、本試題共八大題

試題一：〈 15 分〉

What are the five major classifications of the polymer industry? Write at least two polymer examples for each classification.

試題二：〈 15 分〉

What would be the number average and weight average molecular weight of a sample of propylene oligomer that consists of 5 mol of pentamer and 10 mol of hexamer?

試題三：〈 15 分〉

The viscosities of a series of solutions of polystyrene in toluene were measured at 25°C and the results obtained are summarized below in Table 1. Determine the viscosity average molecular weight of this polymer. The Mark-Houwink-Sakurada constants for this system are $K=3.80 \times 10^{-5} \text{ cm}^3/\text{g}$ and $a=0.63$.

Table 1. Viscosity measurements obtained for a series of polystyrene solutions in toluene.

Concentration ($\text{g} \cdot \text{l}^{-1}$)	0	2.0	4.0	6.0	8.0	10.0
Viscosity ($10^{-4} \text{ kg} \cdot \text{m}^{-1} \cdot \text{s}^{-1}$)	5.58	6.15	6.47	7.35	7.98	8.64

試題四：〈 10 分〉

Tg of nylon 6,6 is about the double to that of polyester of comparable chain. Why?

試題五：〈 10 分〉

Plasticizers make the polymer flexible and rubbery. Why?

試題六：〈 15 分〉

Compare ion polymerization and free radical polymerization.

試題七：〈 10 分〉

The solubility parameter value for the solvents n-octanol ($\delta = 10.3$), n-butanol ($\delta = 11.4$) and methanol ($\delta = 14.5$) show a increasing trend. Why?

試題八：〈 10 分〉

How many methods can be used to determine the number average molecular weight?