

國立勤益技術學院九十二學年度研究所招生初試試題卷

所別：材料與化學工程研究所 組別： 身分別：一般生及在職生
科目：高分子科學 准考證號碼： (考生自填)

考生注意事項：

- 一、 請先核對考試科目與報考類別是否相符
- 二、 本試題共 7 大題，共 100 分，第 1 題為選擇題，其餘為問答題。請依題號順序於答案卷依序作答 (每題皆務必標示題號)
- 三、 不得攜帶字典、翻譯機及計算機
- 四、 請在試題首頁准考證號碼的方格內，填上自己的准考證號碼，考完後將「答案卷」及考試題」一併繳回

1. Which of the following statements is correct ? (20 %)

(1). Hardening of plastics often involves cross-linking. This process is called (a) Curing (b) Vulcanisation (c) Compounding (d) Plasticization

(2). Which of the following is a branched chain polymer

(a) HDPE (b) Isotactic polypropylene (c) LDPE (d) starch 。

(3). Which one of the following polymers can be prepared by anionic , cationic and free radical polymerization ?

(a) Polyethylene oxide (b) Polyvinyl chloride
(c) Poly(vinyl methyl ether) (d) Polystyrene

(4). Dibutyl phthalate, tricresyl phosphate are all examples of

(a) Antioxidants (b) Plasticizers
(c) Curing agents (d) UV stabilizers

(5). The most inert polymer³ used in non-sticking kitchen ware is

(a) Teflon (b) Melamine resin (c) PVC (d) PMMA

2. Write the name ' structures of the monomers and structures of the polymers needed to synthesize the following terms(1~4) and explanation(5~6) : (24 %)

(1). Nylon 6,6

(2). Polycarbonate (PC)

(3). Polyurethane (PU)

(4). Polyimide (PI)

(5). Living polymer

(6) Solubility parameter

3.(1).What are the three main type of synthetic fibers used to produce fiber reinforced plastic composite materials ?

(2).What thermal instrumental technique would we use to determine T_g ?

(3).If a sample of polypropylene measuring 2 cm elongates to x cm , and the tensile strength is 600 atm , what is the percentage of elongation and the tensile modulus (Mpa) ? (18 %)

4. Explain glass transition temperature and the factors that affect it. (10%)

5. Write out the parameters that made us to distinguish the polymers as elastomer, fiber or plastics ? (10%)

6. For a free copolymerization :

(a) Define the reactivity ratios r_1 and r_2 . (4%)

(b)What arg the relative values for an alternating copolymerization.(4 %)

7. For the synthesis of polyethylene terephthalate (PET) :

(a)Write down the structure of monomers used and polymer formed.(each 2%, total 6%)

(b) If the initial concentration for both monomers is equal and the reaction was carried to 98% conversion. What would be the number averaged degree of polymerization, (4 %)