

# 國立臺北科技大學

## 九十四學年度工程科技研究所博士班入學考試

### 材料科學與工程導論試題

填准考證號碼

第一頁 共一頁

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**注意事項：**

1. 本試題共八題，配分共100分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在答案卷之答案欄內，否則不予計分。

1. Please describe the fundamental difference among polymers, ceramics and metals in terms of the structure, processing and properties. (15%)
2. What is the meaning of "the structure of materials". How do the crystal structures of materials be described and classified? (15%)
3. Describe the possible interactions between an electron beam and the materials. (15%)
4. Describe the different strengthening mechanisms available for engineering materials including polymers, ceramics and metals. Give an example for each mechanism. (15%)
5. One of the major heat treatments of steel is tempering. What is the purpose of tempering? People sometimes confuse tempering with annealing. Please clarify these two terms. (10%)
6. What is the glass transition temperature ( $T_g$ ) ? Explain the change of moduli of polymers at the transition temperature. (10%)
7. How do you distinguish between ferromagnetic and ferrimagnetic materials. (10%)
8. (a) Explain the relationship between transducers and piezoelectric materials. (5%)  
(b) Briefly explain why some transparent materials appear colored while others are colorless. (5%)