

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Explain why covalently bonded materials are generally less dense than ionically or metallically bonded ones. **(10%)**
2. Explain the coordination number and the atomic packing factor of crystal structure. **(10%)**
3. For a given material, explain why the grain boundary energy of a small angle grain boundary is less than for a high angle one. **(10%)**
4. Describe and explain: (a) design stress, (b) safe stress, (c) standard half-cell, (d) random copolymer, (e) invariant point **(20%)**
5. Compare the differences between elastic, anelastic, and plastic deformation behaviors. **(10%)**
6. Explain why body-centered cubic ceramics are typically more brittle than hexagonal closed-packed metals. **(10%)**
7. Describe the crystalline state in polymeric materials. **(10%)**
8. (a) What is a hybrid composite? (b) List two important advantages of hybrid composites over normal fiber composites. **(10%)**
9. Name the three factors that influence the degree to which martensite is formed throughout the cross section of a steel specimen. **(10%)**