

國立成功大學  
111學年度碩士班招生考試試題

編 號：85

系 所：資源工程學系

科 目：材料科學導論

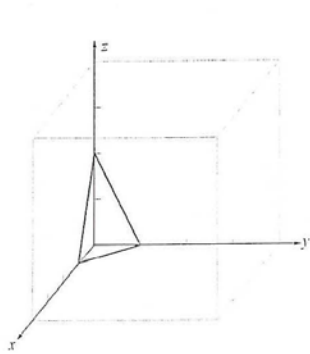
日 期：0219

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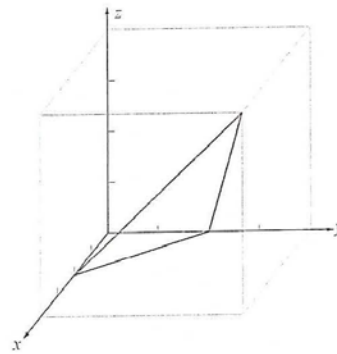
備 註：可使用計算機

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

1. Please plot the schematic engineering stress vs. engineering strain for ceramics and metals. Explain the Young's modulus, yield strength, ultimate tensile stress and toughness based on the curves of the stress vs. strain. (20%)
2. Please explain the meaning of space group I-43m, including the crystal system, Bravais lattice, symmetry element. (15%)
3. Please write the defect reaction equations for the substitution of  $Y_2O_3$  for  $ZrO_2$  in terms of the Schottky and Frenkel defects. (10%)
4. The triangles drawn here are sections of planes through cubic lattices. Identify the relevant planes by their Miller indices. (10%)



(4-a)



(4-b)

5. Please explain the Fick's first law and explain how to increase the diffusion of oxygen ions in solid oxide fuel cell (SOFC). (10%)
6. Please explain and give some examples of the displacive, reconstructive, and order-disorder phase transformations. (15%)
7. Please explain the following items: (20%)
  - (1) Ferroelectricity
  - (2) Ferromagnetism
  - (3) Exsolution
  - (4) Segregation