

國立台灣科技大學九十六學年度碩士班招生試題

系所組別：機械工程系碩士班戊組

科 目：材料特性與應用

總分 100 分

1. Explain why alloy composition would affect the strength of a precipitation hardenable alloy. (10)
2. Determine the Young's modulus of the steel which has upper yield point stress of 207 MPa and yield point strain of 0.001 during a tensile test. (10)
3. Determine the difference between brittle and ductile fracture for materials during mechanical tests. (10)
4. Explain why one would expect to have significant scatter in the fracture strength of ceramic materials. (10)
5. Why are composites common used in the aerospace industry? (10)
6. Compare homogeneous nucleation and heterogeneous nucleation during phase transformations of materials. (10)
7. Calculate the maximum amount of proeutectoid phase that can form when heat treating a plain carbon steel containing 1.2 wt% C. The composition of cementite is 6.7 wt% C and the composition of eutectoid reaction is 0.77 wt% C. (10)
8. Sketch a binary phase diagram containing a simple eutectic. Using this diagram explain what is meant by coring and why it occurs. (10)
9. Write down the following abbreviations in full English and Chinese names: TEM, LED, LCD, IC and DRAM. (20)