

# 大同大學 97 學年度轉學入學考試試題

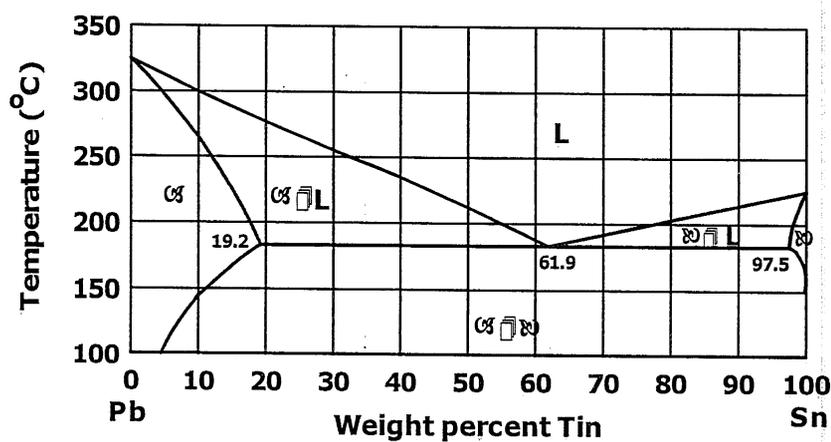
考試科目：材料導論

所別：材料工程學系

第 全 頁

註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 可以使用計算器。

1. Cite some examples to illustrate the following terms: (a) temporary and (b) permanent dipoles. (10%)
2. Why are there no base-centered and face-centered tetragonal lattices? (Use a sketch to answer) (10%)
3. What are the edge, screw and mixed dislocations? (10%)
4. Describe the strengthening mechanisms in metals by grain boundary, solid-solution, precipitation and strain hardening. (10%)
5. A Pb-Sn alloy contains 60wt% pro-eutectic  $\Rightarrow$  and 40wt% eutectic  $\Rightarrow \bar{\alpha} \bar{\beta}$  at a temperature below but very close to the eutectic temperature. Calculate the average composition of this alloy. (10%)



6. Explain the following heat treatments: (a) Martensitic transformations, (b) Tempering, (c) Martempering, and (d) Austempering. (10%)
7. Explain the following hardness tests: Brinell hardness numbers, Vickers hardness number (VHN), Rockwell B, Rockwell C. (10%)
8. Explain why the TTT curves have a characteristic "C" shape. (10%)
9. Describe the possible technical solutions to modify the characteristic hardness and brittleness in white iron. (10%)
10. Define and discuss the differences of failure mechanism among erosion, cavitation and galvanic corrosion. (10%)