

※ 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. Please explain and compare (a) intrinsic semiconductor and (b) extrinsic semiconductor. (10%)
2. (a) Describe and explain Fick's first law, (b) Describe and explain Fick's second laws. (10%)
3. (a) Define engineering stress and engineer strain. (b) Compare the engineering stress and true stress. (10%)
4. Copper has an atomic radius of 0.128 nm, density of 8.89 g/cm³, and an atomic weight of 63.5 g/mol. Determine whether it has an BCC or FCC crystal structure. (10%)
5. Briefly explain (a) Miller indices (b) Lever rule (c) Hardness (d) Tempered Martensite (e) Superconductivity. (10%)
6. Describe simple eutectic phase diagrams. On these diagrams label the various phase regions. Label liquidus, solidus, and solvus lines. (10%)
7. Why a metal having small grains is stronger than one having large grains? (10%)
8. Explain the difference between resolved shear stress and critical resolved shear stress. (10%)
9. Please explain (a) graphite is conductive (b) diamond is not conductive. (10%)
10. If the cold-worked steel is preformed by the annealing treatment. What is the driving force for recrystallization and grain growth? (10%)