

國立金門大學

102學 年 度

電 子 工 程 學 系 碩 士 班 考 試 試 題

工程材料概論

—作答注意事項—

考試時間：90 分鐘

題型題數：

◎問答題共 4 題

配分：

◎問答題每題 25 分，總分 100 分

作答方式：

◎以黑筆或藍筆於「答案紙」作答

祝考試順利

1. (a) A sample of BCC metal was placed in an x-ray diffractometer using X rays with a wavelength of $\lambda = 0.1541$ nm. Diffraction from the $\{221\}$ planes was obtained at $2\theta = 88.838^\circ$. Calculate a value for the lattice constant a for this BCC elemental metal. (Assume first-order diffraction, $n = 1$.)
(b) X rays of an unknown wavelength are diffracted by a gold sample. The 2θ angle was 64.582° for the $\{220\}$ planes. What is the wavelength of the X rays used? (The lattice constant of gold = 0.40788 nm; assume first-order diffraction, $n = 1$.)
2. (a) How is the grain size of polycrystalline materials measured by the ASTM method?
(b) If there are 600 grains per square inch on a photomicrograph of a metal at 100x, what is its ASTM grain-size number?
3. (a) Calculate the atomic packing factor for the FCC structure.
(b) What is the coordination number for the atoms in the FCC crystal structure?
(c) Gold is FCC and has a lattice constant of 0.40788 nm. Calculate a value for the atomic radius of a gold atom in nanometers.
4. What are the 14 Bravais unit cells?

National Sun Yat-sen University
國立金門大學
歷屆試題