

國立宜蘭大學

102 學年度研究所碩士班考試入學

材料科學試題

(化學工程與材料工程學系碩士班)

准考證號碼：

《作答注意事項》

1. 請先檢查准考證號碼、座位號碼及答案卷號碼是否相符。
2. 考試時間：100 分鐘。
3. 本試卷共有 5 題，一題 20 分，共計 100 分。
4. 請將答案寫在答案卷上。
5. 考試中禁止使用大哥大或其他通信設備。
6. 考試後，請將試題卷及答案卷一併繳交。
7. 本考科可使用非程式型（不具備儲存程式功能）之電子計算機。

1. (20%) (a) (10%) What is the dislocation?
(b) (10%) Describe the relative difference of the toughness in terms of three major material types [metal, ceramic, polymer].
2. (20%) What is the value of the coordination number for a body-centered cubic (BCC) structure?(5%) Calculate the atomic packing factor for a BCC structure.(15%)
3. (20%) (a) (10%) Compute the interplanar spacing (d) of diffraction angle of 2θ at 40° (first-order reflection) in an X-ray diffraction experiment (wavelength of X-ray is 0.154 nm)
(b) (10%) Describe how the lever rule and tie lines could be used to calculate the relative amounts of each phase in the phase diagrams of metal alloys.
4. (20%) Explain why residual stresses are introduced into a glass plate when it is cooled?(10%) What treatment could be conducted to remove the residual stress in a great degree?(10%)
5. (20%) (a) (10%) What is the glass transition temperature of polymers?
(b) (10%) What are spherulites in the polymer morphology?