

國立虎尾科技大學 108 學年度第二學期博士班資格考試題

系別：動力機械工程系機械與機電工程博士班

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科目：工程材料

注意事項：

- (1) 本試題共有 5 題，每題 20 分，合計一百分。
- (2) 請依序作答於答案卷上並註明題號，若未註明選答題號及超過規定題數時，謹採計作答順序較前之題目計分。
- (3) 可以使用工程計算機。
- (4) **close book.**

1. Please explain the relationship between the crystallization size and degree of supercooling after solidification of metal materials?
2. Please explain the relationship between cooling rate and transformation of carbon steel?
3. Explain the classifications and features of the semi-solid forming method of magnesium alloys?
4. When the iron atomic radius is 0.1263 nm, the crystal structure is FCC (The Face-centered Cubic Crystal Structure), and when the radius is 0.1241 nm, the crystal structure is BCC. Both the atomic weight is 55.847 g / mol.
 - (1) When the crystal structure is FCC, what is the density of iron (g / cm^3)?
 - (2) When the crystal structure is (crystal structure) BCC, what is the density of iron (g / cm^3)?
5. Titanium (Ti) has the HCP crystal structure, its lattice constant ratio c / a is 1.58, if the atomic radius of titanium is 0.1445nm; try to calculate: (1) the volume of a unit cell? (2) the density of unit cell?