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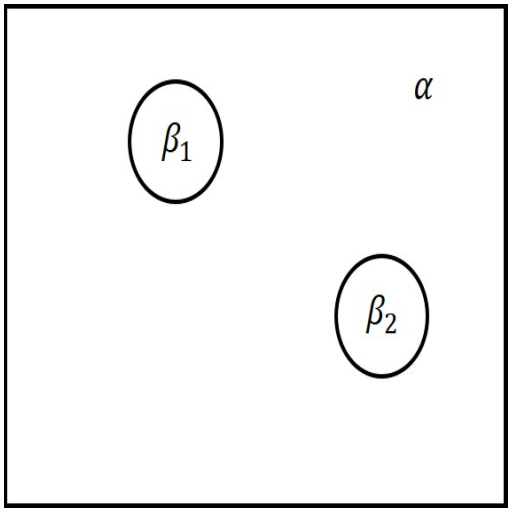
Unit 13 - Week 12

Assignment 12

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2018-10-24, 23:59 IST.

1) A ternary system is shown in the schematic which consists of three phases ($\alpha,\ \beta_1,\ \text{and}\ \beta_2$) with each phases having different crystal structures and compositions $c_\alpha,\ c_{\beta_1},\ c_{\beta_2}$. The minimum number of order parameters required to model this system is



No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 5
(Type: String) five

1 point

2) For the case defined in question 1 which phase field model is suitable? ***1 point***

No, the answer is incorrect.
Score: 0

Accepted Answers:
combination of Cahn-Hilliard and Allen-Cahn

3) The typical polynomial function used to interpolate in such a way that the order parameters and their derivatives go smoothly to one and zero is of order

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 5
(Type: String) five

1 point

4) Consider a polycrystalline system in which each grain is defined with different order parameter ($\eta_1, \eta_2 \ldots \eta_i$). The bulk free energy density of each grain is ***1 point***

- equal
- uniformly increasing
- exponentially decreasing
- cannot be defined

No, the answer is incorrect.
Score: 0

Accepted Answers:
equal

5) The expression for bulk free energy density used by Fan and Chen to model grain growth is ***1 point***

- $\sum_{i=1}^{p} -\frac{\alpha\eta_i^2}{2} + \frac{\beta\eta^4}{4}$
- $\sum_{i=1}^{p} -\frac{\alpha\eta_i^2}{2} + \frac{\beta\eta^4}{4} + \gamma\sum_{i=1}^{p}\sum_{j\neq i}^{p}\eta_i^2\eta_j^2$
- $\sum_{i=1}^{p} -\frac{\alpha\eta_i^2}{2} + \frac{\beta\eta^4}{4} - \gamma\sum_{i=1}^{p}\sum_{j\neq i}^{p}\eta_i^2\eta_j^2$
- $\sum_{i=1}^{p} -\frac{\alpha\eta_i^2}{2} - \frac{\beta\eta^4}{4}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\sum_{i=1}^{p} -\frac{\alpha\eta_i^2}{2} + \frac{\beta\eta^4}{4} + \gamma\sum_{i=1}^{p}\sum_{j\neq i}^{p}\eta_i^2\eta_j^2$

6) In the expression for bulk free energy density written by Fan and Chen (asked in previous question), the condition to be satisfied by the coefficients β and γ is: ***1 point***

- $\beta < \frac{\gamma}{2}$
- $\gamma > \frac{\beta}{2}$

$\beta = \frac{\gamma}{2}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\gamma > \frac{\beta}{2}$

7) For the same expression of bulk free energy density as in previous question, if γ is assumed to be zero (other two coefficients equal to 1), then the total number of minima of free energy for a system described by 'p' order parameters is _____ ? Also, if α = 1.0, β = 1.0 and γ = 1.0, then the number of minima of the same system would be _____ ? ***1 point***

$2p,\ 2^p$

$2^p,\ 2p$

$2,\ 2$

$p^2,\ 2p$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$2^p,\ 2p$

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